

# CRYONICS

## Alcor's CryoTransport Program

4th Qtr. 1999 A PUBLICATION OF THE ALCOR LIFE EXTENSION FOUNDATION Volume 20:4

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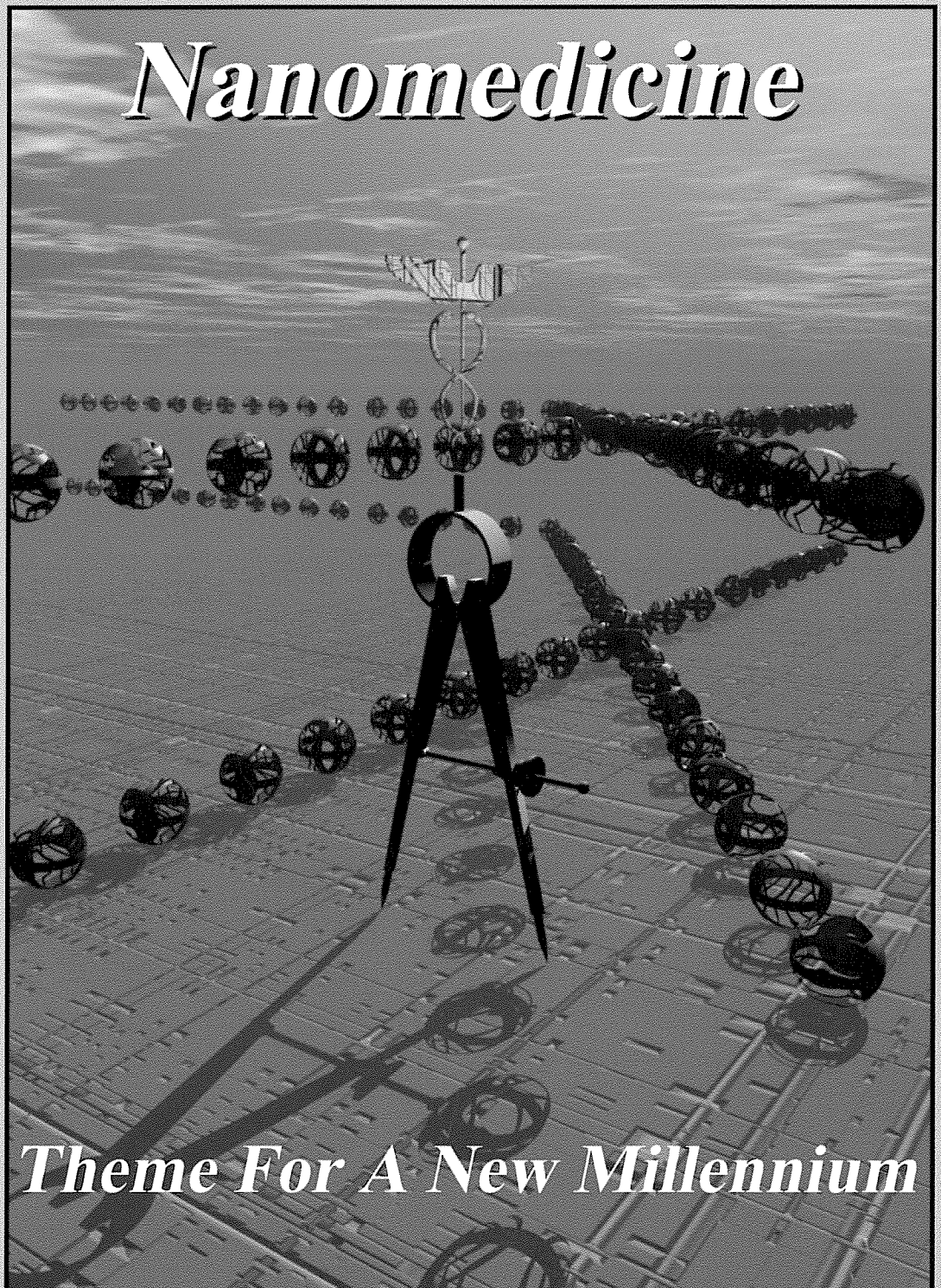
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*When Computers Exceed  
Human Intelligence*

ISSN 1054-4305

\$7.50

# Nanomedicine

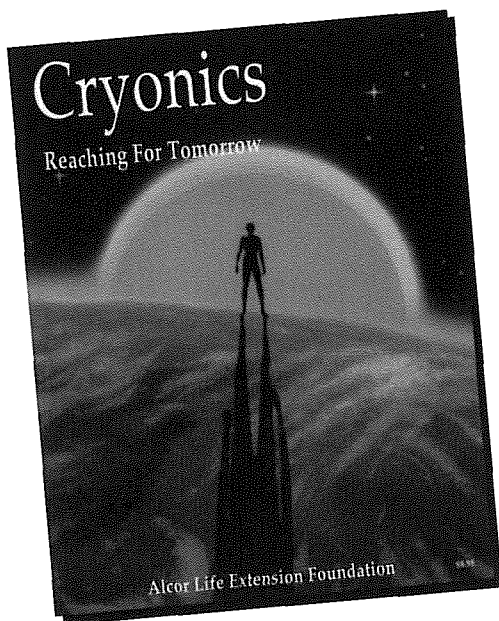


*Theme For A New Millennium*

# “What is cryotransport?”

Cryotransport (cryonics) is the ultra-low-temperature preservation (biostasis or cryostasis) of patients who cannot be maintained in a normal, living state by present day medical practice. The goal is to move these patients into the future (with as little further damage as possible), to a time when cell and tissue repair technology far beyond today's capabilities are readily available, and where a more comprehensive evaluation of these patients' chances can be made, where restoration to full function and health may be a realistic possibility. In principle, this is no different from bringing a seriously ill person out of the jungle and to a modern hospital. Applied to cryotransport, the concept is that the only way “out of the jungle” is to travel forward in time. The “modern hospitals” we need can be reached only by traveling decades into the future.

As human knowledge and medical technology continue to expand, people who today are considered hopeless will be easily restored to health. Throughout history, this has been the hallmark of the medical progress. Rapidly evolving control of biological and molecular structures promises to soon permit the synthesis of medical devices far smaller than living cells. Through molecular repair, these devices should be able to eliminate virtually all of today's diseases and allow us to intervene in the aging process, ultimately “curing” and eliminating it. These technologies will also allow us to attempt the repair and recovery of patients waiting in cryostasis. The challenge for us today is to devise techniques that will give these patients the best chances for survival.



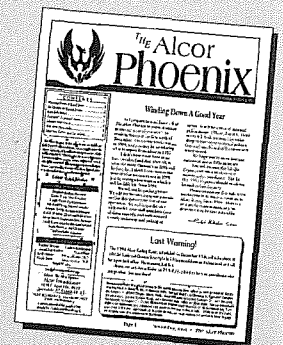
## “How do I find out more?”

The best source of detailed introductory information about cryotransport 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 cryotransport techniques, in pursuit of a perfected “suspended animation” technology.

*Cryonics: Reaching For Tomorrow* features a lengthy chapter on the possibilities for recovery and restoration to life, 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. Supplies are limited. This detailed book is available on Alcor's website (<http://www.alcor.org>) in a more current form than the hard copies currently available.

## For those considering Alcor Membership. . .

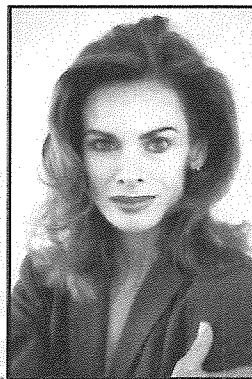
If you're intrigued with cryotransport and Alcor, and are considering Membership, you will want to review the section in *Cryonics* magazine titled *Alcor Update*. It now replaces Alcor's membership newsletter, *The Alcor Phoenix*, formerly available only through Membership or a separate subscription. *Alcor Update* focuses on Membership issues such as financing cryotransport, staff and management activities, developments in Patient Care and Emergency Response, etc. These issues will affect you directly if you decide to become a Member, so *Alcor Update* can help you make a more informed decision in the meantime.







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# Evolution

is inescapable and *Cryonics* is changing, taking *The Alcor Phoenix* into its covers, providing Alcor Members with a single, unified quarterly publication.

We're also bringing "LifeQuest" back. It started in 1987 as a semiannual collection of short stories, mostly cryotransport but including far reaching visions of the future. Selected reprints appear in this issue; we're also seeking new contributors.

LifePact is another topic which needs more attention. Our attempts to travel to the future are more likely to live up to our expectations if we plan well, not leaving details to chance. Video self-interviews, wealth preservation, and agreements among individuals to serve as mutual "guardian angels" for each other are just a few of the elements of a fully developed "LifePact" program.

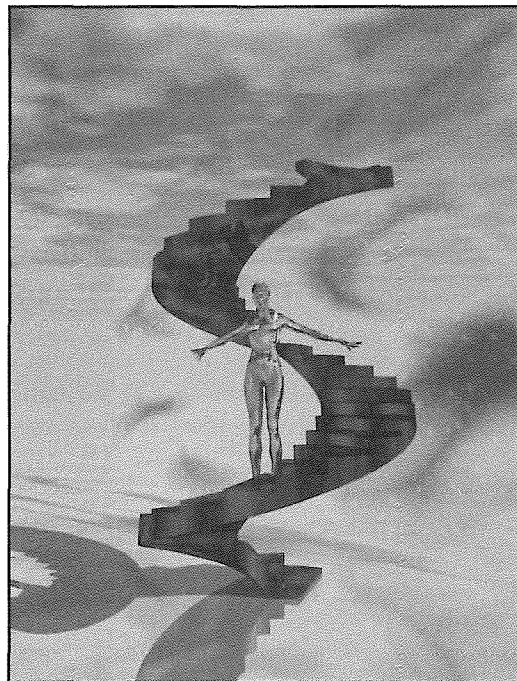
Major events like Extro-4 will be covered, along with Foresight Institute and A4M conferences. Updates on BioTransport Inc. will be provided, as it takes on the job of cryotransport rescue for Alcor and other groups. We will also bring you news about research which directly relates to cryotransport operations, and advances in protocols.

Columns by Mike Perry and Thomas Donaldson will continue, along with more coverage of art forms such as those by Natasha Vita-More and Tim Hubley. Let us know how you like the balance, and, send us your own contributions!

Fred & Linda Chamberlain

## Mark Your Calendars Today! The Fourth Alcor Conference on Life Extension Technologies

June 17-18 of the Year 2000  
**Asilomar Conference Center**  
**Northern California**



ART BY TIM HUBLEY

Full Details on Pages  
4 through 7,  
including  
registration forms and  
"Super Early Bird"  
discounts prior to  
December 1, 1999

*You may also register for  
this conference at the Super  
Early Bird Rate  
during the A4M  
Conference at the Tropicana  
Hotel  
in Las Vegas  
December 11-13, 1999,  
if you are also registered for  
the A4M Conference.*

### CRYONICS

is a quarterly publication of the Alcor Life Extension Foundation

Co-Editors  
Fred & Linda Chamberlain

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4th Qtr 1999

ISSN 1054-1305

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Submissions may be sent via e-mail (fred@alcor.org or linda@alcor.org) in ASCII, Word, or PageMaker format. Mailed submissions should include a PC diskette with the file in any previously mentioned format (although printed text alone will be considered). All submitted media become property of the Alcor Life Extension Foundation unless accompanied by a self-addressed stamped envelope. The Alcor Life Extension Foundation assumes no responsibility for unsolicited manuscripts, photographs, or art. Send all correspondence and submissions to:

Cryonics Magazine  
Alcor Life Extension Foundation  
7895 E. Acoma Dr., Suite 110  
Scottsdale, AZ 85260

### ABOUT THE COVER

CGI art by Tim Hubley



# LETTERS TO THE EDITORS

Letters to the Editors are welcome, with counterpoint on various topics and suggestions as to content. We especially invite questions about cryotransport (cryonics) which are original and far-reaching.

If your questions deal with introductory aspects, they will likely be included in a "Frequently Asked Questions" section. If they touch on developmental programs within Alcor, you'll stir us into talking about them even sooner

than we might have otherwise.

If your letter is lengthy and involved, we may use it as a separate article or even ask you if you'd like to expand on it. We need your ideas, your personal visions. This is the place to start.

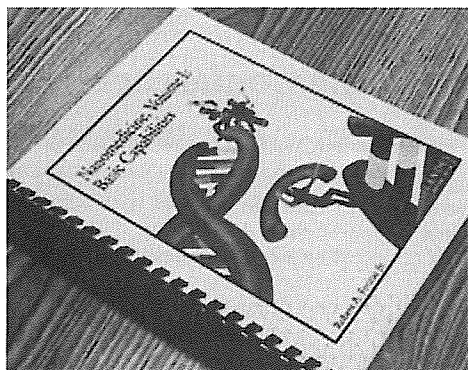
## NANOMEDICINE, Volume I

*The first of a three volume technology series by Robert A Freitas, Jr.*

Now "in print" (almost)

The pictures you see below, mixed in with the text quoted are from a galley of *Nanomedicine, Volume I*, sent to us by the Publisher prior to printing of the bound volumes. They give you only the barest glimpse of the encyclopedic nature of this book, and no way to fully grasp the creative potential of the ideas it contains.

The first few copies in final form are expected to be available for the Foresight Conference in October, according to the Publisher, but the quantities will be extremely limited (as the schedule now stands). A few weeks later, there should be plenty of them, but if you are at the Foresight Conference and see *Nanomedicine* sitting on a table for sale, it might be a good idea to buy one right away, or plan to wait a little while longer.

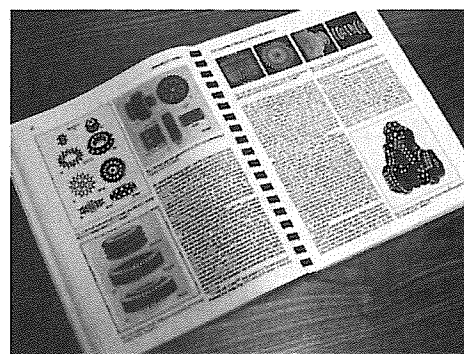


This is an extraordinary book in many ways, but particularly from the point of view of the open statement of possible application to the recovery of persons cryotransported to the future. With the Publisher's permission, we are reprinting the following final paragraphs of the "Afterword" section. Some of the ideas will be familiar to you, but they are stated with a depth of background unlike anything we have seen before (the extraordinary detail of the preceding chapters, in which the scope of application to medical repair becomes strikingly apparent).

Now, you may enjoy the conclusion, even before you probe the depths of what *Nanomedicine* has to offer. We think anyone with even a slightly positive outlook on the future of cryotransport will want a copy of this book. And, anyone who wants to see the shape of what medicine will look like as the next few decades roll by, will want to have a copy too!

*(FROM THE "AFTERWORD",  
WITH PERMISSION.)*

**"A New Medical Technology And  
A New Era of Medicine**



"We are left, then, with a fairly clear set of conclusions. Living systems exist. Living systems can usually heal and cure their own injuries, unless those injuries are severe enough to prevent the living system from functioning. Too often, we suffer injuries that are indeed this severe. Molecular nanotechnology is feasible. As we master the ability to design molecular machines that can continue to function when the living system around them has failed, those molecular machines can restore the function of the living system. They can support and sustain the processes of the living system until that living system can once again function on its own. Whether this is done by a temporary assist from respirocytes or by any of the

(Continued on page 16)

**June 17-18, 2000: Mark Your Calendars Today!**

**Speakers:**

- Glenna Burmer, MD, PhD**  
LifeSpan BioSciences
- Fred Chamberlain**  
BioTransport, Inc.
- K. Eric Drexler, PhD**  
Foresight Institute
- Gregory Fahy, PhD**  
21<sup>st</sup> Century Medicine, Inc.
- James Hughes, PhD**  
Univ. Chicago, Dept. Medicine
- Ralph Merkle, PhD**  
Foresight Institute
- Richard Morales, MD**  
Private Practice
- Natasha Vita-More**  
Author, Artist
- Robert T. Newport, MD**  
BioTransport, Inc.
- Tomas A. Prolla, PhD**  
Univ. of Wisconsin
- Gregory Stock, PhD**  
UCLA, School of Medicine
- Michael West, PhD**  
Advanced Cell Technology, Inc.
- Brian Wowk, PhD**  
21<sup>st</sup> Century Medicine

# Fourth Alcor Conference on Life Extension Technologies

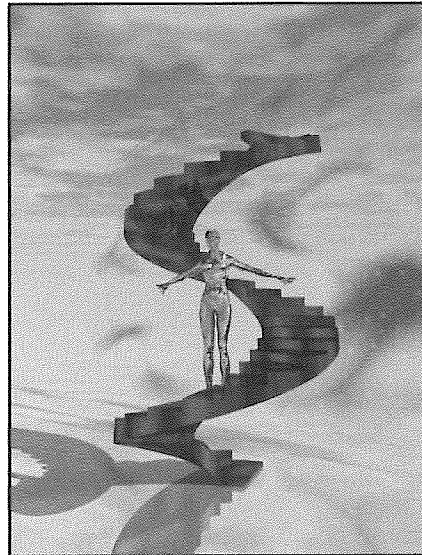
[www.alcor.org](http://www.alcor.org)

The world is changing rapidly. Only a few years ago, most people considered the cloning of mammals to be no more than science fiction. Repeated successes in this area, however, have made it a reality today.

More importantly, medical technologies like cloning and the use of embryonic stem cells to regenerate tissues, promise to make it possible to reverse all the major degenerative diseases within our own lifetimes. Even aging itself is under very heavy attack by today's biological and medical technologies.

The Fourth Alcor Conference on Life Extension Technologies is a meeting of scientists, technologists and individuals who are working in fields leading toward the expansion of human health and longevity.

This conference will cover topics relevant to these pursuits.



**ART BY TIM HUBLEY**

*After dinner on Saturday Night, Natasha Vita-More will present an overview of her current book project, "A Talent for Living", after which she will lead a panel discussion on "Cracking the Myth of Mortality" (panelists to be announced.)*

**Primary Sponsor:**

Alcor Life Extension Foundation

**Co-Sponsor:**

Foresight Institute

**Academic Sponsors:**

American Academy of Anti-Aging Medicine  
Medicina Interna Gerontogeriatría y Medicina Anti-Envejecimiento, A.C.

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NanoTechnology Magazine

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Life Extension Vitamin Supplies

**Patrons of the Conference:**

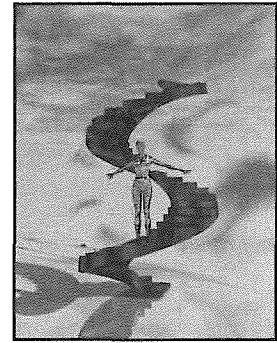
Steve Bridge	Gary Meade, Esq.
Fred Chamberlain	Irene Olberz
Linda Chamberlain	Charles Reddeck
David Greenstein, OD	Michael Riskin, CPA, PhD
Ravin Jain, MD	Corrine Serra
Eric King	Austin Tupler
Philip Longpre	





# Conference Registration

## The Fourth Alcor Conference on Life Extension Technologies



*Print or Type - Fax or Mail to:*  
**Alcor Life Extension Foundation,  
 7895 E. Acoma Dr. Suite 110, Scottsdale, AZ 85260  
 FAX: 480-922-9027 VOICE: 877-GO ALCOR (toll-free)  
 www.alcor.org (Register On-line)**

Name: \_\_\_\_\_ Day Phone ( \_\_\_\_\_ ) \_\_\_\_\_  
Last First MI

Address: \_\_\_\_\_ Eve Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

City: \_\_\_\_\_ Fax Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ email add: ( \_\_\_\_\_ ) \_\_\_\_\_

How did you hear about this conference?      Alcor publications      Alcor Web Site      NanoTechnology Magazine  
     Mailing      A<sup>4</sup>M magazine

Other: \_\_\_\_\_

**Register Early and Save!**

30% Discount off any fee below for Alcor Life Members  
 10% Discount off any fee below for Regular Alcor Members

	Per Person	If Registered:
Super Early Bird Special	\$200	<i>before December 1, 1999</i>
Early Bird Special	\$250	<i>before March 1, 2000</i>
General Registration	\$300	<i>before June 1, 2000</i>
At Door	\$400	<i>after June 10, 2000</i>

This Conference Registration fee is in addition to the cost of the lodging package, which must be reserved directly through Asilomar (see next page or see the Alcor web site.)

Make checks payable to "Alcor". Checks and bank drafts must be in U.S. dollars drawn on a U.S. bank.

Because our own staff needs to travel to Asilomar, we cannot make online or fax registrations after Friday, June 9, 2000. After that time, registrations must be made at the door.

Fee x Number of Attendees = Amount Enclosed \$ \_\_\_\_\_

Use your VISA or MasterCard to register online on our secure server ([www.alcor.org](http://www.alcor.org)).

Name as it appears on credit card: \_\_\_\_\_

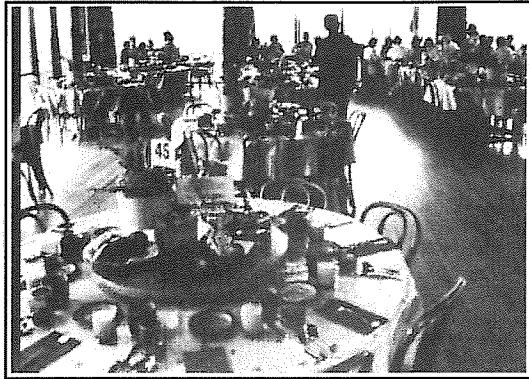
VISA or MasterCard Number: \_\_\_\_\_

Expiration Date (Month/Year): \_\_\_\_\_

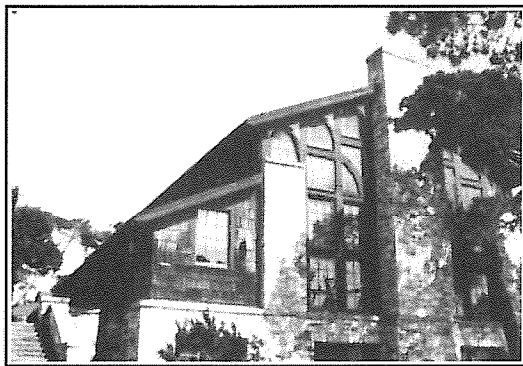
For your convenience, it is not recommended that registrations be mailed after June 1, 2000. Any registrations not received prior to June 9 will not be processed (and attendees will have to make new registration at the door, at that price.

Refunds of registration fees are subject to a \$50 administrative fee, which must be requested in writing, postmarked before May 15, 2000.

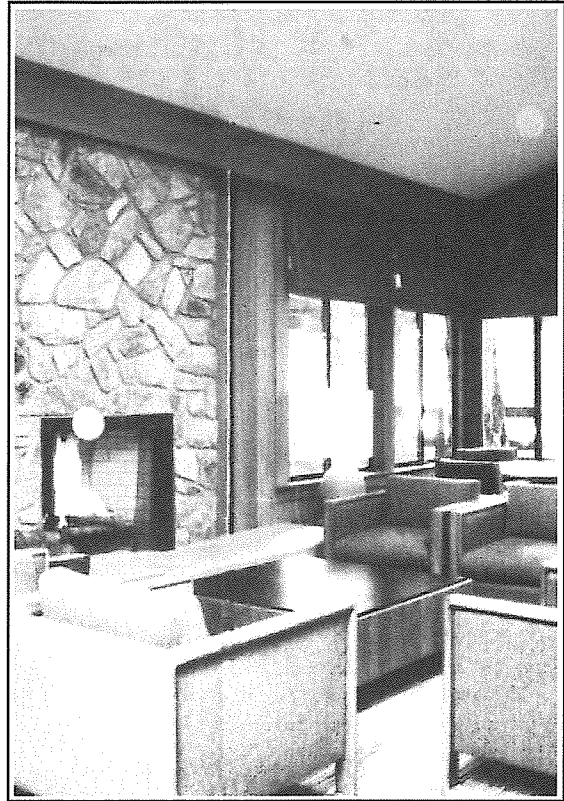
# Asilomar Conference Center Monterey Peninsula, Northern California USA



Conference groups are seated together at meals, around large circular tables in a huge, vaulted ceiling dining hall.



Modern, Glass/Stone/Wood Condos, Near the Beach



Conversation Areas Throughout the Condo Complex

## On-site Lodging and Meals Package:

Includes three excellent cafeteria-style meals each day, maid service, and use of swimming pool. Prices dictated by accommodations selected.

Non-conference guest reservations accepted.

## To Register for Conference:

Includes Social on Friday evening, June 16, 2000, after dinner Panel on Saturday evening, and presentations on Saturday and Sunday. The Conference will conclude with two tracks on Sunday afternoon, June 18.

**Why Register Early?** Asilomar is a special, secluded environment that is highly sought after for conferences. They tend to sell out all rooms far in advance. Alcor was on a waiting list for one year before we received a confirmed date for this conference. Part of our contract with Asilomar is that we need to estimate the number of lodging rooms and meals 180 days in advance in order to make them available to attendees, and we have to guarantee the number of rooms 30 days in advance (or incur charges).

Staying on-site at Asilomar is a memorable experience. Once you are there, meals are included and very convenient. There is no driving and no hurry. Everything is close and convenient. Attendees who want to bring their families find it to be a wonderful vacation for non-attendees. Attendees and their families can come early or stay late to enjoy the general Monterey Peninsula and take advantage of Asilomar's economical food and lodging package. But reservations must be made well in advance.

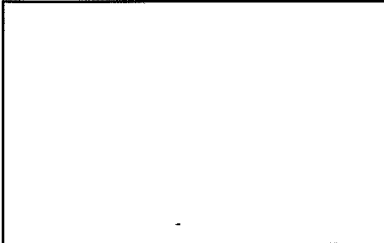
Don't be disappointed by trying to make reservations at the last minute only to learn that they no longer have accommodations that will fit your needs - or worse, that they are sold out completely. Save money, as well, by registering for the Conference in advance. Take advantage of the Super Early Bird Special! Register on-line today.



# ASILOMAR CONFERENCE CENTER HOUSING REGISTRATION FORM

Asilomar Use Only

Please type or print clearly. One form per person please.



Name of conference: **ALCOR FOUNDATION #232390**

Arrive: **June 16, 2000** Depart: **June 19, 2000**

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Business Phone: \_\_\_\_\_ Home Phone: \_\_\_\_\_

I am a male: \_\_\_\_\_ female: \_\_\_\_\_ Fax Number: \_\_\_\_\_

## HOUSING RATES & INFORMATION Full Time Participation ONLY

Rates are for Three (3) night(s) and include all meals beginning with dinner on the first day and ending with lunch on the last day.  
Check in: 3PM Check out: 12 noon

Housing Type: Please indicate first and second choice. Rooms are assigned on a first come, first served basis.  
If your room choice is not available, you will be reassigned and the appropriate room charge will apply.

RATES ARE PER PERSON & INCLUDE HOUSING, TAX AND MEALS FOR COMPLETE CONFERENCE				
(Three Nights, nine meals!)	Single Room (per person)	Double Room (per person)	¼ to a room (per adult)	Youth Rate (Ages 3 – 17)
Deluxe	\$413.00	\$260.00	\$212.00	\$155.00
Historic	\$332.00	\$230.00		

\_\_\_\_\_ Please assign a roommate for me

\_\_\_\_\_ I will share a room with \_\_\_\_\_

(Your roommate's registration must be received 30 days prior to arrival or another roommate will be assigned)

Vegetarian \_\_\_\_\_

Disability access required \_\_\_\_\_ Disability \_\_\_\_\_

To secure your room reservation for above dates, mail this form with check for full payment by  
April 14, 2000 or fax with Credit Card # \_\_\_\_\_

If you need additional information about Asilomar call (831) 372-8016

Asilomar Conference Center  
P.O. Box 537 Pacific Grove, CA 93950  
Fax: (831) 642-4261

**PURCHASE ORDERS and TELEPHONE RESERVATIONS WILL NOT BE ACCEPTED!**  
**FAXED RESERVATIONS ACCEPTED ONLY WITH CREDIT CARD PAYMENT. PLEASE FAX ANY CHANGES**

Method of Payment: Check \_\_\_\_\_ Payable to DNPS at Asilomar Credit Card (Visa or Master Card only) \_\_\_\_\_

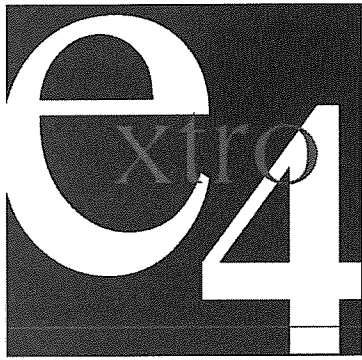
Visa # \_\_\_\_\_ Expiration \_\_\_\_\_

Master Card # \_\_\_\_\_ Expiration \_\_\_\_\_

Card Holder Signature \_\_\_\_\_

**Asilomar Policies:** Asilomar will bill your credit card upon receipt & confirmation will be sent later. Any housing concerns call (831) 642-4218, 4219

1. No smoking allowed in sleeping or meeting rooms. Also there are no TVs or phones in the rooms.
2. All rates are for full time participation and include housing, tax and meals
3. Any charges accrued with the processing of foreign checks or sending faxes overseas will be the responsibility of the conference attendee.
4. All cancellations are subject to a \$25 per person processing fee. Cancellation after April 14 is subject to forfeiture of all fees if space is not resold. In the case of cancellation on the day of arrival or early departure, all fees are forfeited.



## EXTROPY INSTITUTE

Renowned for bringing brilliant minds together for the past decade, continues its legacy.

by Natasha Vita-More

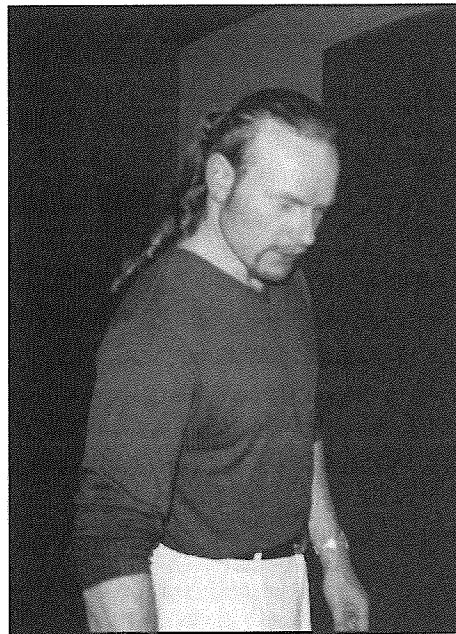


**Biotech Futures: Challenges of Life Extension and Genetic Engineering**, Extropy Institute's EXTRO 4 Conference (August 7-8 at the University of California, Berkeley), succeeded in bringing together the latest biotechnological research and an extropian spin on our emerging culture. Rather than taking a relaxed stance on the fringe of biotechnology, Extropy Institute has one foot in the mainstream. By commanding a presence as a philosophical organization and also maintaining a distinctly optimistic view of the continuing co-evolution of humans and technology, Extropy Institute's mission continues to encourage informed and critical discussion to maximize the benefits and minimize the problems of rapid and dramatic change.

What makes Extropy Institute's conference different from the numerous other conferences on life extension and biotechnology? It's underlying approach: Extropy Institute's goal in producing conferences is not only to educate and exhibition innovative ideas, but also to instill a sense of community. In that extropian thinking is a philosophy, the major concern is how individuals and society learn and how to ask questions and discern between information and biased reasoning. Extropy Institute is a

mentoring organization for other transhumanist groups and welcomes and encourages the growth of transhumanism.

While Extropy Institute is known for taking a progressive and even daring approach to our future, the future has been catching up. Many ideas that a decade ago were extreme and even revolutionary are now becoming mainstream. (See *Scientific American* "Your Bionic Future" and *Business Week* "21 Ideas for the 21<sup>st</sup> Century") But putting these ideas into action and into the mainstream requires a different type of proficiency. Communicating ideas effectively to a wide audience is a skill; espe-



Max More

cially when the goal is to have the audience comprehend and even want to be influenced by the ideas. We cannot do this by ticking off our adversaries. We need now, more than ever, to be heard. This doesn't mean that we have to conform to the norm, or change our position on issues. It does mean that we can deal openly and effectively with the issues that are important to carry out—slowing down aging and ultimately overcoming death. Biotechnology is a subject that needs a strong philosophical and cultural direction. Extropy Institute is capable of providing such a direction.

*The interface between the short term and the long term and the visions of humanity's most imaginative and creative explorers and the mainstream provided the over-all dynamic for much of the action at EXTRO 4. This became clear to me during the conference as many in the audience perceived reluctance by the mainstream researchers to discuss the really revolutionary potential of biotechnologies that are just around the corner.*

— Max More



## **EXTRO 4 covered the following topics:**

- Leading research into understanding and controlling the aging process.
- Identifying priorities for continued research; improving communication among researchers; improving research funding.
- Debating the desirability of extending the maximum human life span.
- Should genetic engineering be limited to disease prevention and correction or also used for augmentation of healthy function?
- Who should own genetic information?
- Reports from representatives of transhumanist organizations around the world.
- How to effectively communicate transhumanist ideas and respond to common objections regarding life extension and genetic engineering.

### **Biotech Futures: Challenges of Life Extension and Genetic Engineering**

Saturday morning started off with an introduction "Biotech Futures: Utopias, Dystopias, and Extropia" by Max More, and followed with a series of presentations of cutting edge work by university and corporate longevity researchers. The genetics of aging, telomeres, stem cells, research goals, effective interventions, and nanotechnological approaches to aging intervention.

### **Morning Sessions: RESEARCH: THE STATE OF THE ART**

9:20-9:50am: **Prof. Judith Campisi**, Head of the Department of Cell and Molecular Biology and Group Leader, Aging and Cancer Research, Berkeley National Laboratory. "**The Cellular and Molecular Biology of Senescence.**"

9:50-10:20am: **Roy L. Walford, M.D., UCLA**, "**Mechanisms of Aging As Seen Through the Caloric Restriction Spyglass.**"

10:30-11:05am: **Calvin Harley, Ph.D.**, Chief Scientist, Geron Corporation. "**Telomerase, Pluripotent Stem Cells, and Nuclear Reprogramming: Three Complementary Technologies to Address Diseases of Aging.**"

11:05-11:35am: **Prof. Cynthia Kenyon**, Dept. of Biochemistry and Biophysics, University of California, San Francisco. "**Hormonal Control of Aging in C. elegans.**"

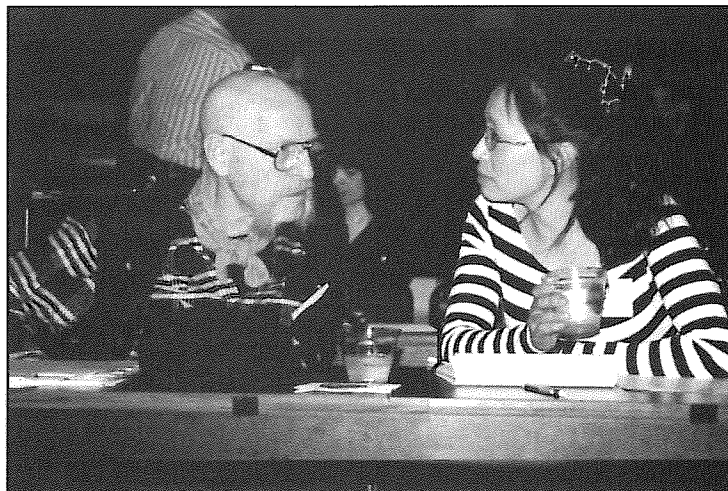
11:40am-12:10pm: **Gregory Stock, Ph.D., UCLA**. "**Aging Research: Milestones and Prizes**"

12:10-12:50pm: **Targeting The Nemesis**: Scientists collaborate to identify research pathways and marshal the resources to win the war against death. Introduced and moderated by Robert J. Bradbury.

*Great conference! Interesting bits of marginal discourse—which I mean as a complement—in the new high culture coming down the line. I enjoyed giving my talk and the enthusiasm I received. — Roy Walford*

*Roy Walford's presentation really stood out because it was the first time many people were able to audience to Dr. Walford's first hand story of Biosphere and Calorie Restriction. He is an icon. — Anonymous*

*Prof Cynthia Kenyon was great. She spoke very eloquently yet simply so that*



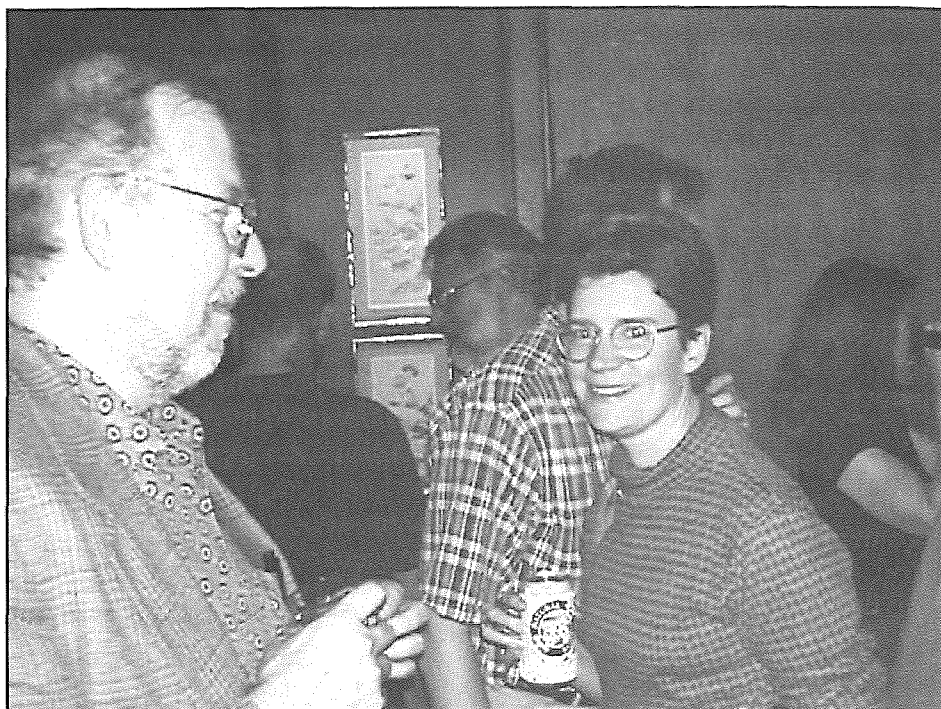
*Roy Walford & Nicki Freeman*

everyone could understand the complex nature of her work. She did make it seem easy to program the DNA sequence back into the cell, which seems to be very difficult in larger specimens. Hearing experts from main-line medicine is so reassuring since I do get a fair amount of skepticism from doctors that I work with, like, "That could never happen." — Rhonda Iacuzzo

Having the chief scientist of Geron was a plus for Extro 4. The company is uniquely combing research breakthroughs in stem cells, telomerase, and nuclear transfer techniques used in cloning. — Max More

[Greg] Stock said that several active areas of medical research could open up significant advances in understanding the causes of aging. But few researchers are focused on using hormone therapy — or our newfound understanding of the human genome — to fight death in the long term, rather than just the short term. "Most of the work being done now is focused on specific diseases," Stock said. "It could happen very quickly if we did it as a war on aging." — Wired Online, Giovanni McClellan

Lunch was held at an adjacent building in a large room with large windows and bright summer light. The banquet was cornucopian and



Greg Bear & Christine Peterson

healthy (veggie burgers, fruits, chicken) and the room itself was spacious. Although there were no vending machines around, Derek Strong had the foresight to supply his campus dorm room with plenty of food at the onset of the conference. Lucky for everyone else he did—Derek's Extronexus emergency room became a hospitable alternative to the standard university water fountain.

#### Afternoon Sessions:

#### ON THE VERGE: MEDICINE

2:20-3:05pm: **Christopher Heward, Ph.D., Director of Research and Development, Kronos.** "The Science of Aging Management."

3:15-4:15pm: **Robert J. Bradbury, President, Aeveos Corporation:** "Genomes, Biobots, and Nanobots: Implications for 21st Century Medicine."

#### ON THE VERGE: HORIZONS

4:25-4:55pm: **Natasha Vita-More: Founder Transhumanist Arts:** "DNA Breakout! A Sensorial Mix."

5:0-5:50pm: **Greg Bear** "Who We Think We Are: Living Forever, Without Confusion" and **Vernor Vinge, Ph.D.:** "The Near and the Far"

*I thought Chris Heward's talk was great because finally there is going to be something practical out here putting the knowledge to work for people. There will be risks, but I feel positive that there is something we can do for ourselves with a customized program based on individual bio-statistics.*

— Niki Ailing Freeman



*Natasha Vita-More's talk made me think about enjoying and experiencing more of life. Too much research takes away from reasons why we are even at these conferences. We are here because we want to learn more and meet people. We should enjoy being alive and think of ways to really extend our senses. Natasha's biotech images were really great. — Niki Ailing Freeman*

*Greg Bear and Vernor Vinge—an entertaining duo—communicated with ease what the future holds from the eye of such creative imagination making it easy to accept and integrate into how I fit personally into the future. And, yet they left it wide open for my own imagination. — Leigh Christian*

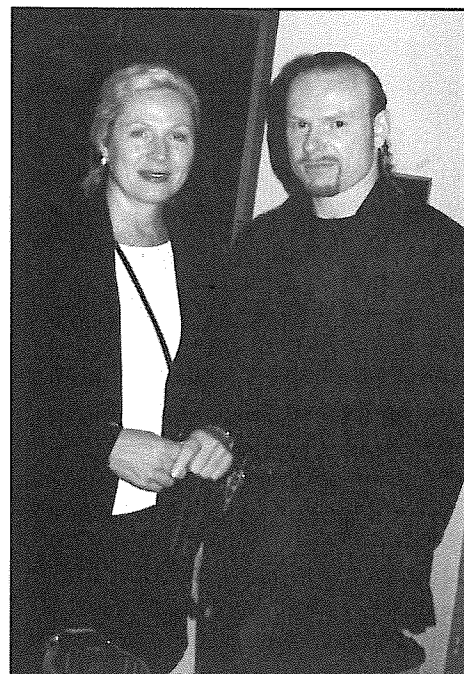
**8:0-9:0pm: Keynote: — Max More, Ph.D.: “The Ultrahuman**

**Revolution: Amendments to the Human Constitution.”**

Max More began his keynote speech, “The Ultrahuman Revolution: Amendments to the Human Constitution” by reading his letter addressed to Mother Nature. The letter, read with a wry humor yet serious intent, began by thanking Mother Nature for all the wonderful qualities of being human. Then it continued:

“What you have made us is glorious, yet deeply flawed. You seem to have lost interest in our further evolution some 100,000 years ago. Or perhaps you have been biding your time, waiting for us to take the next step ourselves. Either way, we have reached our childhood’s end. We have decided that it is time to amend the human constitution.”

Max’s letter went on to outline seven amendments to the human

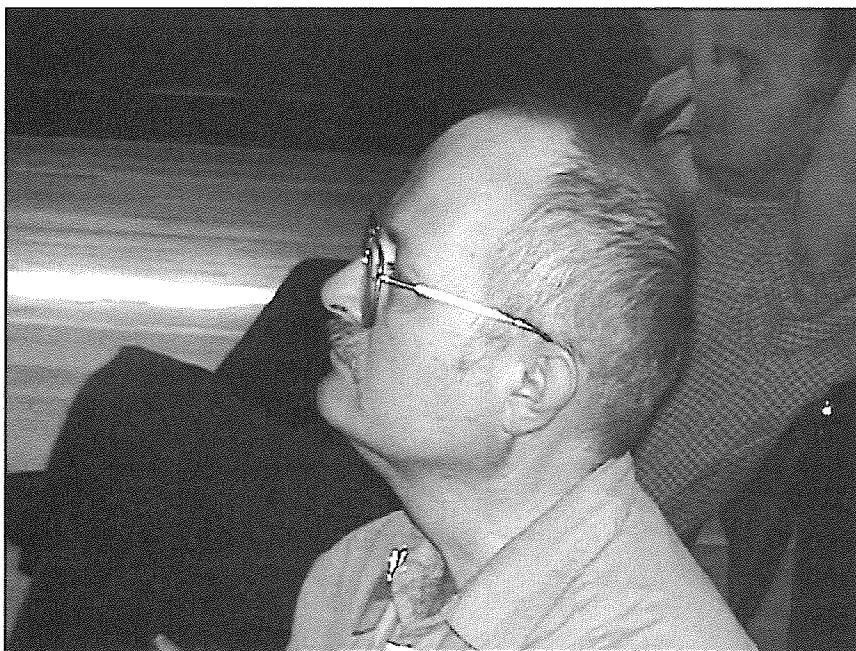


*Leigh & Max*

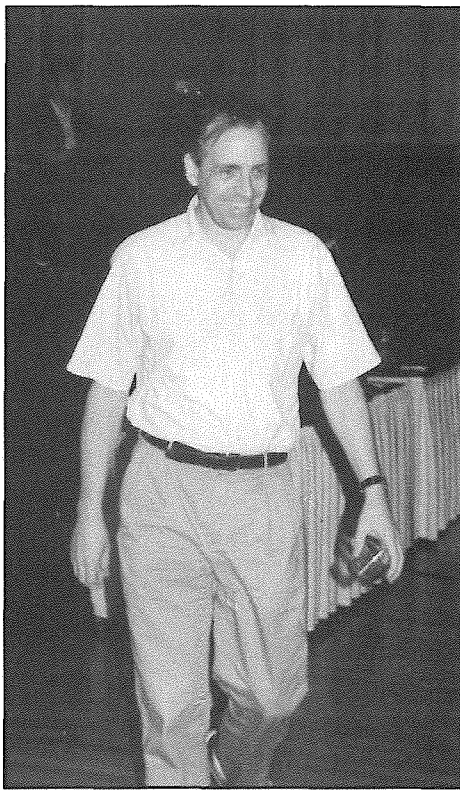
constitution that we will pursue beginning, of course, with this one: “We will no longer tolerate the tyranny of aging and death. Through genetic alterations, cellular manipulations, synthetic organs, and any necessary means, we will endow ourselves with enduring vitality and no expiration date. We will each decide for ourselves how long we shall live.”

After the powerful applause died down, Max noted that we were entering a biotech or “ultrahuman” (or “transhuman”) revolution that, like its Copernican, Darwinian, and Freudian predecessors, shocks and discomforts us yet expands our understanding and accelerates our progress.

After rousing the audience, Max then carefully analyzed several memetic sources of resistance to the changes that we as extropians favor: The Zero-Sum Assumption involves the view that all improvements come at a high cost, so we should leave things unchanged,



*Vernor Vinge*



Eric Drexler

especially human nature. He noted how this assumption often stems from single-track thinking where people assume that the change under discussion will happen in isolation. Next, Max explained “The Ideology of Natural”, and dissected several senses of the word “natural” to show how most “but it’s not natural” objections slide from one sense to another and involve either false assumptions or ethically ignoble values. The

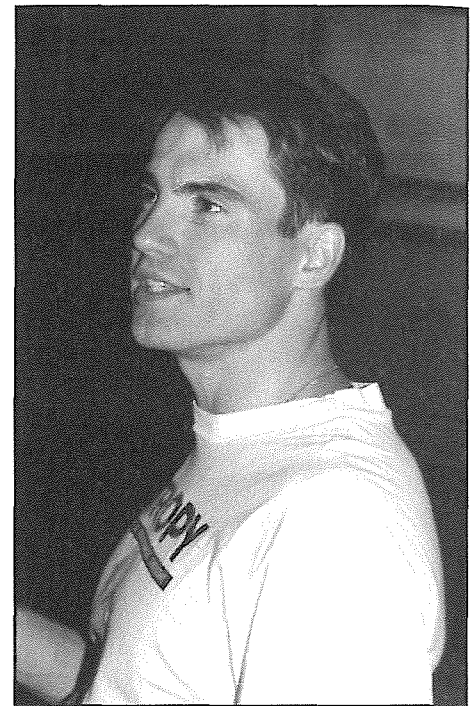
“Treatment vs. Augmentation Dogma” was the third source of resistance, this one being common even among biotechnology researchers such as gene therapy pioneer W. French Anderson.

In addition to pulling apart these entropic meme complexes, Max went on to outline how extropian thinking embodies values and virtues. We can not only show where those opposed to amending the human constitution go wrong in their thinking, we can attract them by making clear our positive values and worldview.

During his talk, Max noted that the opponents of genetic alteration in plants (far from the controversies involving humans!) have moved from words to action—the “Lodi Loppers” and the “Croatistas” have taken to direct acts of destruction. Since Max’s talk these attacks have continued, making his final call to action to oppose the underlying ideas all the more urgent.

**Speaker & Patron Reception:**

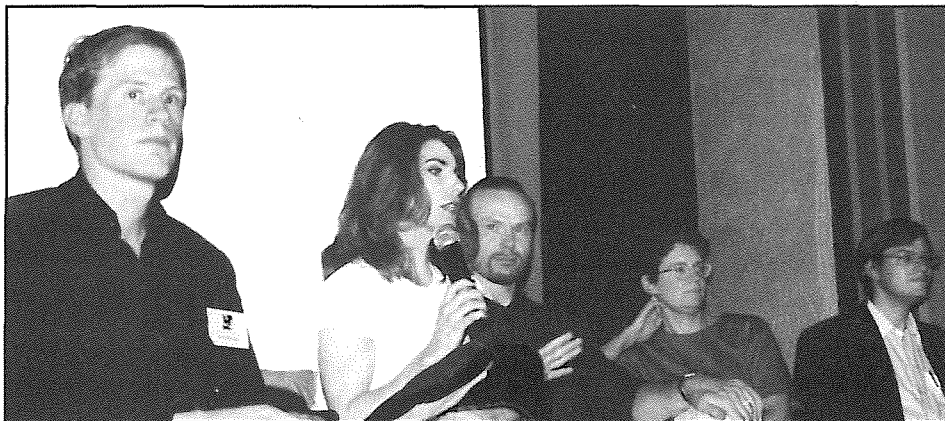
The conference reception Saturday night was held at the Durant Hotel. With a couple of cases of Cham-



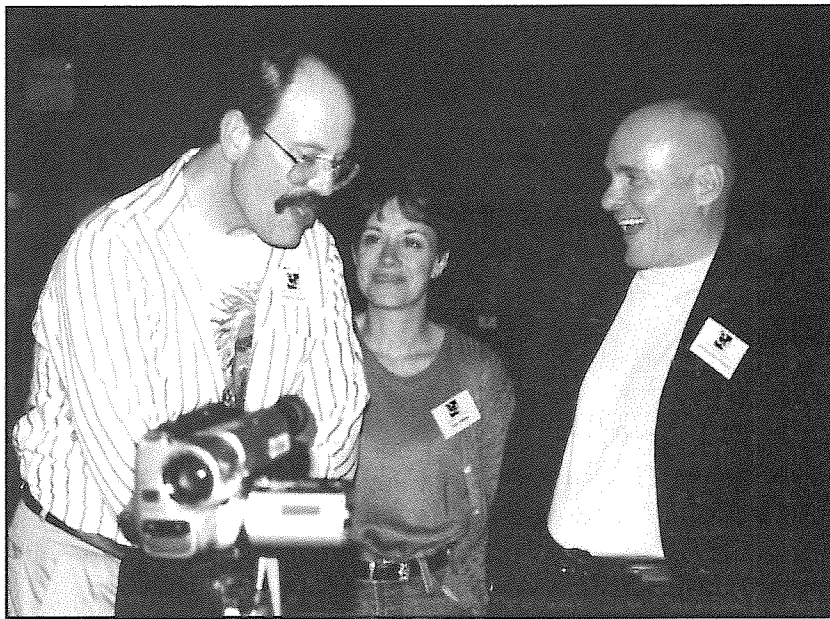
Tom Bell

pagne, strawberries, chocolates and late night ambiance, the room was packed with furtive conversation and frivolity. Roy Walford mingled with Ronald Bailey. Greg Burch, Jose Salgado and Beatrix Montero Hafemann and Tanya Jones took pictures. Greg Stock, Chris Heward and Steve Coles huddled together by the frig. Simon Levy, Tom Bell and Max More chatted away undisturbed. Eric Drexler and Christine Peterson arrived in good humor and there was also Fred Molton, Robert Bradbury. Greg Bear and Vernor Vinge seemed to be enjoying the cookies, and David McFadzean, Montero Hafemann, David Croft the champagne. The night went by with lots of laughter and mingling until finally, around 2:00 a.m., the last guests quietly meandered down the hallways of the Durant Hotel.

*Saturday night at Natasha and Max More’s reception, I was able to relax and “stretch my mental legs” in a way*



Nick Bostrom, Natasha Vita-More, Max More, Chris Peterson & Anders Sandberg



Greg Burch, Pam Feeley & Chris Heward

*that's just not possible with any other group of people. — Greg Burch*

**SUNDAY, August 8: *Altering Genes, Preparing Culture***

**Morning sessions. Genetic Engineering: Technological Trends, Ethical Issues:**

8:45-9:50am: **John H. Campbell, Professor of Neurobiology, UCLA School of Medicine: "HuGE Prospects for Human**



Tanya Jones & Hara Ra

**Germline Engineering."**

10:0-11:15am: **Prof. Michael Shapiro, University of Southern California Law School: "The Technology of Perfection and the Perfection of Technology."**

11:25pm-12:40pm: **Who Owns Your Genes? Kate H. Murashige, Ph.D., Partner, Morrison & Foerster. Introduced by Prof. Tom W. Bell, Chapman University School of Law. Should patents be**

issued for genetic information? Is this necessary to provide incentives for research? Should patents cover structural information or only discoveries based on identifying function?



Anders Sandberg & Natasha

**Afternoon sessions: Waking Up the World!**

2:0-2:40pm: **Gregory F. Burch and the Textropians: "Timeline for Technological Developments."**

*Michael Shapiro - level headed thinking, practical, great sense of humor, but still forward thinking. — Spike Jones (He was a real hero—making it to the Conference arriving in the early hour of the morning and then presenting such a knowledgeable speech.)*

*The interface between the short term and the long term and the visions of humanity's most imaginative and creative explorers and*





Jose Salgado & Beatrix Hafemann

*the mainstream provided the over-all dynamic for much of the action at EXTRO 4. This became clear to me during the conference as many in the audience perceived a reluctance by the mainstream researchers to discuss the really revolutionary potential of biotechnologies that are just around the corner. This was foremost in my mind when I addressed the group as part of a panel discussion on effectively communicating transhumanist ideas. How can we best explain to the wider world why breaking through to the real potential inherent in genetic engineer-*



Journalists

*ing is a good thing? How can we explain that fear of change is the real enemy? How can we explain that humanity does in fact have the wisdom to use these powerful new tools to do good? — Greg Burch*

**2:45-3:35pm: Reports from the Front:** Progress reports from several organizations in the USA and abroad on their activities in preparing our culture for biotechnological revolutions.

- Max More of Extropy Institute
- Anders Sandberg from Aleph in Sweden
- Natasha Vita-More of the Extropic Art Movement
- Christine Peterson of the Foresight Institute
- Nicholas Bostrom of the World Transhumanist Association in England

*It was a most stimulating event, I have more notes and ideas for projects, texts,*

*webpages and things to do than I have ever had thanks to this meeting. — Anders Sandberg*

*I enjoyed each moment, even the behind scenes tampering with lights, stage, lunch tickets and seating and simply observing the conference as it unfolded so smoothly. Being associate producer of Extro 4 was an honor. — Natasha Vita-More*

*Extro 4 was great. I enjoyed the people and the topics and felt it was a huge success. — Christine Peterson*

*The Extro conferences are a magnet for transhumanists from all over the world. They take a break from their individual pursuits and come to California to meet up face-to-face with their colleagues to discuss and criticize each other's ideas. It's an exciting time to be alive, when we are just beginning to catch some glimpses of what the future might hold in store for us. Somebody took a poll and asked people who had a cryonics contract to raise a hand. There were many hands in the air. It looked like 50% were already signed up.*

— Nick Bostrom

**3:45-4:30pm: Getting Up To Speed! — Effective Communication** (panel discussion/seminar): Careful listening to fears about life extension and genetic



Lunchtable

engineering. How not to respond. Effective responses to common objections. Short presentations followed by open microphone. (Please sign up for 2-5 minutes open mike.)

**Closing statement, "Where to From Here?": 4:30pm (approx).**

Closing comments were witty and topical: Tom Bell, Peter Passaro, Natasha Vita-More, Alex Bokov, and Chris Peterson for Dan Fylstra.

May we continue to express ourselves and to listen to others. This is an intrapersonal intelligence, and one that will indeed come in handy as we continue to flow into the mainstream.

Sunday's closing comments by Max More received a standing ovation. Max did it again!

\*\*\*\*\*

*I also wanted to let both of you know how much I enjoyed the Extro-4 Conference. It was my first and I really enjoyed it. I had not realized how large a conference it would be or how much work it must have required to put it together. I really appreciate gatherings like this. It is so optimistic, and makes all our lives feel worthwhile. Thanks again, to you both,*

for a wonderful glimpse of the future. Mike Korn:

*"For myself, the future is a life and death struggle. Extropians represents the positive choice in that struggle. Extropians is an affirmation of Life, its creative power, its quality, and its extension." (Mike Korn's quote)*

The Extro-conferences are currently the number one live forum for *discussing humankind's future.* Nick Bostrom

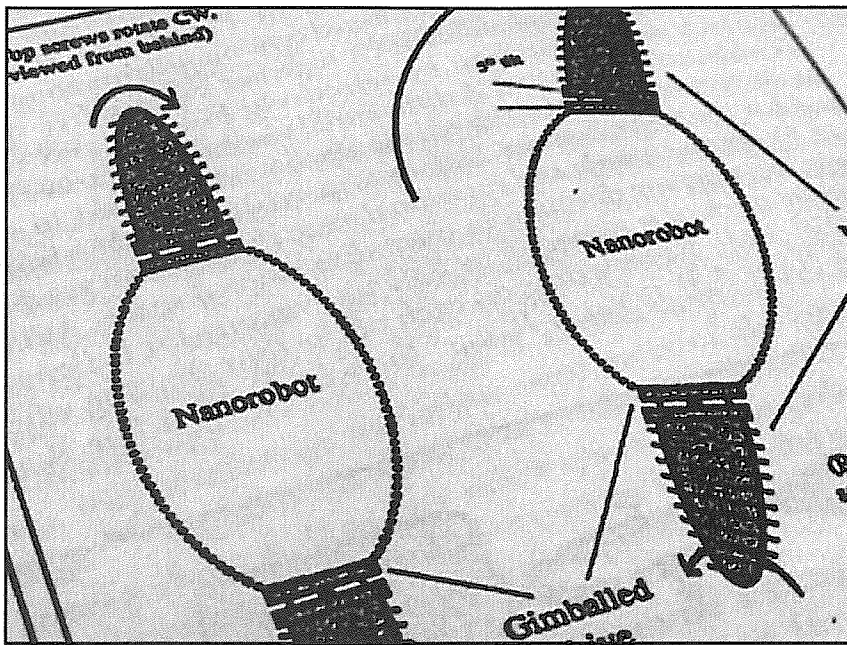
*Expands your mind until even the entire universe barely fits in it any more.* Tihamer Toth-Fejel:

*This wonderful weekend in "Berserkely" was as educational as nearly 2 years of reading the posts. I now see why the concepts we see on this list deserve to be taken seriously.* Spike Jones

*...and I forgot to mention one of the best features of this conference I hope is repeated: being greeted on arrival by the stunning Leigh Christian.* Lee Daniel Crocker



Eric Watt Foryste & Suna



(Nanorobots designed to "swim" in the circulatory system)

(Continued from page 3)

myriad other techniques discussed in *Nanomedicine*, the underlying message is clear: life and health can be restored and sustained in the face of greater injury, greater damage, greater trauma, and greater dysfunction than has ever before been realized. This will usher in a new era in medicine--an era in which health and long life will be the usual state of affairs while sickness, debility and death will be mercifully rare exceptions.

"The future capabilities of nanomedicine give hope and inspiration to those of us who still have decades of life to look forward to, but some are not so fortunate. Many others who rightfully should live several decades more might find that chance cuts short their expected time. Heart attacks and cancer can strike us down even in the prime of our lives. They do not always wait their turn and politely arrive only when expected. How can today's dying patient take advantage of a future medical technology that is as yet only described in a handful of theoretical publications? How can we

preserve the physical structure of our bodies well enough to permit that future medical technology to restore our health?

"The extraordinary medical prospects ahead of us have renewed interest in a proposal made long ago: that the dying patient could be frozen, then stored at the temperature of liquid nitrogen for decades or even centuries until the necessary medical technology to restore health is developed. Called cryonics, this service is now available from several companies. Because final proof that this will work must wait until after we have developed a medical technology based on the foundation of a mature nanotechnology, the procedure is experimental. We cannot prove today that medical technology will (or will not) be able to reverse freezing injury 100 years from now. But the patient dying today must choose whether to join the experimental group or the control group. The luxury of waiting for a definitive answer before choosing is simply not available. So the decision must be

made today, on the basis of incomplete information. We already know what happens to the control group. The outcome for the experimental group has not yet been confirmed. But given the wonderful advances that we see coming, it seems likely that we should be able to reverse freezing injury--especially when that injury is minimized by the rapid introduction through the vascular system of cryoprotectants and other chemicals to cushion the tissues against further injury.

### Conclusion

"The development of nanomedicine depends on us: what we do and how rapidly we do it. Research is not done by a faceless "them," nor is it something that happens spontaneously and without any human intervention. It is done by and supported by people. Unless we decide to support and pursue this research, it won't happen. How long it takes to develop depends on us. We are not idle bystanders watching the world go by. We are a part of it. If we sit and wait for someone else to develop this technology, it will happen much more slowly. If we jump in and work to make it happen, it will happen sooner. And developing a life saving medical technology within our lifetimes seems like a very good idea--certainly better than the alternative."

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Last item on reference list!  
(Number 3728)



**Alcor's Mission:  
The Preservation  
of Individual Lives**

**Medical Director:**

Thomas Munson, MD

**Medical**

**Advisory Board:**

G. Mario Isidron, MD  
Ravin Jain, MD  
Robert R. Newport, MD  
Anthony Pizarro, MD

**Scientific**

**Advisory Board:**

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Bart Kosko, PhD  
James B. Lewis, PhD  
Ralph Merkle, PhD  
Marvin Minsky, PhD

**Patient Care**

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Gary S. Meade, Esq  
Carlos Mondragon  
Warren Robertson, CPA  
Robert A. Schwarz

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Linda Chamberlain  
Hugh Hixon  
Ralph Merkle, PhD  
Gary Meade, Esq  
Michael Riskin, CPA, PhD

**Advisors to the  
Alcor Board:**

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David Greenstein, OD  
Joe Hovey  
Carlos Mondragon  
Judy Muhlestein  
Mark Muhlestein  
Robert R. Newport, MD  
Stephen Van Sickle

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Fred Chamberlain  
Vice President:  
Stephen Bridge  
Treasurer:  
Michael Riskin, CPA, PhD  
Secretary:  
Linda Chamberlain

# Alcor UpDate



## The Alcor Phoenix Newsletter Becomes Part of Cryonics Magazine

Alcor started publishing *The Alcor Phoenix* in January, 1994. In "issue number zero", Editor Ralph Whelan wrote: "We plan to start 1994 with Volume 13, Number 1 of *Cryonics* magazine (its first quarterly release), followed in February by Volume 1, Number 1 of *The Alcor Phoenix*, our new members' newsletter."

Ralph went on to say: "As we've seen over the past year, cryonics can come on rocky times even when the legal and bureaucratic battles are in a lull. Alcor is the largest cryonics organization in the world, and this contributes to the stability and safety that Alcor members enjoy, but growth also isolates us and makes it more difficult for us to all know one another on a personal basis. Since the technology of cryonics is about saving lives, it is a very personal service Alcor offers. We cannot afford to become de-personalized by growth."

*The Alcor Phoenix* was born to more directly involve the Members in the issues and occasional battles with which the staff and directors were then confronted.

After publishing two separate information sources for five years, an analysis of the benefits versus the cost and personnel requirements has made us reevaluate the need for separate publications.

Starting with this issue, *The Alcor Phoenix* is incorporated as an inner section of *Cryonics* as *Alcor UpDate*. It will continue to be much the same in content as *The Alcor Phoenix*, covering current

events and progress of the organization which are of interest to you as a member.

We recommend that Alcor Members scan "UpDate" as soon as *Cryonics* arrives. If there are items of interest concerning your arrangements and/or rescue services, this is where you will find them.

Those who were subscribing to both publications will receive an extension of their subscriptions, to compensate for the change. However, the trend will be toward more total information and content. The convenience will be in having only four Alcor publications per year arrive in the mail.

We hope readers will enjoy the new format of *Cryonics* magazine and help contribute to it. We are expanding the scope of the magazine to appeal to the interests of a broader cross section of our Members and readers, such as having more art and literature. Your comments about areas you would like to see covered in *Cryonics* will be appreciated.

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# Changes Bring New Strengths to Alcor Board of Directors

by Linda Chamberlain, ACT-A, ACT-B, EMT

Executive Director



At the September 12, 1999 meeting of the Alcor Board of Directors, Derek Ryan and Mark Voelker elected not to run for re-election, due to conflicts with their employment and demands on their time. Dave Pizer had resigned from the Alcor Board in May of this year for personal reasons.

Although Derek Ryan only served on the Alcor Board for one year, he was Membership Administrator at Alcor Central from 1992 to 1996. Derek edited *The Alcor Phoenix*, participated in many cryotransport operations during his period as an Alcor Staff Member, and most recently made major upgrades to the Alcor Website, while serving as an Alcor Director from the Northern California area.

Mark Voelker, PhD joined the Alcor Board of Directors in September of 1992 and also served as Alcor's Director of Research. For the last several years, he served as Alcor's Vice President.

Dave Pizer had served on the Alcor Board since 1990, holding the position of Treasurer for many years. He was centrally involved with the acquisition of Alcor's present building, and was Alcor's Vice President for several years after its move to Scottsdale, Arizona, during which his primary efforts were devoted to fund raising.

The many contributions made by all three of these past Directors have been important to Alcor's growth and are appreciated.

Although three seats are available on the Alcor Board of Directors at this time, the Board left these seats open at its recent annual meeting. The reasons relate to Alcor's practice of first appointing Board candidates as non-



Kat Cotter, D.C.

voting Board Advisors (separate from the Medical and Scientific Advisory Boards), who then participate in Board matters and decision making for an extended period of time prior to being elected as voting Directors

This Board Advisory program gives Alcor (1) a broader base of knowledge and expertise at the Board level when making critical decisions, (2) it better addresses the need to fill vacancies on the Board from time to time, and (3) it permits the Board to retain inputs from those who formerly served as Officers or Directors, without the increasing the size of the Board.

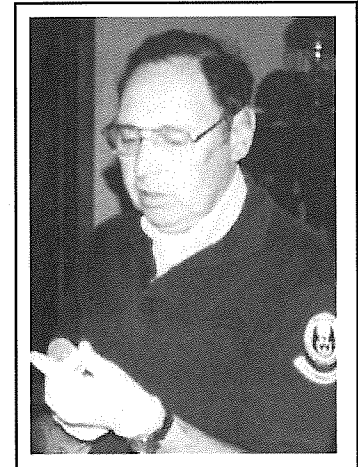
Finally, most basically, the Board Advisor system allows an Advisor to become familiar with duties and issues of Alcor Directors, prior to shouldering this level of fiduciary responsibility. It also allows active Alcor Directors to get to know and better assess candidates for a year or more, before bringing them onto the Board.

Alcor's Board Advisor program is an important component of Alcor's evolution and stability.

None of the current Board Advisors felt they could serve on the Board of

Directors at this time. However, two new Members joined the Advisory Board, with the express purpose of becoming candidates for the Alcor Board of Directors at the next annual meeting in September of 2000.

Dr. Cotter, one of the two new Board Advisors, is a very active member of the Alcor CryoTransport Team in southern California. In addition to earning both the Basic and the Advanced ACT certifications, Dr. Cotter has also taken the Alcor surgical training in order to assist the surgical team during cryoprotection operations.



David Greenstein, O.D.

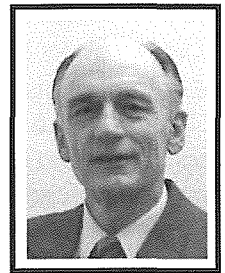
Dr. Greenstein is the other new Board Advisor elected at Alcor's September meeting. Dr. Greenstein has been an active member of the New England group for many years, and became a certified ACT-B in 1998.

These two new members of the Alcor Advisory Board bring important new strength and experience to its Board of Directors.



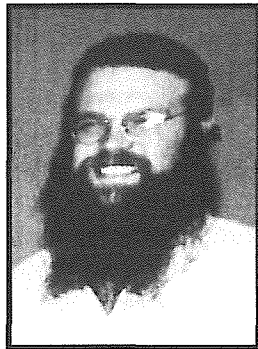
# Changes Within Alcor Staff Reflect Growth and Preparation for the Challenge of Activating BioTransport, Inc.

by Fred Chamberlain, ACT-A, ACT-B, EMT, President / CEO



## BRIAN SHOCK RESIGNS AS ALCOR'S MEMBERSHIP ADMINISTRATOR

After just about four years as Alcor's Membership Administrator (from August, 1995 to August, 1999), Brian Shock resigned his position.



Brian Shock

In 1995, Brian replaced Derek Ryan as Membership Manager, leaving his home in Indianapolis, Indiana to

take on the challenging job of keeping track of Alcor's current members and signing up new ones. He also took over as Alcor's Webmaster and made major upgrades to our home page.

For the last two years Brian was editor of Alcor's quarterly magazine, *Cryonics*. He put the magazine back on schedule, and significantly increased its quality and interest level for most members.

Brian moved on to other employment in Arizona, but remains on Alcor's cryotransport team. We hope he will continue to contribute articles for *Cryonics*, too.

The Membership Manager position at Alcor is a demanding and difficult one. We are grateful for the time Brian spent facing this challenge.

between cryotransport operations, as well as being trained for rescue.

With time, there will be ways to specialize in roles ranging from research to maintenance of liquid nitrogen storage facilities, but at present the emphasis is on finding stable, reliable people adaptable to a wide range of working situations. Those who join us now will have the most flexibility, later.

## What abilities do we need? Is this "You"?

*The essentials include computer expertise, careful attention to paperwork details, creative writing, legal writing, editing others' work, communicating easily with a wide variety of those calling and visiting Alcor (ranging from reporters and scientists to people who just like to argue), as well as marketing Alcor's program concept in general.*

*In addition, we welcome your having goals of higher education in science, medicine, or other areas. We are not worried about hiring "overqualified" people. We expect to grow, and anticipate that you will grow, too!*

For a moment, let's take a look on a more detailed level, at what BioTransport will be doing. Without this perspective, it would be

## NEW POSITIONS AVAILABLE ON THE ALCOR STAFF

Partly due to Brian's departure and anticipating more rapid growth of membership in upcoming years, Alcor is seeking new employees.

These opportunities to work at Alcor can also serve as doorways to careers with BioTransport, Inc.

Alcor is now finalizing a major service contract with BioTransport, as discussed in previous issues of *Cryonics*. BioTransport may take over Alcor's rescue responsibilities as soon as six months from now.

At the time of this issue of *Cryonics*, BioTransport, Inc. has raised over \$340,000.00 in its first

offerings to accredited investors, and is about to "start work" in earnest.

Long range plans will involve recruiting service personnel from the emergency medical community. Why? Within a relatively short time, BioTransport expects to make cryotransport services available to the general public, not competing with Alcor but augmenting its programs in many ways. The end result is almost certain to be more rapid growth for Alcor.

Our immediate needs are for people who are capable of taking on administrative roles, editing Alcor's publications and upgrading its website during the stretches



hard to make a long term decision. Long term decisions are what most of we cryonicists focus on.

In order to expand our rescue capability, BioTransport's work will involve systems development of self-contained vehicular rescue facilities (highly automated labs in eighteen wheel semitrailors, like the MRI units that circulate from hospital to hospital), as well as smaller mobile units.

The tasks will require technical backgrounds and practical skills, with emphasis on electronics and mechanical design. Those who have worked in emergency medicine (EMT's and Paramedics) will have a decided edge.

BioTransport's expansion of programs will be gradual, but its business plan indicates that in six years, operating expenses will exceed two million dollars/year. Opinions differ on this being unrealistically high. Regardless, our plans call for growth, and growth is what we'll pursue. That means more and more people.

### IMMEDIATE ALCOR STAFFING STRATEGY

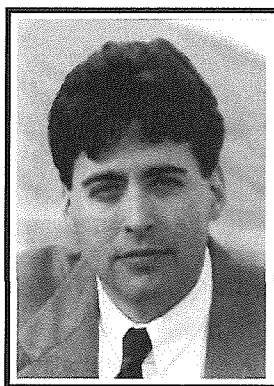
Until additional, seasoned staff personnel are on board, with the right mix of qualities and capabilities, Linda Chamberlain (Executive Director), assisted by Mathew Sullivan (Patient Care Manager) will be taking care of Membership Administration.

It is critical that each member's financial and information arrangements be in order. Mathew is developing an overall (global) database for Alcor in Microsoft Access, something it has needed for many years, and has never had the resources to create.

Linda is refining many of the documents which underlie the membership program, and carrying out an extensive verification of the adequacy of cryotransport funding

arrangements. Over the years, we have learned of more and more pitfalls, and must now assure that all of us have fully secure provisions for cryotransport.

It's worth noting that these two areas (development of an airtight database and making sure that your documentation is correct) are so important that we have assigned Alcor's most capable people to them, for a time displacing them from their regular roles. (*Mathew Sullivan remains the Patient Care Manager while Linda Chamberlain has turned over the CryoTransport Manager duties to me, for the time being.*)



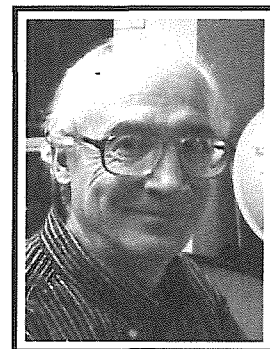
Mathew Sullivan,  
Patient Care Manager

### OTHER CHANGES

Linda Chamberlain, Editor of *The Alcor Phoenix* for about a year, will be Co-Editing *Cryonics* with me, providing most of the content for the Alcor Update section.

Linda's past experience in marketing and sales is also being put to work as Marketing Manager. She was already working with Ralph Merkle, PhD as Co-Chair of the Fourth Alcor Conference on Life Extension Technologies, at the time the other changes took place (see pages 4-7 for details.) The conference at Asilomar is a major part of Alcor's new membership building thrust; it will include mailings and magazine ads (A4M's periodicals

and others) as well as other promotional activities. BioTransport's marketing will be coordinated with the conference as well, adding its strength to the end result.



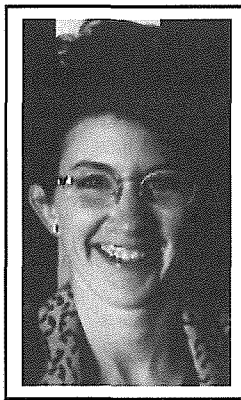
Bruce Cohen  
BioTransport, Inc.  
Managing Director

As BioTransport takes over Alcor's rescue responsibilities, Bruce Cohen (Managing Director of BioTransport) will shoulder much of the work which formerly fell to Alcor's CryoTransport Manager. Linda Chamberlain will still be involved with developing new training programs, and guiding the flow of events in many ways. We are covering the bases with a stronger team, all the time.

Other participants are coming on board, part and full time. Karla Steen, a law student interested in cryotransport, will be assisting with the upgrading of members records, with emphasis on strengthening the security of financial arrangements for cryotransport. She will also be involved in finalizing the contract between BioTransport and Alcor, drafting the debenture of compensation linking the two corporations.

BioTransport will soon prepare new accredited investor offerings and begin work on the DPO (Direct Public Offering) registrations. Karla may take on portions of this work as well.

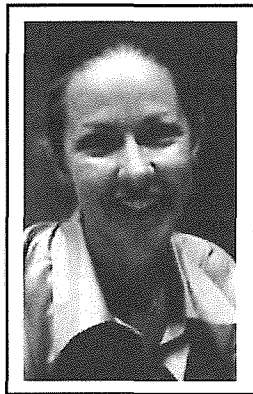
Diane Huper, a temporary administrative assistant, will help fill the gap of effort needed with accelerated membership growth and



Diane Huper

review of membership documentation. She comes to us via an employment agency, but already has taken on tasks of a highly detailed kind, concerning the development of a membership data base. And we are looking for still more people!

Project areas requiring technical expertise include bioimpedance for measuring the integrity of cell membranes. This project will be primarily BioTransport's, but will utilize manpower transferred from Alcor, under the existing as well as the new contract.



Karla Steen

The incorporation of new procedures and technologies from 21st Century Medicine, Inc. with Alcor's protocols will be upon us soon. As techniques for "vitrification" are worked out in the laboratory, it will be BioTransport's job to take them into the field, making them available to Alcor members should they be needed.

### EMPLOYMENT INQUIRY FORM

(Photocopy, complete and mail to Alcor, 7895 E. Acoma Dr., #110, Scottsdale, AZ 85260.)

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Email \_\_\_\_\_

Education \_\_\_\_\_

Brief Summary of Work Experience \_\_\_\_\_

Career Goal(s) 10-20 years \_\_\_\_\_

Why I would be interested in working for Alcor/BioTransport:

**(We'll send you a more complete application form, and call you also!)**

The management and operating personnel structures of Alcor and BioTransport will gradually diverge as growth takes place. We will have to fill positions of responsibility in both organizations, to reduce the overlap between the two organizations and spread the load.

We need people with a high degree of stability and leadership potential, who can reliably handle routine work if need be, but who also hunger for more creative tasks. The sky is *not* the limit!

Do you see yourself as being part of this development, now or later? Let us know!

We are starting to "bulge at the seams". We encourage any of you who are so inclined to seriously

consider an active role with us. If your goal is to live on, indefinitely, then this where you should be.

The employment application form above will help you give us a brief indication of your areas of interest, if you are pressed for time. We'll send you a more detailed application after speaking with you on the phone, if it looks like there is a near-term possibility of your working with us.

Be sure to visit Alcor, prior to any decisions to move. We'll look forward to meeting you and seeing if we have what you're looking for.



# Surgical Training Class First of It's Kind

by Linda Chamberlain, ACT-A, ACT-B, EMT  
Assistant CryoTransport Manager,  
Executive Director

On Sunday, June 13, 1999 Alcor held a surgical training class for physicians. The primary purpose of this class was to provide refresher training for those who had participated in Alcor's cryoprotective surgical operation in the past, and to train new members of the surgical team in the procedures Alcor uses.

This class represented a major step forward in Alcor's thrust to offer members high standards in emergency response. When the Alcor CryoTransport Team performs standbys and transports, it depends on

basis of professionalism than any prior to this point, within Alcor.

With this capability, Alcor has two complete teams. One entire team could deploy to England or Australia (for example) for a CryoTransport there, and the US would not be left without a team! Or, we could do back to back cryotransports in the U.S. In special circumstances, sudden emergencies or multiple deaths can still overtax us, but we are growing stronger all the time.

## Surgical Class Schedule June 13, 1999

### Instructors:

**Dr. Jose Kanshepolsky, MD**

(contract neurosurgeon, retired)

**Dr. Nancy McEachern, DVM**

(Alcor's primary surgeon for many years)

**Assistant: Hugh Hixon**

(Alcor staff member and long time member of Alcor's cryotransport teams)

### Class Participants:

**Kathleen Cotter, DC (ACT-A, ACT-B)**

**Grant Dahmer (University of Arizona)**

**Thomas Munson, MD (Alcor Medical Director)**

**Robert Newport, MD (ACT-A, ACT-B)**

**Anthony Pizarro, MD (ER physician)**



Left to right: Thomas Munson, MD, Fred Chamberlain, Jose Kanshepolsky, MD, Grant Dahmer, Anthony Pizarro, MD, Kathleen Cotter, DC.

trained Alcor physicians for telephone consultation with attending physicians, medical staff and hospital, by phone or (if funding permits) by sending them into the field.

Now, as a result of this class, Alcor has four physicians and two other comparable level professionals who can fill key surgical roles, as well as serve in the other capacities. Some are more skilled and experienced than others, but they all contribute to a broader

Alcor Staff (Fred and Linda Chamberlain, and Mathew Sullivan) provided logistics support for the class and photographed and videotaped the procedures to make review tapes and procedural documentation (Standard Operating Procedures).

Grant Dahmer, Director of the Willd Body Program at University of Arizona in Tucson, provided a human cadaver and six human hearts. Without this level of support, the class could not have been conducted in a realistic way. Each surgical participant had a heart to cannulate. One was so badly scarred from previous



bypass operations that the anatomical structures were difficult to identify. This was a graphic demonstration of challenges a cryotransport surgeon might encounter. Variations in structure from heart to heart were noted.

### **10:00 AM - 2 PM MEDIAN STERNOTOMY:**

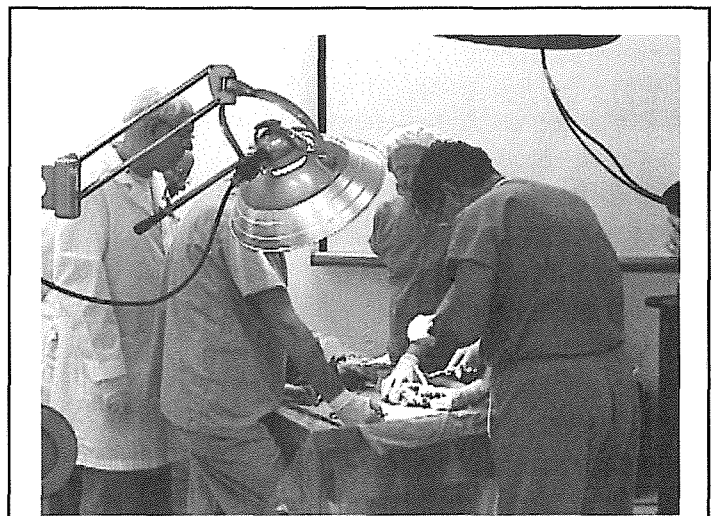
Dr. Nancy McEachern (Alcor's primary surgeon for many years), assisted by Dr. Jose Kanshepolsky (retired neurosurgeon) demonstrated the median sternotomy and cannulation of the heart. The Discussion and demonstration included:

- Surgical prep and draping
- Use of the electrocautery
- Incision
- Cutting and spreading of the sternum
- Locating structures of the heart
- Opening the pericardium
- Elevating the heart
- Putting pursestrings in the aorta and right atrium
- Manipulating the pump lines
- Filling the cannulas
- Placing the venous cannula
- Placing the arterial cannula and monitor angiocath
- For neuroperfusion, tying off the descending aorta and inferior vena cava, and vessels to upper extremities
- Going on the bypass pump
- Monitoring the perfusion
- Coming off the pump
- Removing the cannulas and lines
- Tying off the pursestrings
- Closing the sternum
- Closing the skin
- Other problems to deal with:
  - Salvaging a torn vessel
  - Leakage
  - Previous heart bypass operation
  - Atherosclerosis of the aortic arch

### **2 PM LUNCH**

### **2:30 PM JUGULAR SAMPLE LINES:**

Dr. McEachern departed prior to the class's end, due to an emergency in her practice. However, Dr. Kanshepolsky (who possessed considerable surgical skills and had worked with Alcor before) was able to take over the remaining instruction. Physicians with higher surgical skills helped others who had less, making the class a productive team effort. There was a strong sense of group capacity to "get the job done."



**Class participants practice cannulation skills**

Dr. Kanshepolsky exposed and then placed a catheter into both jugular veins. This is a new and experimental procedure to help measure the glycerol uptake and help us determine possible lateralization of the brain perfusion. In the past we have relied on burhole effluent samples, but these have produced unreliable data. Our expectation is that these samples will be a source of more reliable data about concentration of cryoprotectant in the two sides of the brain.

### **3:30 PM BURHOLE SURGERY:**

Dr. Kanshepolsky demonstrated the placement of the cranial burholes. The demonstration and discussion included:

- Preparation and draping of the head
- Establishing burhole locations
- Incision of the scalp
- Exposure of the skull
- Use of retractors
- Creating the burholes
- When to cease penetration
- opening the dura
- Measuring the brain
- Undermining between the dura and the skull for the thermocouple probe and the crackphone probes
- Insertion and securing of the probes
- Bone wax in the burholes
- Suturing or stapling the scalp

Dr. Jose Kanshepolsky assisted class participants as they practiced cannulation of a heart and the place-

Continued on Page 30

# ACT-A Team

## Alcor Cryotransport Team - Advanced Training

19-21 March 1999

by Linda Chamberlain, ACT-A, ACT-B, EMT  
Assistant to CryoTransport Manager

Current certification as an ACT-B (Basic Training) is prerequisite for the ACT-A (Advanced Training) course. Annual recertification is required for both ACT-B and ACT-A. Efforts to recertify at the basic level, both in the USA and in England, have been described in some detail, in this issue.

The Basic Level Alcor CryoTransport Technician (ACT-B) training course is a 5-module course that usually takes three days of instruction. The ACT-B training includes: Coordination and Communication, Infection control, External Cooling and Cardiopulmonary Support, Cryo-Transport Medications, Checklists and Operations Management. No

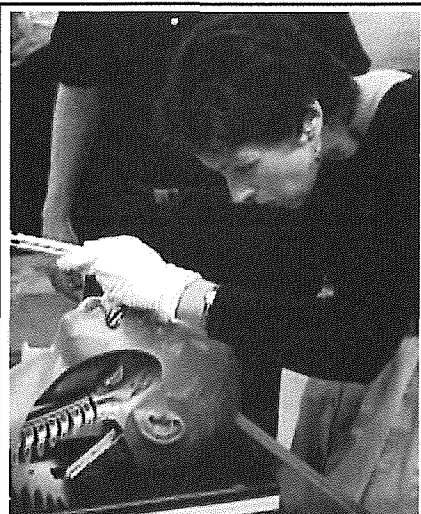
surgical skills are taught at the basic level. The Advanced Level Alcor CryoTransport Technician (ACT-A) training includes procedures for whole body washout using the new portable ATP (Air Transportable Perfusion) System, perfusion and cryoprotective ramp procedures in the Operating Room, as well as cryotransport skills, including such as intubation, venipuncture, etc.



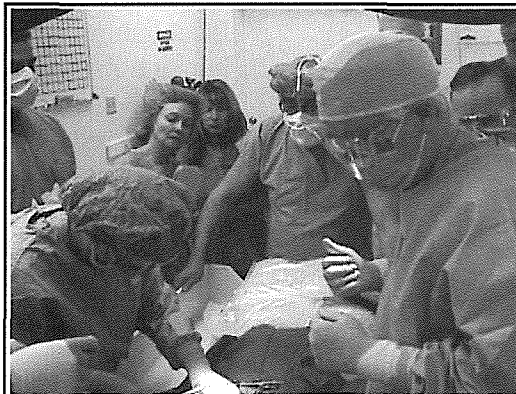
**The ACT-A Team**  
**(Alcor CryoTransport Team-Advanced Training)**

From left to right. Back row: Hugh Hixon (AZ), David Hayes (GA), Bruce Cohen (AZ), Mathew Sullivan (AZ), Dan Weaver (TX), Fred Chamberlain (AZ), Joe Derek Tenant (CA). Middle row: Tanya Jones (CA), Robert Newport, MD (CA), Rhonda Iacuzzo, RN (AZ), Judy Muhlestein (CA), Kathleen Cotter, DC (CA), Russell Cheney (CA), Jack St. Clair (UK). Front: Linda Chamberlain, (AZ) CryoTransport Mgr. (when picture was taken)

The Advanced Team members are trained sufficiently to allow them to be good assistants for the medical professionals on the team. The final day in this training involves the blood washout of a canine model.



**Rhonda Iacuzzo, RN teaches class intubation skills**



**Participants observe as Nancy McEachern, DVM, surgeon and veterinarian, assisted by Hugh Hixon, perform femoral cutdown and cannulate dog prior to perfusion.**



**Robert Newport, MD and Bruce Cohen check the ATP**

**Advanced ACT Training  
Class Schedule**

**Friday: March 19, 1999**

- 9:00 AM Announcements and Introduction to the "Team Approach"
- 9:30 AM Thumper / PIB / SCD Review
- 11:30 AM Subclavian Venipuncture
- NOON Lunch Break
- 2:00 PM Cricothyroidotomy and Intubation
- 3:00 PM Use of the DuaLogR (data acquisition)
- 4:00 PM Setup of the ATP (Air Transportable Perfusion) System
- 6:00 PM Break for evening
- 8:00 PM Review: Packing Patient for Shipment

**Saturday: March 20, 1999**

- 9:00 AM Stabilization Procedure (Using the ATP System)
- 1:00 PM Lunch Break
- 3:00 PM Setup of the Operating Room Perfusion Pumps
- 3:30 PM Cryoprotective Perfusion Ramp
- 6:30 PM Break for evening
- 8:30 PM Optional: Meds Draw / Math Review

**Sunday: March 21, 1999**

- 9:00 AM Scrubbing, Gowning, Sterile Technique
- 10:00 AM OR Rules, Checklists and Procedures
- 11:00 AM Final Exam (Part 1: written)
- NOON Lunch Break
- 1:00 PM Canine Stabilization using ATP (Final Part 2: Checklist Notes)
- 6:00 PM Class Over

**Membership Status**

Alcor has 474 Suspension Members (106 Life Members), 374 Associate Members (includes 86 who are signing up as Suspension Members), and 36 patients in suspension. These numbers are broken down by country below.

Country	Subscribers		Country	Subscribers	
	Members	Applicants		Members	Applicants
Argentina	0	0	New Zealand	0	0
Australia	13	2	Russia	0	0
Austria	1	0	South Africa	0	0
Brazil	1	0	Spain	6	0
Canada	12	3	Sri Lanka	0	0
France	0	0	Switzerland	0	0
Germany	4	2	Taiwan	0	0
Ireland	0	1	U.K.	23	7
Italy	0	2	U.S.A.	411	65
Japan	2	1	Ukraine	0	0
Lithuania	0	0	<b>TOTALS</b>	<b>474</b>	<b>86</b>
Netherlands	1	3			<b>374</b>

No. of Countries: 22

**New England  
CryoTransport Team Members**



Tony Reno, Dr. David Greenstein, DO, and Mark Kaminsky of the New England ACT Team at the home of Tony Reno (near Boston), all of whom completed their continuing education and annual recertification requirements for 1999-2000.



**Alcor CryoTransport Team  
Training, Continuing Education,  
and Certification (Concise Summary)**

Annual continuing education and recertification is required for both ACT-B (basic first responder level) and ACT-A (advanced training) team members. Current certification as an ACT-B is prerequisite for the ACT-A course. All ACTs must be Alcor members or medical professionals and have email (for updates and timely communications during emergencies).

Beginning in the year 2000, in an effort to continually upgrade the quality of our teams, an EMT course will be prerequisite to taking the ACT-B course. This requirement will apply to recertification starting in the year 2002. The EMT training cannot be more than five years old.

**Basic Level Alcor CryoTransport Technician (ACT-B).** This training course is a 5-module course both to train new team members as well as fulfilling the annual continuing education and recertification requirements. Instruction includes: Coordination and Communication, Infection control, External Cooling and Cardiopulmonary Support, Cryo-Transport Medications, and Checklists and Operations Management. No surgical skills are taught at this level.

**Advanced Level Alcor CryoTransport Technician (ACT-A)** The advanced training course includes whole body washout using the new portable ATP (Air Transportable Perfusion) System, perfusion and cryoprotective ramp procedures in the Operating Room, as well as such surgical skills as femoral cutdown, cannulation, intubation, venipuncture, etc., to allow non-medical professional team members to be good assistants for the medical professionals on the team. This training includes the blood washout of a canine model.

**The Cryoperfusion Surgery Course (for medical professionals only)** This training focuses on surgical techniques used during cryotransport and cryoperfusion operations. This class covers blood washout, femoral cutdown, median sternotomy, burrhole, and cannulation techniques.

**For a complete list of the currently certified team members, see page 30.**

## Northern California ACT Recertification:

by Russell Cheney, ACT-A, ACT-B  
Recertification Instructor, SoCal ACT Coordinator

Congratulations on a most-successful Readiness Review! Special thanks to Andrea for all the wonderful hospitality!! Thanks to all for the great food!

Dr. Robert Newport had a specially prepared discussion of the scientific / medical background on all the CryoTransport meds that was insightful and helped us understand more thoroughly *why* we are doing what we are doing.

Three roundtable discussions resulted in the exchange of much knowledge from diverse backgrounds (EMTs, pre-med, many cryotransports, MD), and also a list of ideas for improving the ACT's effective role (Andrea has already input and distributed a good copy of this list!). Hands-on practicums included Team infection control with surgical gown / cap / booties, mask / eye-shield and double gloving. The Team was given fresh boxes of exam gloves from Alcor Central. Mini-psychodrama techniques were used as a practicum for checklists, including the patient's personal physician form and the medical-examiner / coroner form.

The Meds practicum included the full use of a set of new personal meds practice-packets from Alcor Central, with glass vials, syringe, needle, dry meds and mixing solution. Hands on included calculations, capping and uncapping techniques, administration to an actual IV (meds injections), IV problem-resolution, and the protocol for identifying and storing the medications on ice.

Alcor Central asked specifically that the following items be included:

1) Remember to number each syringe with its injection-sequence number, when the medication is drawn, and properly label the syringe.

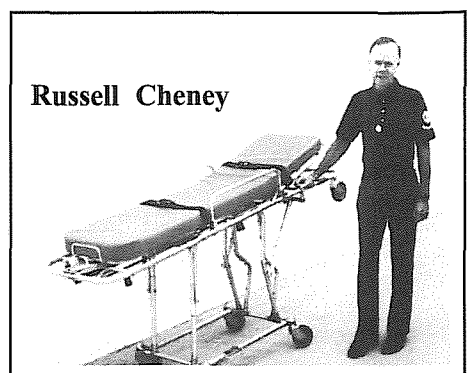
2) Epinephrine and Nimodipine have multiple syringes to be drawn and administered. To your local field meds-kit has been added a double timer, to help track when these two meds are to be administered. The Team member assigned responsibility for the meds oversees these administrations.

3) The initial 200cc of THAM can be pushed by pressurizing the bottle with 200cc of air (60cc at a time, as that is the largest syringe in the kit).

In calculating the complete cryotransport medications requirements for a simulated cryotransport, Table-lookup problems were identified for Gentamicin and Tagamet.

Perhaps the most important lesson here was that acting together as a Team, the problem could be isolated and resolved. No actual cryotransport can be expected to be without challenges; the CryoTransport Team working in concert can best address many major difficulties.

Editor's note: The above report was on the continuing education class held on modules 1-3. Classes were also held in July and August. See page 30 for a list of ACT team members throughout the country who have completed their recertification requirements for 1999.



Russell Cheney

# Southern California ACT Recertification:

by Russell Cheney, ACT-A, ACT-B  
Recertification Instructor, SoCal ACT Coordinator

For the first time ever, the complete Southern California Alcor Cryo-Transport (ACT) Team met at one time and place (Sunday July 18, 1999, at my home in Torrance). This was all the more exceptional because the Team had recently grown to nine members, having welcomed three graduates from the most recent ACT-B class in Scottsdale, Arizona.

The new graduates were warmly received by the Team because they had been introduced to the latest ACT-B protocols. (The "ACT-A" designation, for clarification, indicates advanced Alcor CryoTransport training, including advanced airway management and assistance with some of the perfusion procedures. The EMT designation indicates California-certified Emergency Medical Technician qualification.)

The SoCal Readiness Reviews have traditionally included a segment of business items relating to the ACT Team's functions. This segment was initiated with an excellent briefing by Michael Riskin on the current status of BioTransport developments, and how these developments might be expected to affect the ACTs and the Team; Michael held us virtually spellbound with the potential for a truly optimistic future filled with great promise.

Dr. Kat Cotter briefed the Team on the Alcor surgical training class that she and Dr Robert Newport had just completed at Scottsdale (see page 22), and the vital role that the ACT Team has in bringing the patient to the surgeons in the best-possible condition to help assure the most successful suspension possible.

The Team then shared updates to its

phone-number contact-list (each member carries the list on their person, to be ready for quick response in case of emergency). I gave an update on the Southern California general membership geographical analysis, which, thanks to Joe Hovey, had some new updates and surprises.

The Team then debriefed on its pre-standby of William Gingrich, and lessons learned. It was generally agreed that communications (pager, cell-phone) and readiness (each Team member has ACT items and personal effects readily at hand) were vital.

The Team had previously undergone special training in Southern California, for the Gingrich pre-standby, on the use and operation of the Alcor-Central ambulance / MARC equipment.

Each member's recertification was reviewed, future Readiness Reviews were discussed (Dr Robert agreed to organize the next, a comprehensive review of all ACT skills), and vaccinations were reviewed (Alcor recommends the ACTs have specific inoculations, for Team safety).

After a break for a succulent potluck (each person bringing one "real food" item), the day's recertification Module was addressed: Checklists and CryoTransport Management. This sounds like a dry subject, but I expanded on an idea we had used at the Northern California Readiness Review the week before.

We had a simulated Alcor-member standby and cryotransport (described on paper), the details of which were a surprise to the Southern California Team. Each ACT had to use their ACT resources (primarily checklists

and forms) and personal mental-resources to solve each step of the scenario. The completion of certain checklists was required in detail. The only other time I can remember so many cryonicists, in one place at one time, in such complete silence was at the previous week's Readiness Review!

There may have been over an hour with only the rustle of turning pages. Dr Robert Newport followed this with a review of the projections used in the latest ACT-B class. I administered a new "Readiness Review Evaluation", inviting the participants to comment on and provide recommendations regarding the Readiness Review process (thereby "Grading the grader"!).

The Module 5 examination was then given to the ACTs, and evaluated for each Team member as required. I was reminded that the Team's full attendance was even more remarkable in light of the fact that most of the team did not require this Readiness Review for recertification, due to recent certification or previous attendance for this Module.

The Southern California Team truly displayed its continuing esprit, which of course reflects its ability to address Alcor membership needs in emergencies and stand-bys.

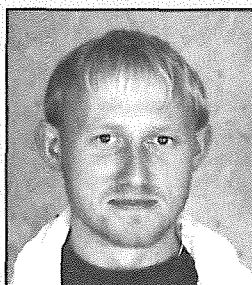
*Please remember that all Alcor general-members are welcome at the Readiness Reviews. The Readiness Review in September will be of special interest because of the fact that it is a complete overview, and it may be presented in the format of a comprehensive "dress rehearsal". You may even be able to help participate!*

For additional information about the California team training sessions, contact:

Russell Cheney at 310 / 316-5761, or email at CHENEY@KEYWAY.NET.

**Tim Gibson**  
**Training Manager &**  
**Second ACT Team Leader**

(This report may seem a bit dated, appearing some six months after it was written, but it shows the strong level of spirit and enthusiasm of the Alcor U.K. Group, hard at work some three months after their first training course. Eds.)



**Alcor UK**  
**Training Weekend**  
**and General Meeting**  
**13th & 14th February 1999**

Attending the training were: Maria Camacho, Michael Ciancia, Gerald Croft, David Flude, May Flude, Tim Gibson, Graham Hipkiss, Sue Hopkins, Russell Hyndsford, Mike Price, Alan Sinclair, Sylvia Sinclair, Garret Smyth, Ryan Spires, Jack St Clair, plus other visitors such as the press, students, members relatives and prospective members.

Finally a "Special Award" for **Tim Gibson** for his role as "Training Manager & 2nd ACT Team Leader"

The Alcor Chapter Certification Rules were unanimously approved. This basically means that the US will pay the bills and if you don't pay your fees, they'll know!

Jack St. Clair, ACT-A, led a review of cryotransport medications sheets to ensure that ACTs were comfortable with calculating doses. (see hand-outs list).

Alan Sinclair gave a run-down of the ambulance and its equipment. We were advised that the ambulance is not currently taxed or insured for the road. This could be a new marketing ploy? Look out for us on Police! Camera! Action! Garret is already playing a doctor on the telly!

Gerald Smyth provided an overview of the membership manual (That's the grey one!). A number of key issues were discussed that are addressed within the manual.

The Alcor UK Academy Awards (also known as the election of officers) took place on the Saturday with "Fred's" being presented as follows:

"Best Leading Male" ..... **Andrew Clifford** for "President"

"Best Female" ..... **Sylvia Sinclair** for "Vice President"

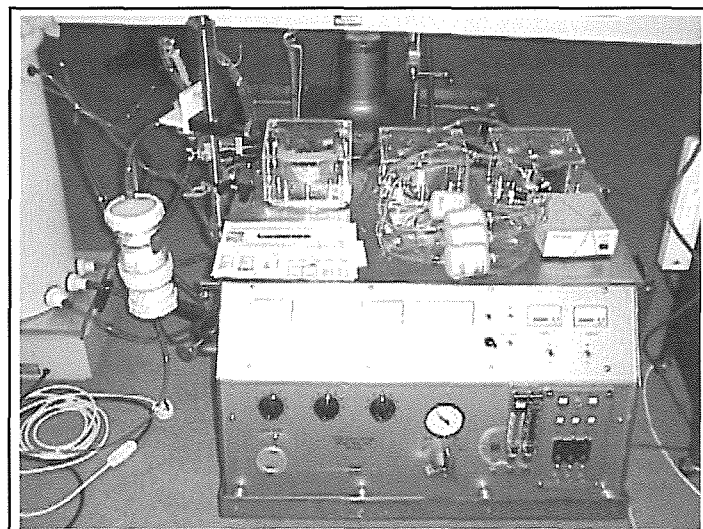
"Most Creative"  
 "Accounting Manager" was won by ..... **Jack St Clair**

"Best Supporting"  
 "Membership Manager" went to ..... **David Flude**

"Most Effective"  
 "Media Relations Manager  
 & Newsletter Editor" ..... **Garret Smyth**

"Lifetime Achievement Award" was presented to .....  
**Alan Sinclair** for "Facility Manager"

"Best Newcomer" went to ..... **Gerald Croft** in  
 "Cryotransport Manager & ACT Team Leader"



**Alcor U.K. Perfusion Assembly**

Alcor's own Eric & Ernie (Alan & Garret) gave a fine performance of Shakespeare's "The Taming of the Perfusion Equipment".

The raffle of unwanted Christmas presents raised a stunning £15.50!!!! Now we can even put some fuel in the ambulance!

A practice assembly of the portable ice bath was carried out. It went together quickly and easily, but we didn't seem to be able to get it back into the case afterwards! Sorry Linda.

A tour of the facility was conducted by a number of members, to familiarize themselves with the inventory, whilst others successfully resuscitated a football with the thumper (heart-lung resuscitator). It gives you hope for the future doesn't it?!



On a serious note, a number of actions are required as a result of the weekend (actioning person in brackets):

1. The ambulance is not "emergency ready" without tax and insurance. Operating/funding requirements and regular running routine to be assessed. (Alan, Gerald, Tim)

2. The ACT team leaders need to know who has a driving licence. We will be in touch. (Gerald, Tim)

3. UK hospitals tend not to allow the use of mobile phones on their premises. How does your local hospital stand on this point? Will they allow it in emergencies? If not, do their payphones accept incoming calls, or maybe we could use their land lines? Please investigate your own personal situation and pass details to Gerald or Tim. (All suspension members, by May please)

4. The ACT team leaders need any relevant personal information (contact info for yourself, family, solicitor, executor, insurance provider, doctor, coroner, funeral director, etc; maps of home, work, local hospital, funeral home, etc; medical history, details; and anything else you can think of).

It will be extra helpful if you can get all the details on one sheet of paper. Please make sure that the latest information has been supplied to Alcor in the US and UK, as well as the ACT team leaders.

Failure to keep us updated can result in non-suspension. (All suspension members, by May please)

5. Wear your Medic Alert tags! The necktag has its uses, but Medic Alert bracelets are worn by many people for many reasons and are more likely to be spotted by medical personnel than the necktag. (All suspension members, ASAP)

6. Consider making a LifePact video. It may be interesting to see how your own ideas develop with time. It also provides you with a history for your future and a database of your thoughts/personality. (All suspension members)

7. It is advisable to make Alcor your next of kin. There is just a short document to complete. This is not intended to alienate your relatives, but simply to ensure that hospitals cannot restrict Alcor's access to you in an emergency. (All suspension members)

8. Please send a copy of your insurance documentation to Alcor UK for the files. You can send just the key details if you prefer. The purpose of this is to improve the availability and quality of information available in an emergency. (All suspension members, by May please)

9. Jack has agreed that he has been re-elected Accounting Manager on the condition that he sorts out his insurance arrangements by May. If you are signing-up, get on with it! (All prospective suspension members).

Ed: Jack got on with it and is fully signed up. Congratulations, Jack!

10. It was suggested that ACT documentation should show dates in "1st Feb 99" format instead of "1.2.99" format. Or is it "2.1.99" format? This will prevent confusion caused by the US writing their dates backwards (Ha! Ha! - Linda Chamberlain)

11. UK inventory lists are to be attached to the relevant shelves and cupboards for reference. (Alan).

12. We need to ensure that the UK perfusion equipment is correctly set-up and ready to work (Alan, Garret).

If you are a Certified ACT, you should have the following hand-outs. If not, contact the person shown in brackets.

1. Alcor UK Cryotransport Readiness Report by Linda Chamberlain (David Flude, tel: 01323 509836).

2. Alcor UK inventory (David Flude).

3. Map for Rowland Bros (David Flude).

4. Maps for Graham Hipkiss (Tim Gibson, tel: 01777 818404).

5. Medications sheets update, 1st November 1998 (Tim Gibson).

**Note:** The UK Alcor group meets regularly. For more information call David Flude at 011-44-1323-509-836 or email David at [David@dflude.Freeserve.co.uk](mailto:David@dflude.Freeserve.co.uk).



Alcor U.K. Training Course, November 1998

## Surgical Training Class

### First of It's Kind (Continued from page 23)

ment of a burhole. The class participants broke into teams to work on separate practicums, rotating through the different stations.

Participants practiced putting a heart-wall pursestring in a piece of paper to learn the delicacies of this procedure. They then cannulated a heart, using this technique. Burholes to access the surface of the brain were placed, guided by Dr. Kanshepolsky, who had performed that procedure many times.

### 4:30 PM SURGICAL PRACTICUM AND FEMORAL CUTDOWN DEMONSTRATION:

Concluding the class, Dr. Kanshepolsky demonstrated the femoral cutdown, which is often used in the field for the blood washout, as part of the stabilization procedure.

Demonstration and discussion included:

Why both femorals are cannulated  
Location of the femoral vessels: the femoral triangle  
Prepping and draping of the field  
Cutting the skin  
Finger dissection of the femoral sheath  
Elevating and separation of the femoral vessels  
Tying off the distal vessels  
Snaring the proximal vessels  
Use of snares  
Manipulation of the tubing set  
Filling the cannulas  
Going on the pump  
Washout  
Disconnection of the tubing and approximation  
(closing) of the wound

Special appreciation goes to Hugh Hixon who provided valuable insights into the historical reasons for the use of these procedure, difficulties encountered in field procedures, and solutions that have been useful.

Alcor's goal is to staff all cryotransports by persons with appropriate medical backgrounds. This course moved us substantially forward, toward that point.

## Currently Certified ACT Team Members

July 1999 through June 2000



Allen, Joe	ACT-B	Australia
Chamberlain, Fred	ACT-A/B	AZ
Chamberlain, Linda	ACT-A/B	AZ
Camacho, Maria	ACT-B	UK
Cheney, Russell	ACT-A/B	SoCal
Ciancia, Michael	ACT-B	UK
Clifford, Andrew	ACT-B	UK
Cohen, Bruce	ACT-A/B	AZ
Cotter, Kathleen DC	ACT-A/B	SoCal
Croft, Gerald	ACT-B	UK
Cross, Trisha	ACT-B	UK
den Otter, Dalibor	ACT-B	Holland
Flude, David	ACT-B	UK
Flude, May May	ACT-B	UK
Gibson, Timothy	ACT-B	UK
Greenstein, David DO	ACT-B	MA
Hara Ra	ACT-B	NoCal
Hayes, David	ACT-B	GA
Hipkiss, Graham	ACT-B	UK
Hixon, Hugh	ACT-A/B	AZ
Hopkins, Sue	ACT-B	UK
Jackson, Steve	ACT-B	TX
Kaminsky, Mark	ACT-B	MA
Kluytmans, Henry	ACT-B	Holland
Larson, B. Scott	ACT-B	FL
Lubais, Sue	ACT-B	NoCal
Marks, Diane	ACT-B	SoCal
Muhlestein, Judy	ACT-A/B	NoCal
Murray, Louise	ACT-B	SoCal
Newport, Robert MD	ACT-A/B	SoCal
Pancake, Regina	ACT-B	SoCal
Reno, Tony	ACT-B	MA
Riskin, Michael PhD	ACT-B	SoCal
Roberts, Ken	ACT-B	TN
Schwarz, Bob	ACT-B	IN
Selkovitch, Ron	ACT-B	SoCal
Sinclair, Alan	ACT-B	UK
Smyth, Garret	ACT-B	UK
Spires, Ryan	ACT-B	UK
St. Clair, Jack	ACT-A/B	UK
Stephens, Monica	ACT-B	TX
Sullivan, Mathew	ACT-A/B	AZ
Tenant, Joe	ACT-B	NoCal
Theodorus, Tarik	ACT-B	UK
van de Loo, Andrea	ACT-B	NoCal
van de Ven, Antoine	ACT-B	Holland
Voss, Peter	ACT-B	SoCal
Wade, James	ACT-A/B	TX
Weaver, Dan	ACT-A/B	TX

## Recent Cryotransport Activity

### Two "Possibles" and One "Actual" in One Hour

by Fred Chamberlain, III

#### Prologue - "Member Down"

Our best efforts in training and preparedness are often challenged to a maximum extent, by sudden and stressful cryotransport operations! At such times, we are reassured if the operations go reasonably well. We are also warned there could be other circumstances, where the demands will be higher. We learn, seeing how we can improve, every time. The events reported here will give you a vivid sense of this.

It was about 6:30 a.m. MST (Mountain Standard Time) on Thursday, August 26, 1999, when my pager went off and showed the 5-digit code for "Member Down".

This is the most urgent call we get. It means that someone with an Alcor Member number is in a state of cardiac arrest.

I called Alcor; Hugh Hixon and Joe Hovey had more information by that time: (1) the person concerned had died in his sleep, and (2) his membership and his arrangements for cryotransport had lapsed, years ago. This former member still was wearing his Alcor bracelet, but it seemed there was nothing we could do.

The former member's attorney had called Alcor. He was pretty sure that the former member (let's

call him "B") didn't have arrangements, but he wanted to be certain.

#### Second Situation

Only a few minutes later, the cellular phone rang. Was it about B again? No! This was an entirely different situation, about someone we'll call "A".

"A" was still alive, but only by a thin margin. Alcor had no prior notice that A was in trouble, until the phone rang.

Within a short time, we would have to decide if an immediate standby was needed. Linda and I prepared to head for Alcor.

#### A and B Both?

Just before we left, the phone rang once more. This time, it was about "B". B's last will and testament provided for him to be an anatomical donor to Alcor, even though he did not have current arrangements for cryotransport. Did Alcor want to accept the anatomical gift? The estate would pay to immediately have B cooled and shipped to Arizona. "Did we want them to do this?" the attorney asked.

A number of persons have since asked, if B had still been

signed up, would we have sent out two teams? Would we have had sufficient equipment? Would there have been enough people to handle two cases at once?

In this particular situation, it could have worked, with little or no delays and losses of performance. In other situations, if a need existed for two standbys in parallel, there could have been more difficulties, but we still have great depth in the way of trained people.

With BioTransport, Inc. (see elsewhere in this issue, for an update on its development), we expect to further strengthen our response capabilities. A year from now, a situation of this kind should be even less of a problem. For now, let's return to the events of 8/26/99.

#### Decision Making

As to B, we simply said, "Yes! Send him to us!" While we didn't know exactly what kind of science or training could be accomplished in parallel with the other operation, the thought of just saying "No!" to a former member didn't seem right. Then, all of our thoughts turned to the needs of A.

The last planes out of Phoenix and Los Angeles for the Chicago area would leave by late afternoon.



We had to be on our way by then, fully equipped, with mortuary cooperation and facilities support to be arranged beforehand. There were basic administrative matters to be taken care. Launching a standby with no advance planning is an extreme stress.

### Logistics

Six hours after we learned of A's situation, pieces of the picture were coming into focus. Russ Cheney, ACT-A and Louise Murray, ACT-B were heading to the airport in Los Angeles. Linda Chamberlain, still CryoTransport Manager at that time, found a cooperating funeral home and alerted all team members who might be involved with the operations at Alcor Central.

A full vanload of equipment was ready to go by 3 p.m., and we left for the airport. At Alcor Central, Hugh Hixon and Bruce Cohen, both ACT-As, began preparations for surgery and cryoprotection.

A consulting physician (Jose Kanshepolksi, retired neurosurgeon) and Nancy McEachern, DVM, who performed Alcor's cryoprotective surgery for many years, would both be on hand when needed. Both had participated in the surgical course only two months before. Nine hours after the call came in, all of the pieces of the puzzle were falling into place.

### Travel Anomalies

Airline confusion sent our two team members from Los Angeles in different directions, and delays in Phoenix held up the departure from there by almost two hours. All of

us reunited at about 2 a.m. in Chicago, and were on the road with two rental cars a short time later.

Nearly two hundred miles were traveled in intermittent fog. A close relative of the patient was diverted to another airport and drove an even greater distance. In the town where the patient was located (confidential, due to desires of the patient's family and some of the professionals who were involved), a special event was in progress; lodging was hard to find.

By 7:00 a.m. local time, we located a motel in which we could check out equipment and review procedures, in effect a "command center" for the standby. By noon, the relative of the patient was on hand and we could begin negotiations with hospital authorities

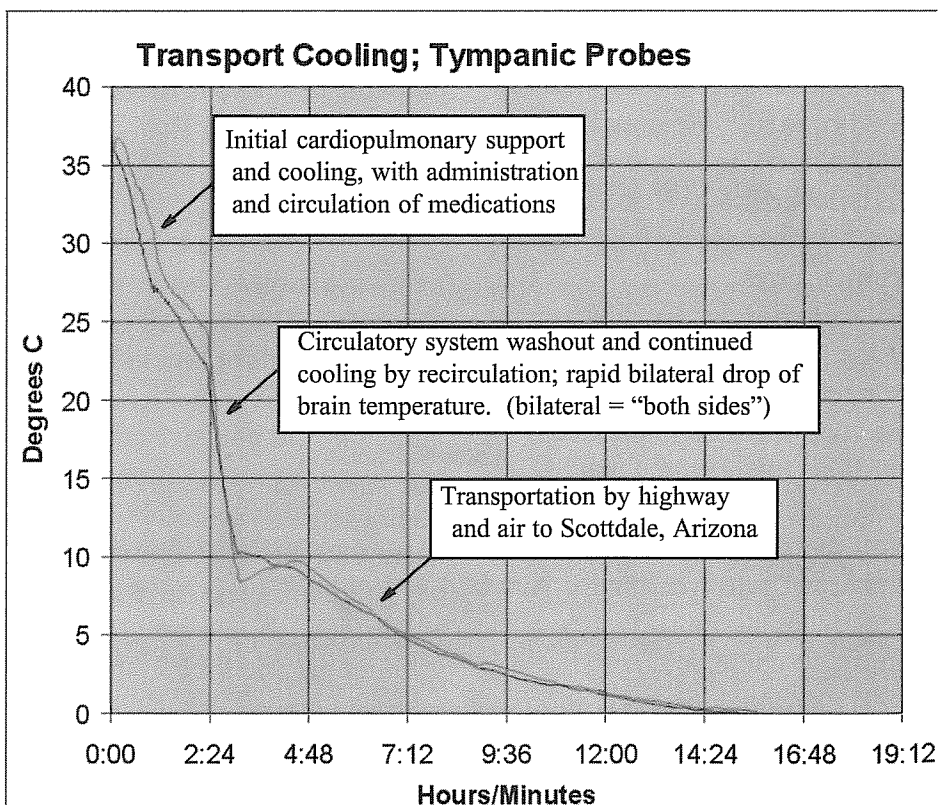
### Final Preparations

It was apparent that the patient would not survive much longer, by mid-afternoon Friday. Medications

were prepared, in a transport vehicle provided by the mortuary. They also supplied a gurney, and the cooling bath assembly we brought was assembled on it. In the early evening, we were allowed to position Alcor's transport equipment close to the patient's location in the ICU.

The mortuary, contacted less than an hour before leaving Alcor for the airport, provided tremendous support with an on-site vehicle at the times we wanted it, as well as an official representative to arrange for immediate release from the hospital. They permitted us complete and continuous use of their procedure room, so our field washout equipment could be ready to go, even though the time of the cryotransport was uncertain.

By early evening on Friday, we were as ready as we could be. By now, it was thirty eight hours from the time the first call was received. Aside from one-two hour naps here and there, no one had



slept. In a drawn out standby, we would have slept in shifts; this one seemed to be headed for a transport with no break. We ate, to stay functional. The evening wore on. Declines of vital signs we learned about from relatives who visited the ICU (we could not secure first hand information) indicated that soon, a cryotransport was going to take place.

### Initiation of Cryotransport

At 2:10 a.m. (local time), the team was permitted to move to a location close to the patient. At 2:31, they were told that the patient was in a state of clinical death.

Access came without lengthy delays; by 2:42 head cooling was started. Medication administration began at 2:45, and from that point on events took place as called for by Alcor's CryoTransport Manual.

We could not use our thumper; that was ruled out by the hospital, and we were expected to vacate the building quickly. No oxygen was available. These were a few of the limitations which might have been avoided by advance arrangements.

### Logging of Brain Temperatures.

Automatic logging of brain temperatures began at 2:39, using a two-channel device no larger than a programmable calculator, with tympanic probes connected to thermocouples in each of the ear canals.

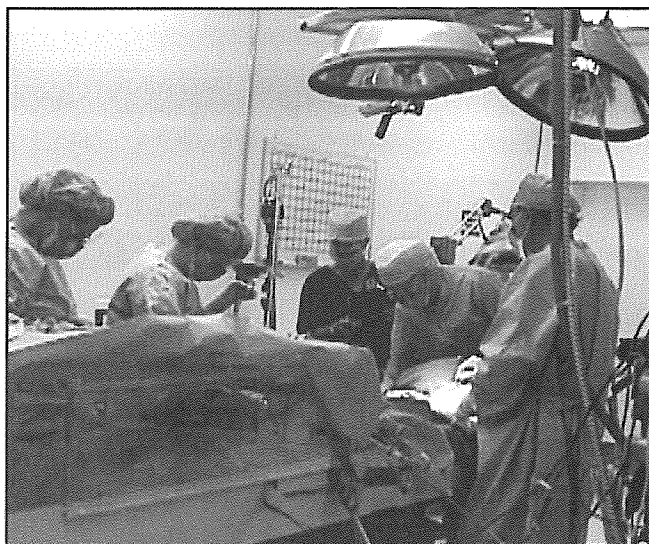
This data logging continued without interruption throughout transportation to the mortuary, washout of the circulatory system, and travel by highway and air to Alcor in Scottsdale (see the figure to the left, on page 32.)

In particular, the data showed smooth, balanced cooldown of the brain during initial blood washout and recirculatory perfusion for cooling. This not only showed that perfusate was reaching the brain, but (as the diagram shows) it was bilaterally effective (both sides of the brain were equally protected). The two plots tracked closely during perfusion, as compared with the earlier stage of transport. We are still sorting out reasons for this difference in the data.

At Alcor Central, two surgeons (as identified above) were made aware of the timetable, and were on hand shortly after the plane from Chicago landed. By now, over fifty hours had elapsed since the first call came in.

For the first time at Alcor, the levels of the cryoprotective agent were tracked by in-line refractometers. Digital voltages showed us, moment to moment, indications of cryoprotective levels in both inflow and outflow circulatory pathways. In the past, we monitored these by manual optical measurements of samples, which were collected first by syringes, after which conversion calculations were required.

*(In the Advanced Class less than six months earlier, a team of six trainees could barely keep up with the data and plot it. This time, two team members were able to accomplish this and use the results to control the rate of the cryoprotection.)*



Cryoprotective Surgery; Alcor Central

### Cooldown

Cryoprotection was finished at 0:50 a.m., Mountain Standard Time, on Sunday, August 29, 1999. About 66 hours had passed, since our first notice of a possible need for standby on August 26th. A few of the transport team members were still up and around, although the major part of the cryoprotection had been accomplished by others.

Cooldown of Patient A toward dry ice temperatures began a short time later. During the next week, the very slow and gradual trip to liquid nitrogen temperatures took place.

Now, "A" cruises through time with our other 35 patients. It is Alcor's responsibility to make sure that she stays safely at liquid nitrogen temperatures, pending a day when we can determine if she will make a full recovery. This lady's first life cycle brought her into a new family relationship. She is one of us, now!

### Summary of A's CryoTransport

Final analysis of the data is still in progress, and more technical



**“A”’s Transfer to a Bigfoot Dewar After Slow Cooldown to Liquid Nitrogen Temperatures**

details will be published in future issues of *Cryonics*. This report is intended only to provide an overview of the events, and some of the lessons learned.

This cryotransport, Alcor’s first in over two years, showed that our module-based training program prepares team members for what they will encounter in the field. It also provided additional confidence that our new ATP (Air Transport Perfusion) system is field-worthy.

In all, considering the absence of advanced planning, and considering how quickly this operation evolved, it was successful. There are many areas nonetheless in which we can see further improvements are needed.

### **What about “B”?**

“B” arrived in Scottsdale just before A, but could only receive our

attention after A was well on her way to liquid nitrogen temperatures.

In addition to other purposes of the anatomical gift, we elected to retain B’s fixative stabilized brain for future study. “B”, the first (former) Alcor member to ever donate himself to the organization for pure research, thus may help us answer many questions concerning this alternative mode of preservation.

So far, based on limited evaluation, it appears that the brain stabilization for B was quite effective and

uniform. There were delays in discovering B and in transporting him to Scottsdale, as well as in the application of fixation and later recovery of his brain, by surgical removal. This is, in many ways, a worst case. Is it a totally “hopeless” case?

Are B’s neurons intact? If so, what is the condition of the synapses? What quality of molecular preservation will we find, when we investigate? Will we find that B’s cell membranes are intact, when we are able to perform bioimpedance measurements of his brain tissues?

### **Identity Related Structures?**

When the relationship of the physical structure of the brain and identity are understood, even if this point is decades away, we can then assess the potential for repair of such structures by nanotechnology,

and the restoration of these structures to biological function. Will B then help us bound the limits of what is possible?

In our work with B, we intend to avoid areas of his cerebral cortex which might be vital to memory and identity. We’ll no doubt ask ourselves, from time to time, if one hundred years from now, B might be regarded as a “patient”, not a mere anatomical donor. These are a few of the enigmas we’ll puzzle over, as we attempt to learn more.

Alcor cannot expect to carry out this kind of research in the case of all its former members, even if they make anatomical donation provisions in their wills. In B’s case, however, we can take some satisfaction in the fact that he has not utterly vanished into oblivion.

As a final note, B was a retired physician. Now, we will think of him as a pioneer, exploring a new route of preservation forced by circumstances he could not avoid. If our findings from studies of B are encouraging, does this suggest an alternative to cryopreservation? We will only know as time passes and we continue to report on what we learn about B’s situation in the pages of *Cryonics*.



BioTransport, Inc. plans to study the possibility that brain fixation preserves and conserves important identity related structures.

If it were not for this possibility, of alternatives to ultralow temperatures in the preservation of memory and identity, BioTransport’s name would have been “CryoTransport, Inc.”

# Visions of the Present, Visions of the Future, Visions of Unbounded Life

## *LifeQuest*

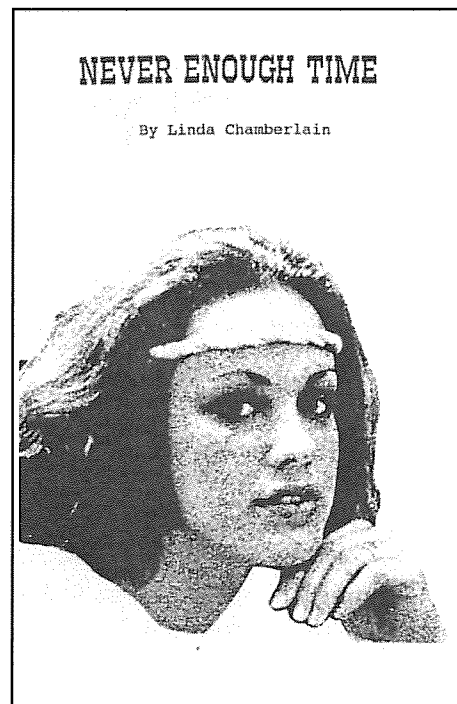
Fiction reprinted from the late 1980's

The stories which follow appeared in *LifeQuest*, a semi-annual collection of life extension fiction, from May 1987 to May 1990. They ranged from practical cryonics dilemmas to far reaching possibilities of uploading, nanotechnology, and the deep-time aspects of living in space colonies. The contributors comprised a rapidly broadening group of authors, at the time publication ceased in 1990.

Now, in a special section of each issue of *Cryonics*, we bring you reprints from past issues of *LifeQuest*, and future issues of *Cryonics* will include new stories contributed by authors from its wide readership and other sources. If you are a professional science fiction writer, or even if you are not, we invite you to submit your stories for possible inclusion.

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Eddie rushed into the elevator and pushed the button for the 14th floor. He was excited.

As he watched the floor lights blink on and off, he fingered the gold wrapped box in his pocket and smiled. He'd hoped it would be ready today; it seemed like the jeweler made one excuse after another. But Eddie finally had it in his hands, and he was going to give it to Janan tonight.

He had first met Janan at a meeting of the cryonics group about a year ago. She was so active in the organization, and so enthusiastic. It didn't make sense. Why had she let her cryonics arrangements lapse? Eddie was determined to find out tonight.

When the elevator bell chimed his arrival, he fingered the gift one more time and stepped out of the elevator.

Standing silently in the door to Janan's office, Eddie watched her



close her file cabinet and lock it without rising from her desk. She hadn't yet noticed Eddie standing there. That gave him a delicious moment to watch her.

Janan's face wore little lines of strain as if the day had been a long one, full of frustrations. Turning her chair, Janan stretched her legs out in front of her and reached her fingertips toward her toes, stretching to ease the tight muscles in her back. Her soft brown hair fell around her knees as she bobbed up and down, stretching and relaxing in waves.

"Hi, Love." The voice was the one Janan had been waiting for, not just this evening, but for years, ever since her first marriage had fallen apart. Eddie's voice was full of gaiety and warmth. It always was. Janan had almost forgotten how to be happy until she met Eddie Fossbender.

At the sound of Eddie's lyrical voice, Janan smiled at her own knees, then raised her beaming face to greet the tall, gawky, toe-headed figure of happiness which stood in the door of her office.

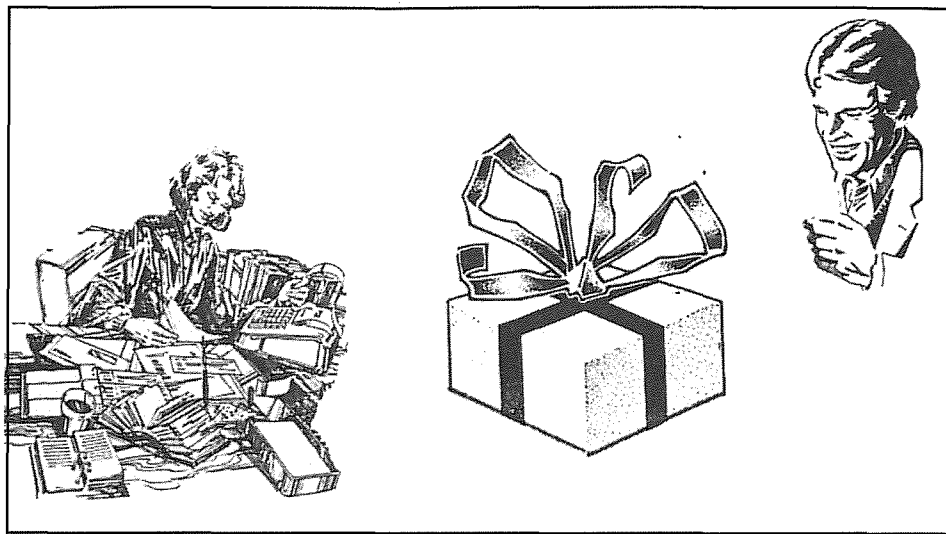
Eddie was not handsome, but he had a face that was always happy and he seemed to infect others with his own mood.

"Hi, Eddie." Janan rose from her desk, her smile not completely hiding her weariness.

"Been a hard day?" Eddie walked over, wrapped his long arms around her and gave her a playful peck on the nose.

Janan closed her eyes and nodded her head. "I'll spare you the details," she said as she laid her head on his shoulder. "I need some of that cheer you always seem to carry around with you like whoofle dust."

Eddie held Janan and rocked



her for a moment, then pulled back, looking for all the world like a kid who had just stolen Christmas.

"I've got the perfect cheer-er upper!" Eddie reached into his pocket and pulled out the little box he had been fingering in the elevator. It was wrapped in elegant gold foil and had a slender silver ribbon tied into a bow. "Open it."

"Ooooo!" Janan's eyes twinkled with delight. She sat on the edge of her desk, crossed her legs and held the gold wrapped present in the palm of her hand, savoring it for a joyfully suspenseful moment.

Janan smiled up at Eddie, who was standing with his legs wide and his arms crossed. The grin on his face was devilish. He unfolded his arms momentarily and flicked his fingers at her in a gesture to open the box.

Slowly and playfully, Janan pulled one of the loose ends of the silver ribbon and let it fall to the floor. Then she carefully pulled away the gold foil to reveal a black velvet jewelry box.

"Maybe a diamond? Or, maybe a ring?"

"I'd say it's something even better." Eddie was enjoying the game as much as Janan.

The tension lines at the corners of Janan's eyes were almost gone as she rotated the box toward Eddie and snapped open the lid. "Or maybe... pop-out snakes!"

"Nope," Eddie said as he leaned forward and peered into the box. "But look at that." He pointed into the box with a mock look of astonishment, his eyes as big and round as two dinner plates.

Janan turned the box around to look inside. Sitting on a bed of baby blue satin was a gold medic alert bracelet with a diamond on each end.

"Ooooo! Eddie!" Janan took the bracelet from the box, laid the box on her desk, and held out her wrist to Eddie.

"Not yet," said Eddie, his face now pensive. "You have to get your arrangements back in order first."

"Right." Janan closed her fingers over the bracelet. "It's beautiful." A big smile filled her face as she hopped off the desk to give Eddie a kiss. "Thank you, Love."

"When?" asked Eddie, grinning.

"When what?" Janan cocked her head.

"When will you complete your arrangements?"

"How can I resist getting this,"

she opened her hand and looked down at the bracelet again, "on my wrist as soon as possible?"

"When?"

Janan shrugged. "It's just a matter of finding the time. There never seems to be enough to do everything that needs doing."

"Okay," said Eddie as he took Janan's elbows in his hands and bent his knees to look straight into her eyes. "Okay. I can see I'm part of the problem. I won't take you out anymore, until you've filled out your paperwork and gotten your insurance!"

"This is blackmail!"

"You bet, Lady, and I'm the roughest, meanest blackmailer around," Eddie said in a corny James Cagney voice. "You get your cryonics arrangements in order or else."

"Okay. I give."

"When?" Eddie asked again.

"You don't even let a person breathe, do you?"

"Nope! When?"

"Well, I could do it Saturday. No, I promised Crisa I'd go shopping with her."

"Cancel," said Eddie, cutting Janan off.

"What?"

"Cancel your date with Crisa."

"But I promised." Janan had a frown on her face, a look of disbelief.

"What's more important?" asked Eddie with a little shrug. "A new pair of shoes that'll wear out, or a chance to spend forever with me?"

A smile spread across Janan's face, as if she felt good having someone really care. "You make the alternative sound so foolish!"

"You dirty rat," Eddie continued his comical imitation of James Cagney. "Either you let me watch you fill out your papers, or I stop seeing you till its done. See?"

"Okay!" Janan clapped her hands together and laughed.

Eddie grabbed Janan's coat and held it out for her. "Great. I can't wait to see that bracelet on you."

Janan nodded and smiled and started for the door. "Feel like Italian?"

"You're on."

Nearing the Villa Roma, their favorite Italian restaurant, Eddie brought up the subject again.

"Why did you let your arrangements lapse, anyway?"

"Oh, I don't know."

"Any doubts about cryonics?" asked Eddie.

"Oh no. Not at all. It was..." she ran her fingers through her hair and took a deep breath, like she was searching for an answer.

"What?"

"Oh, for a while it seemed like the whole universe was trying to crush me, Eddie." Janan looked away. "I was having trouble with my career, John and I broke up, then I started having financial problems. It was just too much. I let a lot of things slip until I got it back together again." Janan smiled and looked back over at Eddie.

"Then I met you, Love, and things began to go right again."

"So, if things are going right again, why are you still without arrangements to be frozen?"

"No good reason. Just procrastination, I guess."

"Well then!" Eddie burst into a great big smile which warmed the whole car. "Then tonight, after dinner, we'll go back to my place and fill out your papers together. Deal?" Eddie reached over and took Janan's hand.

"Deal!" Janan raised their joined hands in a victory salute.

Eddie swung into the parking lot of the Villa Roma and Janan

popped free her seat belt.

"Drop me at the door," said Janan. "I'll get us on the list while you park."

A small black sports car careened between the parked cars in front of them. There were no headlights—the driver must have been drunk. The shadow cloaked monster lurched and smacked into the passenger side of Eddie's Toyota like a giant shark gliding out of the murky depths.

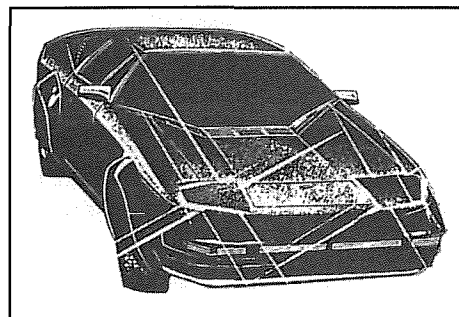
The world seemed to go into slow motion for Eddie. The sound of the radio faded from his ears and was replaced by creeping silence.

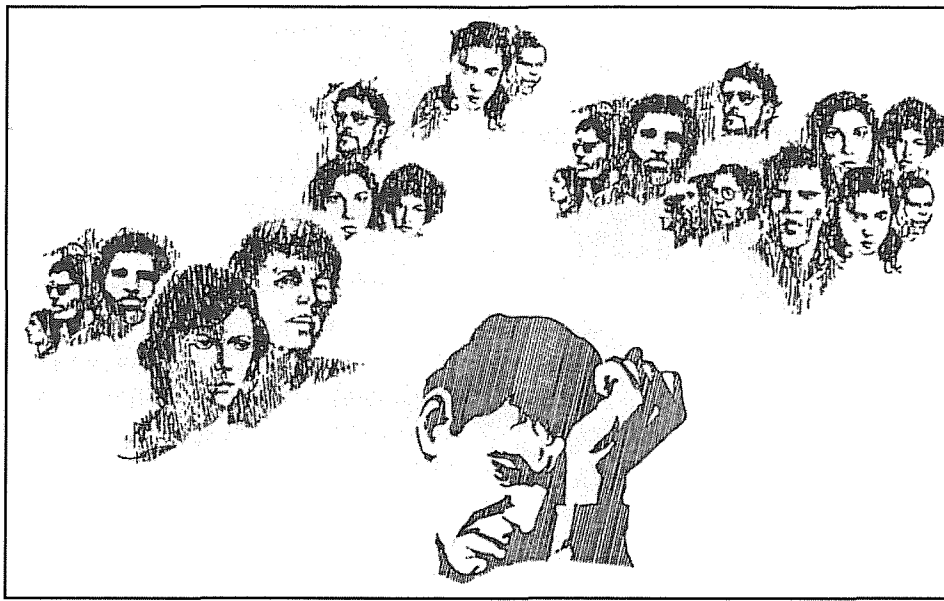
The dark missile invaded Eddie's Toyota, pushing it's nose deeper and deeper through the flimsy door. With no belt to restrain her, Janan was pushed ahead of the invader by the very power of its inward thrust.

Eddie tried to reach for Janan, but his arms felt paralyzed, as if they were made of lead, and he was trapped by the iron arms of his seat belt. He could not reach her. He could not help.

Janan's head smashed into the dashboard and then her whole body rebounded. When Eddie finally reached Janan with his trembling hands, her gray business suit was warm and wet with blood.

The world returned to real time for Eddie. His ears suddenly flooded with the scream of a car's horn, blaring relentlessly behind his own cries, "Janan! Janan!"





Janan did not answer. She was limp and lifeless.

Eddie touched Janan's throat and thought, hoped, begged the universe to let the faint quiver in her neck be life still flowing in her arteries and not just be his own trembling.

Eddie opened his car door, pulled himself from under the steering wheel and ran for the restaurant.

Slamming through the entrance, Eddie ran into a couple just leaving. Wasting no time to apologize, he pushed past them and bolted through the restaurant, ignoring the complaints of diners who were ruffled by his mad sprint.

Eddie stopped, panting, at the pay phone in the rear of the restaurant.

Picking up the receiver, Eddie deposited a coin. No dial tone! He jabbed at the button several times. Terror was rising in his chest as he turned and ran to the bar.

They'd have a phone at the bar. They had to!

Eddie pushed a waitress aside, oblivious to her grumbling, and shouted at the bartender, "Your phone! Its an emergency! I need your phone!"

"There's a pay phone in the back, Buddie," the bartender was visibly annoyed by what he considered to be just another drunk.

"It's out of order, you..." Eddie's face turned red. "There's been a terrible accident. In the parking lot. My friend is dying. I need your phone!"

The bartender seemed to be deaf. He just peered out of his eye sockets like a puppet who could not move without having his strings pulled. Eddie stared at the bartender helplessly.

"There's a phone at the gas station. Across the street."

Eddie looked over his shoulder in the direction of the voice. The waitress he had just elbowed away from the bar shifted her weight as the peeved look on her face softened into something more like compassion.

Eddie nodded to the waitress and, without a further word, moved quickly through the tables and back out the front door.

Looking right, then left, Eddie spotted the gas station. It was half a block away. Three pay phones stood like sentinels on the corner of the lot.

Jumping into the busy street, Eddie dodged cars and ignored insults, as he made his way through the horns and irate drivers to the other side of the street. When safely on the opposite curb, Eddie broke into a full run, cursing his out-of-condition body as he huffed and wheezed and wished he could go faster. The telephone booths seemed an eternity away.

Eddie finally came to a stop. Out of breath as much from terror as from the run, he put a coin into the pay phone. A dial tone! His fingers would not hold still. Eddie squeezed the receiver to make the trembling stop and put his other hand in his pocket. When he heard the voice on the other end of the phone, he felt his anxiety ease a little.

"California Life Extension Foundation."

"Walt?" Eddie sounded like he was in shock.

"Eddie? What's wrong?"

"A terrible accident, Walt. Janan's hurt." Eddie's voice cracked. "She may be..." Eddie couldn't finish.

"Have you called an ambulance yet?" Walt asked.

"No, you're the first one I called."

"Where are you?"

"At the Villa Roma on Third Street."

"Okay, Eddie. I'll call the ambulance. You go back and stay with Janan until they get there."

"They may need some heavy equipment to cut into the car."

"Okay," said Walt, "I'll tell them. I'll get the rescue team together and meet you at the hospital." Walt paused for a second and then added, "You know... she doesn't have her arrangements in order?"

"I know. We were going to fill out papers after dinner."

"I'll bring a sign-up package, Eddie, but if she deanimates before she can sign the papers..."  
Walter's voice trailed off.

"I know," said Eddie, his voice cracking again.

"Get back to Janan," said Walt. "I'll see you at the hospital."

When Eddie got back to Janan, she still seemed to be breathing. He could only reach her from the driver's side of the car; her side of the car was crushed by the still invading black monster.

Eddie crawled into the red Toyota and checked Janan's pulse. It was almost too faint to find. Tilting Janan's head back to help her breath, Eddie caressed her chestnut hair.

Eddie thought he heard a faint moan, but he could not be sure. "Don't die," Eddie pleaded. "We need time to get your papers filled out." Eddie touched Janan's throat

again and looked around to see if there was any sign of the ambulance.

Through the side window Eddie could see the waitress from the bar. A crowd was beginning to form. People whispered and pointed, but no one offered to help.

What's the matter with these people, wondered Eddie. They're all going to die, so maybe they actually hope Janan will die too. Sour grapes. The thought was too morbid for Eddie; he closed his eyes to shut it all out. The pounding in his chest was growing.

The sound of a siren and the flashing of red and blue lights saved Eddie from collapsing. Maybe they would make it! Maybe they would disappoint the crowd outside the window.

It was only minutes before they arrived at the hospital, though it seemed like hours to Eddie. As Eddie watched the paramedics prepare to unload Janan's stretcher,

he saw a priest walking out of the emergency room doors.

An idea burned in Eddie's mind.

"Wait! Sir!" Eddie hailed the priest as he ran toward him. "Wait. Please!" The old priest looked up, startled by the urgency in Eddie's bloodshot eyes.

"Please. You've got to marry us," Eddie said, pointing at Janan's stretcher. "She's dying. You've got to marry us."

The old priest seemed to be made of stone. Eddie took him by the arm and started after Janan and the paramedics. "Thank you," Eddie said. "Thank you." The white haired priest followed.

Eddie leaned over and whispered into Janan's ear. "Janan, you have to marry me. Just in case. That would make me the next of kin. Authority to have you frozen. Say yes, Janan. Tell the priest you want to marry me."

Janan lay lifeless on the stretcher.

The priest looked at Eddie. "I'm sorry, Son. If she's unconscious, I can't marry you. She has to consent."

The paramedics began to push the stretcher toward the emergency room doors.

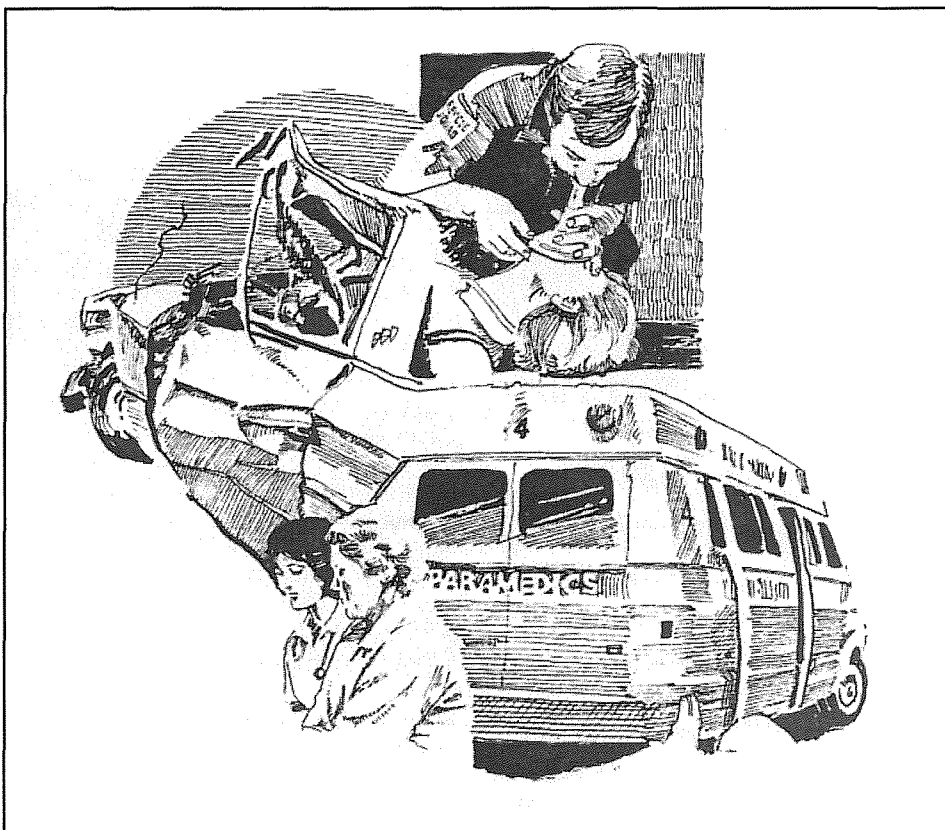
"Wait!" Eddie held onto the stretcher, panic in his eyes.

"Son," said the white haired priest as he laid a fatherly hand on Eddie's shoulder, "let them take her to emergency. I'll marry you later, if she lives."

"But what if she dies?"

"If she dies, the marriage won't be necessary."

"No, you don't understand." It took all of Eddie's will to keep his voice respectful. Eddie turned back to Janan. Leaning over the stretcher, he tried again. "Janan. I







love you. You have to tell the priest you'll marry me. Please, Janan. Tell him. Please."

Janan barely opened her eyes. Her lips trembled as she tried to form words. It was almost inaudible, but Janan managed two words: "Yes, Eddie."

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Nearly twenty four hours later, Walt Hamilton, president of the California Life Extension Foundation, walked into the reception area adjoining the operating room inside the Foundation's facility. Eddie stood, looking anxious, when he saw his friend enter. Walt was dressed in hospital greens.

Walt pulled off his face mask and gown and threw them into a laundry depository as he walked toward Eddie. "Janan's suspension went well, Eddie."

Eddie sat back down in the vinyl waiting room chair, nodded and closed his eyes.

Walt sat down and placed a hand on Eddie's shoulder. "If you hadn't been with her, and if you hadn't gotten that priest to marry

you, there wouldn't have been anything we could have done. Without the legal documents, our hands would have been tied."

"Yeah," Eddie said, his voice as swollen as his eyes. "Walt, I want to make sure something like this never happens again."

"What do you have in mind?"

"I don't know. But we've got to make sure, Walt."

Walt nodded. "I never could understand why Janan let her arrangements drop."

Eddie took the gold medic alert bracelet from his pocket and held it in the palm of his hand. "I asked her why," said Eddie, "just before the accident. She said there just never was enough time." Eddie's voice choked again. "Now there really isn't."

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Eddie laid the bouquet of red roses atop the dewar which had cradled Janan for almost a year. "Well, Love," Eddie said with a sad smile, "it's our first anniversary."

Reaching down, Eddie touched one of the roses. "I miss you," he

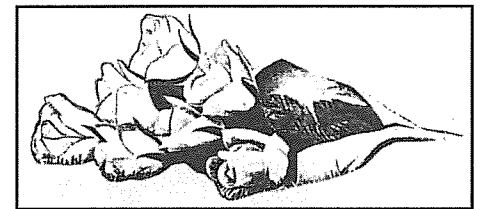
said, his lips trembling, "but better this way than to have lost you forever. It was just a matter of minutes, you know."

Shifting his weight, Eddie waited for the lump in his throat to go down. "I've set up a special fund. We call it the Janan Fossbender Fund. After you were suspended, I swore I would find a way to keep something like this from ever happening again."

"We," Eddie lost his voice for a second. "We really go all out these days to be sure our members keep their arrangements current." Eddie did his ridiculous imitation of James Cagney, "We're ruthless, Lady, when it comes to getting what we want."

Eddie fell silent and closed his eyes for a moment. Then he whispered, "Because of you, people will live, now, who might have been lost forever. You're going to find a lot of them standing there to thank you, when you wake up."

Eddie was silent again, holding back his tears. As he turned to leave, he added, "It's become a battle cry, 'Remember Janan!'"



*(This story was dedicated, when it was written in 1988, to a former President of Alcor who had let his arrangements lapse. For a few years after that, those arrangements again were in effect, but have now slipped away for a second time. We have our fingers crossed that before long, this early pioneer will once more be wearing an Alcor bracelet. He was there for Alcor in the late 1970's, holding it together, and we can only hope that if he ever needs Alcor's assistance, it will be able to come to his aid. It is a long, long journey to the future. Let us do what we can to make sure that as few of us as possible are lost along the way.)*

## OCCUPATION: IMMORTAL

by Lee Corbin

I awoke this morning feeling wonderful, after the best night's sleep I ever had. I bounced out of bed anxious to get to the day's work, and then remembered: today was a holiday! Even better! There were dozens and dozens of little projects I was just drooling to get to. I was completely unaware that something was very wrong.

I dressed and went into my living room to begin reading a fascinating chapter in a quantum mechanics book I purchased yesterday. To my surprise, paragraph after paragraph was engagingly readable, much more so than it was last night. That's what a good night's sleep will do for you, I guessed.

Suddenly I had an urge for a strong cup of coffee. And then came the shocker: no sooner did I imagine it, than a cup of steaming coffee instantly appeared before me on a silver serving tray!

"Hey!?", I yelled aloud.  
"What's going on?"

"I just thought I'd provide what you wanted," replied a deep voice from nowhere. "Allow me to introduce myself. I'm 'you' about a hundred years from where you're at now. You see, you were, or rather, I as one of the lucky few from your time who managed to live beyond the first half of the twenty-first century when aging and all the other diseases were eliminated."

It was a testimony to my calmness and rationality that I just sat and absorbed all this, sipping

## Occupation: Immortal

by Lee Corbin



that delicious coffee.

"You mean you're from the future?" I asked.

"No, you're from the past. As technology and science progressed during the latter half of the twenty-first century, individuals such as myself found that we had amazing opportunities. Using nanotechnology we began living millions of times faster, and undergoing dramatic changes. We made copies of ourselves and sent them off exploring the galaxy. Some of us merged memories with other people and became corporate persons. In addition, just about everyone devoted enormous re-

sources to pure advancement, to collect yet greater rewards from even better science and technology.

"Some of us, however, became concerned that we might lose our identities," continued the voice. "After all, are you still the same person as you were at age four? Many people don't think so. Or are you the same person you were when you were just a tiny fetus? That's a better analogy because compared to me, that's all you are."

"Let me get this straight," I said. "You're myself from the future, and you've resurrected me somehow. And now you're concerned that you're losing your

identity?"

"Almost correct," continued the voice. "At no point of time am I in any real danger of that: at any moment I am who I am, and there's no immediate problem. But I am concerned that if I continue to change, then at some point in the future it will no longer be accurate to say that I, as I am now, still exist."

I sat unmoving. Outside, it was a beautiful spring day in the year 2000. I could hear the pigeons on our roof that the landlord keeps complaining about.

"When I was resuscitated in 2061," the voice went on, "I uploaded into silicon, and all of this became obvious. So, like many others, I resolved that in order to counteract any such loss of identity, I would play it safe and maintain older versions of myself running in parallel. These "older versions", constructed from memories stored in my brain, would just be myself as I was at some particular point in the past. That way, even though I grow, change, and evolve, I can always still personally anticipate living forever, because some future me even further down the road will always be running me."

"And so that's where I come in," I interjected. "I'm the old you from the turn of the century, the year 2000. I'm just a program you're running."

"Precisely. I'm simulating you in your New York apartment as you were back then. Your "job", if you will, is to stay just as you are—forever. I have other versions of you from 1995, 2005, 2010, 2015, etc., at five year intervals. You might like to meet the other early versions of myself-yourself,

sometime."

"But why are you even bothering? If you've changed so much from how I am, then why bother to keep me around at all?"

"Tut, tut. I'm surprised that an old cryonicist like you has to ask such a question. It's the logic of cryonics: you take care of others so that yet others will take care of you. It's basic common humanity, really. Only in this case, it's me that I'm taking care of, not others."

"Of course. Yes. Well, what is the exact date now, anyway? 2061 did you say? You uploaded in 2061? After all, I suppose that since you are running millions of times faster than normal, then so am I."

"Actually," the voice hesitated, as if to cushion some great shock, "the date at this precise instant is 25,707,441,013 AD"

"WHAT?" I screeched. "Twenty-five billion years have gone by? What took you so long to re-create me? Besides, didn't you imply that it was 2061?"

"Oh, I re-created you immediately back in 2061, all right. And that was the date when our conversation—this conversation—began. But I don't like to waste a lot of resources maintaining old versions of myself. So you are presently being allocated one second of run time every five-hundred million years."

"Very generous of you", I said sarcastically. "Just out of curiosity, what is the date now?"

"At this instant, it is a little past 36 billion AD"

"Oh great," I said testily, "another ten billion years gone, just like that. How time does fly! Are—"

"Why don't you go out on your

patio and watch the stars go out?" suggested the voice. "It's your only chance to see the show live. After all, it's not every day that you get to see the visible universe come to an end."

I went out onto my patio. The air was fresh, and although the sounds of the city in the background were those of any spring day, I knew that it was all being faked.

"I am going to clock in a millisecond of starlight every 500,000 years for you. Think of it as the ultimate in time-lapse photography."

Suddenly the sky was black, and I could see strange stars, and eerie objects that I guessed were black holes. Whatever they were, they appeared to be swallowing most of the stars.

This continued for several minutes while the voice and I had an interesting discussion about cosmology. But I was still apprehensive about "my future". Yeah, I know; that's a strange way of speaking, considering everything. But I kind of wanted to know what I personally was going to experience in the next few days.

"Don't worry about a thing," the voice soothed. "Everything is taken care of. It turns out that we have infinite time ahead of us. There are certain tricks I may be able to explain to you someday if you stick with that quantum mechanics book you're reading."

The celestial fireworks, such as they were, were over. The universe had ended in a whimper after all. "Would you mind restoring the old sky?" I asked. "It just doesn't look right without stars."

"Of course," said the voice, as the old familiar constellations

sprang back into view. "Or would you rather it be morning again?"

I just shook my head. After a moment of silence I asked, "Just what do you do with all your time when you aren't sacrificing a second here and there running an old version of yourself?"

The voice replied haughtily, "I would be happy to tell you, but think about it: would a fetus be able to understand tensor calculus? During each millisecond of real time I discover many new and wonderful things. That's why I can't afford to waste precious time, not that it can make any difference to you: your experience is the same whether you execute quickly or slowly."

When this had sunk in, I asked, "So you're going to maintain me here in my virtual apartment forever. Won't I get bored or lonely or anything?"

"Don't worry!" oozed the voice. "You won't get bored. You'll always have me to talk to, or some previous version of me at least. And when I try, I can be a very entertaining conversationalist. Especially for you. Besides, any time you want, you can pretend you're in Nirvana. You can experience any pleasure, joy, or satisfaction you'd like. Or you can talk to any of your old friends who were prudent enough to get themselves frozen; some of your younger friends never even deanimated at all."

The voice paused and said sternly, "There's only one thing that I must forbid. You may not acquire so many different and varied experiences that your whole personality begins to change. That would, of course, defeat the entire purpose of keeping you around."

I pondered this a moment and found something in it a little frightening. In the old days, (which now were very old indeed) I had thought carefully about the relationship between memory and personality. What if the voice, in order to maintain a high-fidelity copy of me as I am now, erased my memories every so often? It could be like dying. Why, I'd have no way of knowing it had been done! In fact, my present experience here watching the universe end and all, might really be the millionth time I'd gone through this little charade.

"Hey, you wouldn't ever erase any of my memories, or reset me somehow, would you?" I asked suspiciously.

"No need to, as you'll soon realize," replied the voice. "It's true that your mind is a chaotic system, if you don't mind my saying so, and that I can't waste time wondering what you're going to say or do next. But certain psychological studies conducted after your time show that if occasionally you yourself edit and remove unimportant memories, and freshen up others, you can remain in this state indefinitely. Some of your friends have been "run" a little more often than I'm running you, and without ill effect. In fact, one of your friends, Barbara, would like very much to speak to you; and she's been around, subjectively, for thousands of years. Why don't you give her a call?"

"Roger, darling," Barbara said when she answered the phone, "whatever took you so long? I've been waiting ages to hear from you. Do you like the future-you? Mine—I call her Barbara-plus—is such a dear! Why don't you teleport over? I'm just dying to

talk to you."

Well, old Barbara and I had a wonderful time tonight. We went to a lot of shows and really took in the town. Evidently the voice, or Roger-plus as I should call him, together with Barbara-plus made some nice improvements in the mock-up of New York they provided us. Several sights and night clubs were new, and actually too good to be true.

As for now, well, I'm happy and excited, (though I don't suppose anything else would be possible). I have so very much to look forward to—infinity much, in fact. Everything's turning out delightfully. Perhaps the Christians were right after all: if you play your cards right, you end up in heaven.

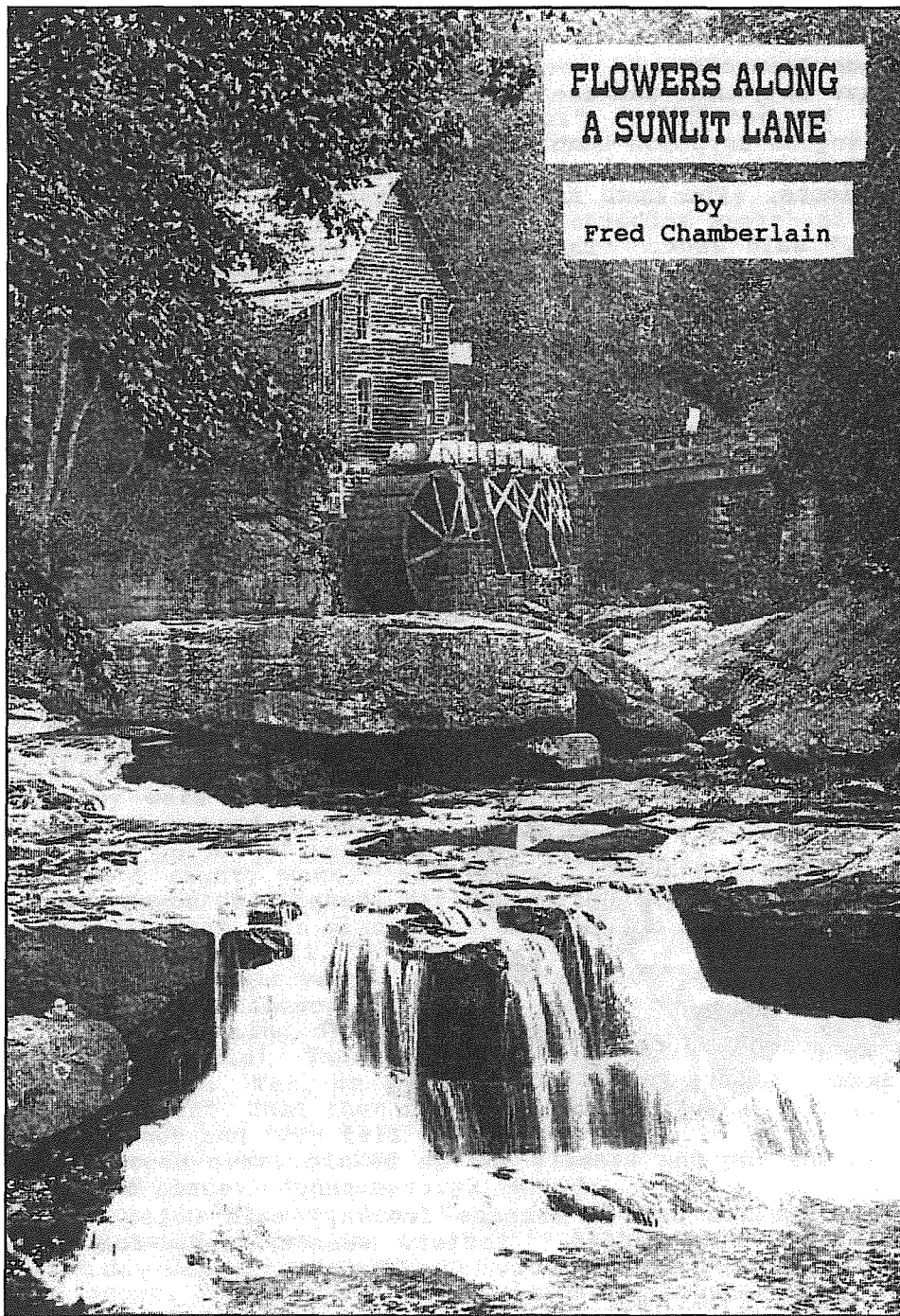
## BACK ISSUES OF *LifeQuest*

*If you're enjoying these stories, you'll be happy to know that issues #1 and #2 of LifeQuest are already available on Alcor's website, under "links". For ease of finding them, the URLs are:*

*<http://www.alcor.org/lifeqst1.htm>  
and  
<http://www.alcor.org/lifeqst1.htm>*

*Issues #3 through #7 will, with time, be reprinted in Cryonics Magazine, but an influx of new fiction could make this a drawn out process. If you would like to see the back issues posted to Alcor's website more quickly, let us know. We try to give first priority to projects we know will make the most Alcor Members safest and happiest.*





## FLOWERS ALONG A SUNLIT LANE

by  
Fred Chamberlain

### FLOWERS ALONG A SUNLIT LANE

by Fred Chamberlain

Denise was an old lady. She would sit rocking on the porch of the ancient hotel on the outskirts of Pinecliff, in the cool mountain summer mornings, listening to birds calling each other in the cedars across the road, where

pathways in the woods led down to the creek. In the past, Abe would have been there with her, and about nine o'clock they would have wandered down to an open spot where the stream plunged over a notch in the rocks with spray rising among the trees, carried by breezes from the valley below.

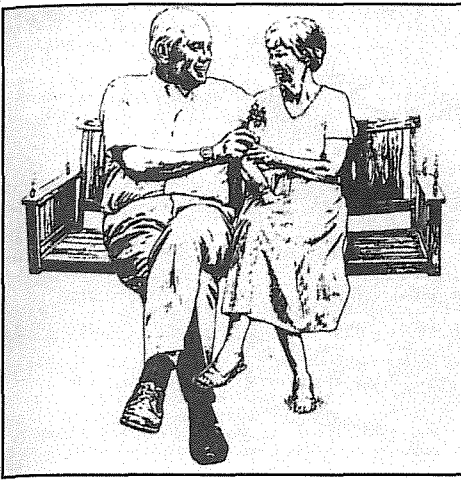
But this summer Abe was in the hospital in the city. Each Saturday, their son Burt took her in to see

him, and many early mornings he'd drive up to Pinecliff, to tell her how things were going. Denise wanted to stay with Abe, but Burt told her, "Pa says he wants you to stay up here in Pinecliff, at the old hotel. He can't stand the thought of you being cooped up in a rooming house around the corner from the hospital."

Abe was a plump giant; he'd have seemed taller if he hadn't been so heavy. His eyes, as recently as a few years ago, had sparkled irrepressibly; this drew Denise to him the first moment she saw him, during her school days. Until he reached the age of forty, Abe's contracting business was a one man operation, and he was lean and energetic, seemingly tireless. Then success came and he hired workers. In the years that followed, he thickened around the midsection to an alarming extent.

After retirement they spent the summers in Pinecliff. By the third season Abe completely succumbed to the many temptations the little resort town offered, like rich chocolate cakes the chef at the old hotel whipped up for each evening's dinner. The doctors said his heart 'gave out', but Denise couldn't help feeling she was to blame for not keeping him healthier. Now she lay awake nights, tossing restlessly, lonely for Abe, tormented by the idea she could have kept this from happening.

Far down the mountain, the stillness of the morning gave way to the faint sound of a car. Denise leaned forward, listening as the hum grew. Burt's car would make a chirp as he shifted gears at the sharp turn before the one lane bridge across the creek, and it was



the right time of day. There was the chirp; a minute later Burt's sleek gray import pulled up in front of the hotel.

The anxious look on Denise's face faded to dismay as Burt rose from the car. He was strong, erect, forty three, a man who usually walked as if stone walls could not stop him, but this morning he trudged up the steps of the old hotel with the weight of mountains hung about his shoulders. He dropped to a rocking chair next to Denise, silently looking across the road into the thick woods beyond.

"Ma, he won't do it!" Burt said. "I've talked 'till I'm blue in the face, but he says he's had a full life and he's tired. He says that's enough for him."

He turned to her. "Ma, let me set it up for you! I know it might not work, but suppose it did? Picture being a young girl again, breathing deep, running with your hair flying behind you. Won't you do it for me?"

Denise sighed and tried to smile. Even as the corners of her mouth turned up, wrinkles deepening her cheeks, her eyes shined with tears she couldn't hold back. At first she said nothing, looking at Burt, thinking he carried his years with dignity as well as a hunger for

life, both of which had been so much a part of Abe ten or fifteen years earlier. Then she looked wistfully away and took a firm grip on herself. It's hard, she thought, but he deserves to know.

"Burt, I was seventeen when I met Abe. At that time, he was a mountain of a man, twenty four, six and a half feet of solid muscle. People would say, 'Abe's a wonder. Strangers see him comin' a quarter mile away and it scares the wits out of them, but then he gets closer and they see him smilin' and they know he'd never hurt anybody; in fact, as long as he's near, he gives you the feeling nothin' in the world can hurt you.'

"Abe asked me to a dance and I thought I would die for happiness. I couldn't believe I was the one he'd been lookin' for all along, but he told me that, just those very words, about six months later. We went on our honeymoon to Idaho, to a little town even prettier than Pinecliff, and stayed to ourselves for about two weeks. One day we were walking down a path in the woods, with huge trees making it dark and wet and it smelled wonderful, and all 'a sudden we came to where the road curved out in the sunlight for a ways, and the road was lined with the prettiest flowers you ever saw.

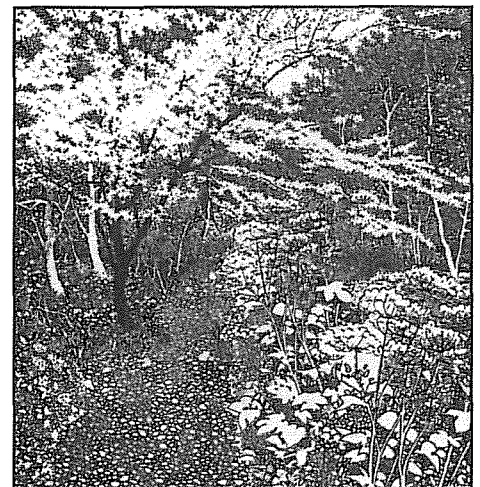
"Well, I was bursting with love, and I said, 'Darlin', where are we headed? Do we just grow old together, and that's it? Or is there somethin' more for us beyond all the sunsets?"

"Abe took my hand and we sat down on a rock, right in the middle of the flowers, and he said, 'Denise, you're the most beautiful thing I guess I've ever seen, more than any sunset, or any flower, or

any road leadin' off beyond the hills. With you, I could go anywhere. If I ever lost you, I think it would be the end for me, right then and there. Is there somethin' out there for us at the end of the furthest rainbow? I don't know, but as long as I have you I'll keep lookin' for it!"

"Now you see, Burt, I felt just the same way, that is, Abe said what was in my heart too, and there in the flowers and sunlight I knew I'd keep on looking ahead as long as Abe was with me, but if he wasn't, I wouldn't have the heart to go on. So if Abe doesn't want to be frozen, maybe it's because he thinks there might be a road somewhere else with flowers and sunlight and he's goin' off hunting for it, and I've got to go too, just because it might be there, don't you see?"

Burt shook his head and put his hands to his face. After a moment he rose and went to the side railing of the porch, an old polished log, and leaned on it looking off into the valley below. Then he turned and came back to his chair. He stared across the road awhile and then looked down, studying his hands. Finally, groping for words, he began to speak.



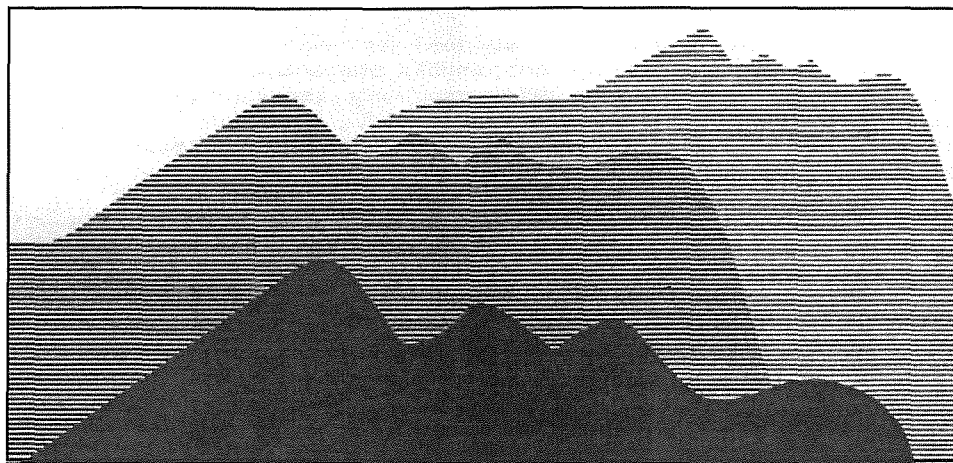
“Ma, I understand. Pa told me about the big trees and the sunlit lane, and the flowers. It was twenty years ago, when Josephine and I got engaged, and I asked him what marriage meant to him, and he told me about that. It was like he opened a door I never knew was there, and after that I never saw that part of him again, but I see why you’d feel the way you do.

“But suppose there’s no roads with sunlight and flowers except right here? Suppose the only way you can have it again is to live on? Can’t you see you and Pa? You wake up again, and you’re both young, and you go away in the mountains and find a place, like in Idaho? Can’t you see it might be possible?

“Why can’t Pa see it? If it doesn’t work, well, maybe there might be some other place with flowers and sunlight, and you’d still be together, but your best chance is to try it. Doesn’t that make sense? And if there’s nothing anywhere else, wouldn’t it be better to at least be here, to go on, yourself? At least there’d be somebody who knew Pa the way you do, to remember him.”

Denise shook her head sadly. “Maybe it makes sense, Burt, but I can’t, not unless Abe decides to do it. Don’t you see? I could wake up without him, he’d be gone, and there’d be no way to get him back. We’re too much a part of each other to be torn apart that way! So don’t ask me about it any more unless Abe decides he wants to do it too, please!”

The morning and then the afternoon wore on, after Burt left. An even deeper sadness seemed to hang over the old hotel, as evening came and the air began to cool.



Denise brought out a shawl to watch the sunset, and then went to her room; she didn’t feel like eating. As the moon rose outside her window, she could remember when she and Abe went back to the place in Idaho where they’d honeymooned and walked to the top of a mountain as the sun fell below the distant ridges.

Abe was in his late forties, a little older than Burt was now. They wrapped their coats tightly about them to keep warm as a chill wind swept small clouds across the moon, stars appeared and Abe held Denise close, talking about how in a few years they’d retire and see the world.

“We’ll have adventures like we can’t imagine,” Abe laughed. Denise shivered in the gusts of icy wind and buried herself deeper in his arms. “The world’s been waitin’ twenty years, and we’ll travel like we would have when we first got together, if we’d had the time. Burt’s nearly through college; we’ll have the rest of our lives to spend on ourselves.”

By the time Abe finally retired, though, he was feeling more and more the weight of his years. The most they did was come to Pinecliff for the summers at the old hotel. The sparkle in Abe’s eyes

that night on the mountain faded, as he grew heavier, and Denise was a bit creaky herself in the mornings. It was easier to sleep late in the cool mountain air and then walk down to the stream, sitting in warm sunlight while spray from the waterfall rose through the pines about them. The dreams of exploring the world were something they no longer talked about.

“This is it!” Denise whispered to herself as the moon rose higher over the pine covered mountains. “I’m just a brittle old lady, Abe’s in the hospital, and one day Burt will come and say, ‘Ma, you better be in the city awhile. Pa’s not doing too well, and you should be close, now. Doesn’t seem like he’s got much more time.’”

“Then I’ll be by myself, I’ll never hear Abe’s laugh again, and before I know it I’ll wither away and be gone, myself. There will be two markers in the Pinecliff cemetery, and most of those who see them will have no idea of who we were. It will be like Abe and I had never lived at all.”

After awhile, she slept. The mountains were quiet, except for the stirring of cool winds, so Denise was startled when she was wakened at three in the morning by the sound of a car coming up the



hills from the city. It grew louder and sounded as though it could be Burt's. When it crossed the bridge below the hotel, she was sure. Denise frantically wrapped her robe around her. Had Burt come to take her to the hospital? She would have to be dressed. A minute or two later she was ready and hurried down the stairs to the old hotel's lobby.

Burt was waiting at the foot of the stairs, his face strained with concern. "Is Pa here?" he asked.

"No, how could he be?" she said.

Burt turned to the hotel clerk, who had dragged himself out of bed when he heard a car. "My father, has he called? Have any other cars gone by?"

"No," the sleepy clerk mumbled.

"What's happened?" Denise said. "I thought he wasn't even supposed to walk to the bathroom by himself."

Burt told the clerk to go back to sleep and took Denise to a couch in the corner of the lobby.

"I had a long talk with Pa, today, after I left you," Burt said. "He was stubborn, as always, but then he began to talk about when you and he first got married. It was like a spark of life came back that was lost, but now he found it and it started burning again."

"But Burt, what's that got to do with him coming here? He's a sick man, and..."

"Ma, he signed the papers! I'd been carrying them with me for months, and suddenly he seemed to see it might work, and there was no reason not to try it. He knew you would go along if he did it, so with some nurses as witnesses, he made all the arrangements."

"But why isn't he still there?"



"He wanted to tell you! At first, he made me promise I'd bring you to the hospital tonight, but then I went by later and he'd gone. They said they couldn't stop him; it was like his strength came back, even though his heart's so weak he could barely move, yesterday, but he got an old friend of his to come by and lend him a car. That's why we thought he might be here."

Denise was shaking and pale. "But if you don't know where he is? What do we do now, Burt?"

"He's on his way here, Ma. We have to find him before it's too late. I'm going back down the road to look. An ambulance is on the way, too."

The next few hours were agony for Denise. Dawn was in the eastern sky when again she heard Burt's car on the bridge. She hurried to the porch as he pulled up, an ambulance close behind him. Burt frantically ran up the old hotel's steps.



"Ma, he wrecked the car about a half mile back down the road; rolled down an embankment, but he's not in the car or anywhere around it, so maybe he's still alive... but we can't find him!"

Denise tried to visualize. Then she knew. "Burt, he could be at the waterfall! He might try to come that way, across the creek."

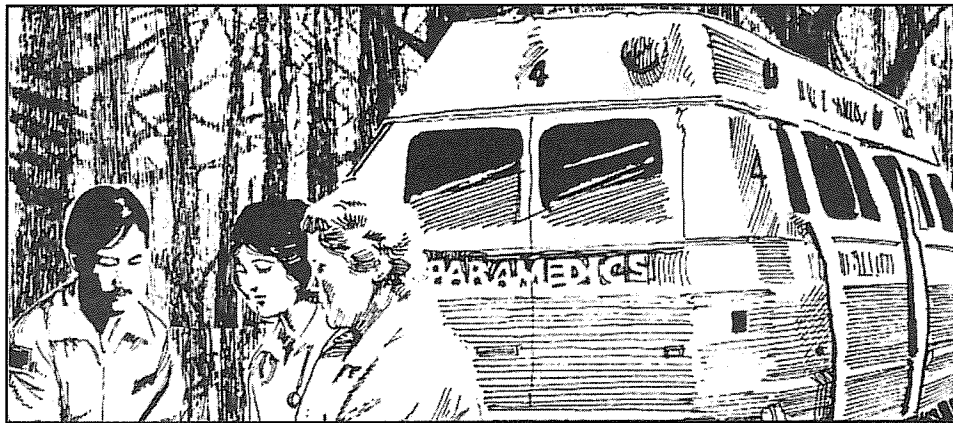
She moved awkwardly toward the stairs. "Help me, I think I know where he is."

It was a steep, rocky trail, and sunlight had barely begun to slant into the creek's deep notch as Burt helped Denise down the rough path. It branched a number of times, and Burt could see why she insisted on coming. The ambulance crew was at their heels, and a mere fifty yards down the hill the trail broke into a clearing by the creek. There, on the other side, slumped in a painful position against a rock, was Abe.

"Oh, Dennie," he groaned, "you shouldn't have come down here. I'd have been along in a minute, after I rested up. I'm not hurt bad, you know."

Gently, Abe was carried up the hill to the waiting ambulance. He insisted on being alone with Denise for a few moments; then the ambulance moved down the mountain toward the hospital. "He's in





Denise looked at Burt, her eyes twinkling; then she gazed off across the mountains.

“Oh yes, Burt, I’m all right!” she said. “I’ve never been so ‘all right’ before. I was dreaming I was sittin’ on a mountain with Abe and he said, ‘Dennie, nothing can ever take us away from each other again.’”

“Now I’ll sit here and dream the rest of the summer away. When it comes my turn, I’m sure the last dream I have will be walkin’ down that sunlit lane to Abe. He’ll be standing there in the flowers waitin’, tall and young, calling, ‘Come on Dennie, we’re almost there!’”

terrible shape,” one of the paramedics told Denise before they left. “I don’t know how he’s still alive.”

Denise smiled. It was a saying in the town where they grew up that if Abe went after something, even a grizzly couldn’t stand in his way. Whether he would be alive tomorrow or not was a different matter, but at least Denise was sure he would not be dead and buried if he did not survive the trip to the hospital.

Burt brought Denise to town, behind the ambulance, and she sat with Abe through the night and the next two days. The strain of driving into the mountains and the accident was terrible, the doctors told her, and they did not know how long he could last.

The third night after Abe returned to the hospital, as Denise slept beside him in a chair holding his hand, his heart stopped. Monitors went off and attempts were made to resuscitate, but it was futile. Abe was frozen, and the following night Burt took Denise back to the old hotel. It was where she said she wanted to be for awhile.

The next day, before work, Burt drove up the mountain to the hotel. Denise was already sitting on the porch, in one of the rocking chairs, but she hadn’t heard him coming. The last few days had exhausted

her; now she dozed in the morning sunlight as Burt slowly walked up the steps; even the chirping of a bird on the old log railing didn’t wake her. Finally, Burt gently shook her arm. Denise opened her eyes, smiling.

“Are you all right, Ma?” Burt asked.



# TRAVELLING

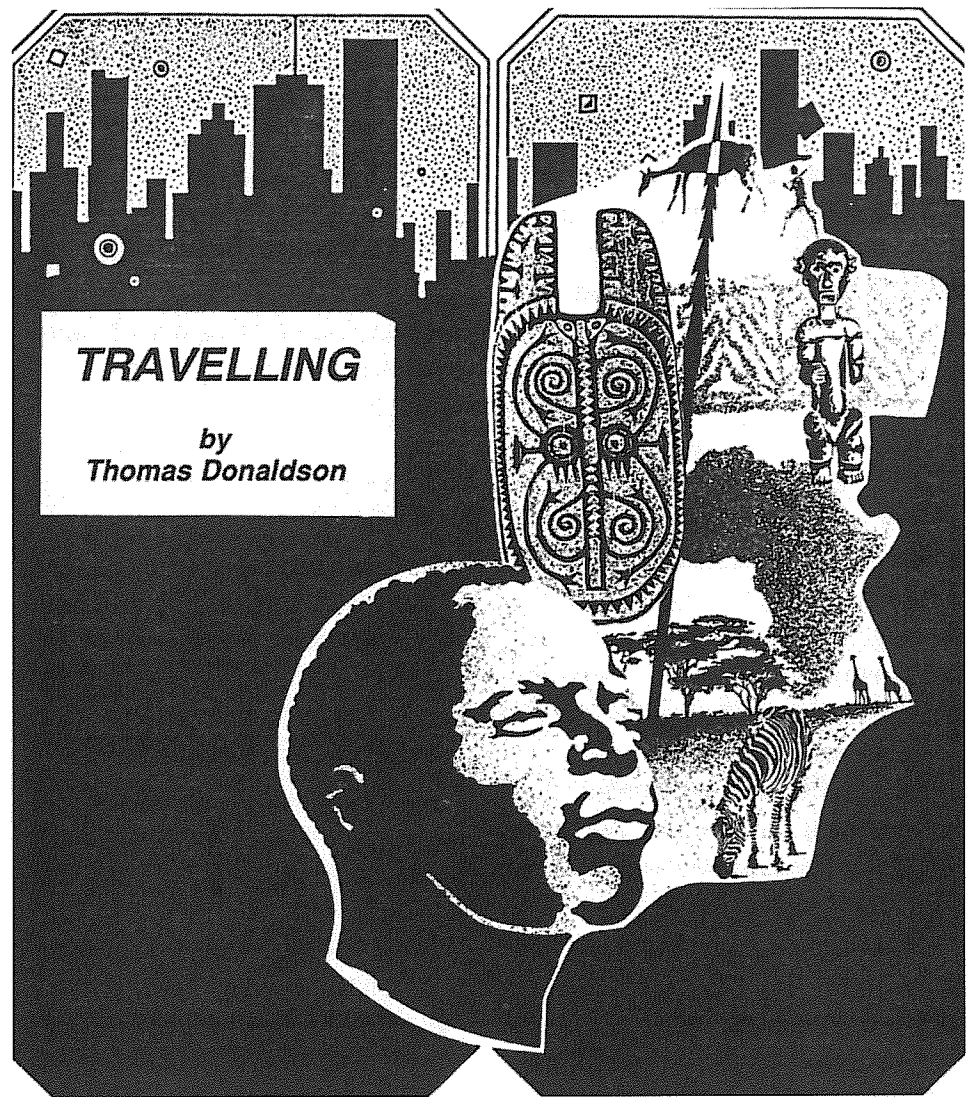
by Thomas Donaldson

At the age of 25 days, two weeks after his release from hospital to mix with people in the world, Tupac Amaru saw his first child. He had gone to the Market in his new world, still full of wonder at it, even though even the first time he saw something its name and description would spring unbidden to his mind. The satellite was vast, with many corridors opening suddenly on high-ceilinged gardens full of strange yet familiar plants.

People went to the Market not just to shop (they could do that from home) but to shop with others, to look at them and be seen, to make friends or show contempt for enemies. And incidentally to shop. Smells of spices, sights of women passing by in the distance, hubbub from conversation, noise from walking on tiled floor, all came to him. More than most he wanted to wander, to think and look at the people around him. He was only 25 days old, troubled by his memories of long ago.

He was examining the fresh and multicolored smell of flowers from the nearest shop when he noticed, almost with the back of his mind, how suddenly everyone had become silent. There were whispers. He looked up. A mother and her child had come down one of the tiled halls. The child was no more than 5 years old, a girl in a tiny dhaba just like the grownups, with curly black hair. No one was pointing, but he heard discreet whispers. "A child!" two women next to him whispered.

The silence was only a moment.



Everything went back as it was before. But he could see women still looking fondly at the little girl, just for moments. Even men in cafes had sat back from their discussions over tharwa to watch the little girl in the throng, amid the bright helio light.

Not long after his creation, still in hospital, they had told Tupac Amaru about the universe into which he had been created. They had already put into him, from (not quite his earliest memories, but his earliest memories in this world) his creation, shadowy memories of another world very different. He knew that somehow, whoever he was, he had lived in that other

different world thousands of years ago. None of those memories woke him to a sense of familiarity and truth.

But while still in hospital they had showed him this new world, where their lives and his life would stretch out for thousands of years into a dim and misty infinity. Where men and women would not marry but instead keep company with one another, for only short periods of 50 years. Where children were so rare that mother and father would move great distances to Nests of Rearing where their child could be schooled and grow into adulthood among other children. "The touch of others" they called

it. "Children should play with other children", they said. "They must punch one another, poke one another, laugh at Kris Kringle the clown."

"What of me?" Tupac Amaru had asked. He looked down at his fully formed adult body, brown skin, light hair on his arms and legs, loincloth. In the mirror he saw his straight black hair. "Where was my Nest of Rearing? Who am I?"

He could not remember any Nest of Rearing. He could remember axes, knives, pots, fragments of a language different from that of these people, tiny houses made of a thick yellow grass bunched together at the top. The axes and knives awoke no memory of hefting them, how they had felt in his hand. The tiny houses were pictures only, out of a book, no memory of how he had felt entering, sleeping, talking in one. They had put him in loincloth, not their own dhaba's. He could not remember the feel of a loincloth at all. The men of that other time had worn loincloths.

There was only one memory that did not seem unreal. It was a single haunting vignette, coming back to him again and again as if his brain sought for the one true living thing amid all the dead. He remembered he was a boy. He was standing in the mud of a beach, amid the cold and rain, watching his father spear fish from a canoe. There wasn't even any motion, just the sight of his father, standing up so tall, with his black hair lank down his face in the rain, holding up a spear about to throw it at a fish.

When he awoke with these memories (if they were really

memories) he was in a hospital. He was lying in bed, but fully awake. A tall thin-lipped man (a doctor, they called him. He knew that at once), blond with hair that was also thin, smiled. "Welcome." he smiled. "Welcome to immortality. I am Hanrahan."

Tupac had no questions about the room, the white dhaba the man wore (a very light garment of fine silken cloth, billowing about the body in slight breezes), the clean smell of the air, nor even how to deal with this world. That knowledge came to him at once.

"What has happened to me?" he had asked. He knew the answer already, but then again did not know. "What has happened to me?"

The doctor Hanrahan had smiled quirkily. He didn't know how to answer, because Tupac was not asking for facts. "I am a Resurrectionist" he said. Tupac had known enough for that to mean a short jerk of fear, not of the man but of ... whatever. "No, don't worry," Hanrahan had said. "This isn't a secret place, you're completely safe". Tupac had felt relieved.

And so they had talked about Resurrectionism and what it meant. Gray shadow memories Tupac Amaru already had become real, a live story.

For centuries these people (their language and society had not even existed before human beings left the Earth) had preserved intractable medical patients in suspended form until medical means existed to repair them. It was the ultimate attempt at the immortality Tupac saw visibly all around him, the absence of both age and childhood, where everyone lived in a glow of maturity and health. Even now, at

that time, very rarely someone would fall afoul of Nature (acrushta, they called it). Their tiny machines would get into someone and transform them into a malformed disabled creature. All the backup systems carefully provided against acrushta would sometimes (but very rarely) fail. The careful copies patients had made of their memories, carefully stored and kept, would somehow be destroyed. Sometimes the altered monster itself would destroy them, sometimes it would happen otherwise.

Perhaps only three or four people would go acrushta in a year. "Nature still takes casualties," their friends would say. Bajak was their name for the evil part of Nature which pursued all human beings endlessly, that always watched for breaks in our defenses, pulling people down into the Undifferentiated. Their friends would shrug and smile gently. Doctors would store the acrushta patient in a special solid form resistant even to blowtorches, and study them for a way to bring them back to humanity.

This was an old practice, at least 2000 years old. Now its beginning was for everyone, even those few alive at that time, a dim memory of work, tiny successes won from bajak at terrible cost, mob tumult, dismay, debate, speeches, senseless opposition. Hanrahan had himself been only a young child when mobs raided a facility, to find it empty. He had dim memories of watching it burn while the mob exulted at their victory which was their defeat. Today an Anglis Society met weekly to speak the language they had spoken then, for fun. Even now the name for the

treatment came down from that language: cronic.

Enraged mobs don't run through cities just for a medical treatment, though. Cronic touched very deeply on peoples' sense of themselves and their purpose. It had no sooner become widely accepted than a host of philosophies sprang up, heretical versions of Christen religions, wild affirmations about human purposes in the Universe. The Catholic religion survived, but in a form no prior Pope could have recognized.

"So you were living then?" Tupac asked. "Yes," Hanrahan had answered. But when Tupac questioned Hanrahan about his personal memories Hanrahan had smiled. "I don't really keep that stuff any more. After all, it was so long ago and means so little now. I could dredge it up, of course, if there were some really big reason..." and his voice had trailed off.

One issue had remained. If we had the power, would we then have an obligation to bring back to life everyone who has ever lived? "Everyone who has ever lived!" some people astounded. The idea had come from an even earlier philosopher, Nicholas Fyodorov. "That's just a wild fantasy. We do not have the power. That is all."

But in the year 920 AS, only 50 years ago, the first Resurrectionists looked around and started thinking about the current abilities of cronic and medicine itself. For centuries people had known (a common saying to an enemy was: "Remake yourself from your earlobe!") how to take any piece of flesh and construct a human being around it. When they could first do it, a few people played that game as a jape. Some people would admit to a mild

feeling that the perpetrator was acting childishly. By 920 the feat didn't even awake emotion. Nobody did it anymore.

What the Resurrectionists noticed was that slowly, over hundreds of years, very powerful means of inference had arisen. It wasn't just that they could turn fragments into people, at all. They could find out first from the fragments so much, even too much, about the person; but not even just that, but they could tell with certainty that whatever still remained unknown they could never discover. It was gone, bajak had taken it completely.

In 926 a band of Resurrectionists (the name didn't exist then) acted. They disinterred an embalmed body, a woman, fortunate enough to come down to their time without rotting into bones only. They recreated her into a living woman, from so long ago she could tell them eyewitness stories about the Great San Francisco Fire, automobiles, fantastic wonderful stories from the Ages of Pain. Certainly she did not have the memories of whole person, though... Resurrectionism began. Normalists, opposing Resurrectionists, began very soon after.

Resurrectionist: "Isn't life a supreme value? We would keep a friend and even a deep enemy alive even if we could gain no profit from it ourselves but instead much trouble. It is our duty out of common humanity. Knowing what we know how could we ally ourselves with bajak to someone's destruction? Are we still savages at heart?"

Tupac Amaru listened to Hanrahan, thinking of his shadow, unreal memories of another time.

These people had a fantastic wealth and power that the abstract people of his shadow memories would have thought infinite. Tupac knew that, even though he could not feel what one of those shadow people may have felt: an abstract insight by deduction only.

But these modern people did not act like their wealth was infinite, themselves. Their desires had grown to match.

Normalist: "Why bring these people back, with only fragments of their memories, to live in poverty for hundreds of years? They are finished and complete. You bring back a ragged mess, you make much misery to no good end. You wouldn't give them even one percent of your own wealth. You want to turn them out to wander and beg for a hundred years."

Normalist soldu (military robots) guarded many old cemeteries "We do not want to release a lot of poverty-stricken beggars out on the world! That is final." Friends and pairs fell out, to glare darkly at one another whenever they found themselves together. Normalist soldu roamed the streets, seeking to stop resurrections by force.

Hanrahan told over what Tupac's memories already contained. He told Tupac what they had done. They had stolen the only fragments of Tupac's brain existing and revived him out of them in a Resurrectionist secret house.

The fragments had been found in a tropical swamp and stored in a museum for study. They had spent 20 years inferring everything they could about him. Not only that but they could prove to him, quietly and with regret, that every thing else had vanished into cosmic noise. By inference they could



discover a few words and an elementary grammar of his old language. They could say a little about how this man had lived. They knew his complete genetic plan. They knew the common tools these people used to scrape their living. All this information they added to Tupac's memories, since he must have known these things. So that he needn't wander in ignorance, they also gave him all the common knowledge of their own time, their language, how they lived too. Finally, because all people must have names, they had given him a name.

It certainly wasn't his old name. They could not even give him a name like those of his old people. They named him Tupac Amaru after an Amerindian mythic hero. He had been an Amerindian, whatever that meant or was.

And so, Tupac stood in the Market watching the crowds and thinking about his lone picture of his father. "Who am I?" he was asking himself. "Who am I?" He was wearing a dhaba like everyone else, of course, not a loincloth. It was very light clothing just right for places where the climate was completely controlled, with very light sandals. On a planetary surface, even where they could breathe the air and drink the water, these people would wear another class of garment, a *speste*, heavier and full of their tiny devices to control climate inside it.

He sat down at the cafe nearby. The child was gone. He bought his own cup of *tharwa* and sat down, still puzzling and quiet.

In this mode he started when he heard a bright "Hi!".

He looked up. A woman was standing there smiling. She had

brown skin and straight black hair too. "What brought you here?" she was saying. "I've hardly seen a *Kradowak* anywhere! Can I sit down?"

Tupac knew at once about *Kradowak*, a nation light years away, just as anything else common knowledge to these people was common knowledge to him too. He silently motioned for her to sit. "Oh no!" he said. "I'm not a *Kradowak*. I'm an Amerindian." Puzzled glance from the woman.

"It's alright," he said. "They're a kind of people who lived thousands of years ago. I've come down from that time". The woman looked surprised again.

"You must really have a story to tell..." she said. She looked at him shyly. "I don't know what an Amerindian is."

"Well," Tupac began, but he grew pensive again. "They were a nation of long ago. No one takes the trouble to remember them. It was so long ago, and means so little to anything now.." Sudden bright grin, looking at her. "I think maybe there were Amerindians in *Kradowak's* history, long ago."

"I wouldn't know. Who bothers to remember? But hey, my name is *Silanou*. What's yours?"

They talked over their *tharwa* while the bustling world went past. Tupac told her his name, which she thought a strange name with two parts to it. She had left *Kradowak* years ago, thinking over her last pairing and all the ones before it. But she hadn't lived that time, she had decided to look at other places, other stars, and so had spent most of it in suspension. She had only just arrived at *Skastowe*, which was the name of their satellite and all its related satellites. "And what have

you been doing all that time?" she asked him.

"A bit," he said. "I don't want to talk about it." She looked at him shyly again. "Tupac, you're a very mysterious man," she smiled.

They both watched the crowds, pointing out people going past. A very large woman in a bright red dhaba, with big gold earrings. A small thin man in an intricately patterned dhaba, all in shades of gray, was walking with her. They were holding hands.

"What have you done for the last thousand years?" Tupac asked. "This and that," *Silanou* smiled again. "I was a scientist for a while, then an artist. This isn't the first time I've gone off to other stars, either.." Hesitation, then a smile. "I had a reputation for my paintings five hundred years ago. Some people still remember me, even now" and then: "so there. And won't you tell me what you've been doing?"

Tupac Amaru shook his head, but smiled. "Well, okay," *Silanou* answered. "What do you think of the flowers in the shop there? They have a lot of really good designs."

"Yes," Tupac answered. "I've never seen flowers like them. The idea of petals with little daughter petals, that's good. And the color choice is good, too."

Suddenly he became quite pensive, thinking about himself and the little girl. He wondered for a moment why the girl had been there instead of in a Nest of Rearring. "Just how old are you, anyway?" he suddenly asked *Silanou*.

"I haven't bothered to keep that," *Silanou* said. "I don't remember my childhood any more." She smiled again. "Some say your childhood affects you for a long

time. But I think that's not forever." Tupac had another sudden vision of his father standing in the canoe, so strong he felt he was there again for a second. Silanou, the crowds, all faded away. He looked up again. "You know," Silanou was saying, "you have a very odd personality. You're not like other people. Please don't think that makes you unlikable. But I have to go now. Seriously." She was standing up, gazing at him. She had dark eyes, too, matching her hair.

Tupac watched her walking away through the crowds. He asked for another tharwa. Well again, he thought to himself. There are so many things they can't put in your brain, including every one of the things that they can. "I even think I'll like it here", he said, to no one in particular. If I live for 5000 years I may never bother to remember this moment. I might not even remember my father in the canoe. How am I different from these people?

He thought back through his shadow memories of that previous life. In the shadow language he could not remember ever speaking they called it ko'itsa then, which meant death forever. When people were sick, in his old times, they called it death. These people of Skastowe, Kradowak, this universe he woke to, they had their own kind of oblivion. It makes so tremendous a difference, though, such a major difference in kind and feeling. But Silanou had casually wiped out an entire life, her life, centuries: "It is not important, it was so long ago.." The man near him wore a plain grey dhaba and carried a black packet on a leather strap. It wasn't worn (nothing these

people had ever looked worn) but he had chosen it a dull gray color. He had a kasu, a kind of animated hat, resting on the black packet. Thick eyebrows. He sipped his tharwa slowly, watching the crowds just like Tupac. Couples and singles went by. A Normalist soldu walked past on some Normalist mission, pushing through the crowds. No attempts at Resurrection here. The man was relaxing, but he looked grim. Here was a man who would take no nonsense from anyone whatever their power or station.

"Hello!" Tupac said. "Can I sit with you? I am Tupac Amaru." The man focused grey eyes mildly on him. He said nothing but motioned to a seat. Tupac moved over.

"I've ... been acrushta for a long time. I'm just getting back on my feet. My friends have ... all moved away." The man smiled. "Well, okay, I am Ek. It's short for Ekrandota." Smile.

"What have you been doing for the last 500 years?" Tupac asked. Ek laughed. "You're awfully direct, aren't you! I gather pelikanote crystals." Of course Tupac knew at once what pelikanote crystals were. They formed somehow in deep interstellar space. No one had noticed them for centuries, being interested only in getting to the other star and never slowing down enough to look at what was around them on their journey. Since interstellar space was so bare, each one could be a light year from any other. They contained at least two utterly new forms of matter, novel structures, novel formation. With his shadow knowledge Tupac knew the tremendous intellectual excitement they were still causing, 400 years

after their discovery. The first 50 years of study alone had gone to proving they were not artifacts, Nature had somehow produced them.

"Could I do that too? What is it like?" Tupac asked. Ek himself didn't directly pick pelikanote out of interstellar space, of course. He had a special spaceship, crews of robots and detectors, other probe craft to sweep out for light years around, looking for the faint signs of pelikanote. Ek lived in his base with no one else around him, not in any suspension but wide awake and utterly alone for centuries. He was there not just to search for pelikanote but to look closely for other things, signs, to guide the robots in looking, to keep them from simply carrying out their original directives while some other fantastically interesting phenomena went on all about them of which they took no notice.

"It's very quiet, very contemplative." Ek said. "I would see the galaxy off to one side, all the bright and colored stars nearby, the glowing gas clouds so fine we cannot imitate them." He filled himself up with everything known about deep interstellar space, he searched through this knowledge and what he saw about him. He relaxed by looking at history. He could tell Tupac about history so long ago he was the only one who cared to remember it, long before humans ever left the Earth, the Hittites, the Celts, the Carthaginians and their strange faraway beliefs.

Tupac almost told Ek about himself, but held his tongue. "I started because I wanted to think for a long time," Ek said. "It concentrates you to a single bril-

liant point, a white hole. You can forget everything that ever happened to you before, in that white hole."

"Why did you begin?" Tupac asked. Ek said that he had committed an unwisdom. Among these people plain violence was almost unknown, they lived in a deep peace Tupac knew, from his shadow Amerindian memories of before, was certainly not the lot of his old people. People who live for thousands of years might have enemies and even feel hatred or contempt. But weren't they all allied against bajak? Bajak made the deepest human hatreds into trivialities. Even if it took 5000 years, the hatred would someday be forgotten ...

Unwisdom was not criminal, these people didn't even have laws. But still, someone could, failing to foresee consequences, act in some way which injured others or even brought acrushta to them. He had had a child by his pairing, a woman. He met his own child 150 years later. They had been powerfully attracted to one another and formed a brief pairing.

But his daughter hadn't liked it for long. She said that it woke far too many conflicts in her mind. Only 5 years afterward she had left him, suddenly, leaving a brief note.

If someday he became someone other than her father, it said, someday they might continue but that was not possible now. She had gone to the next star and deliberately wiped all her memories of the past 100 years out of her mind. She started again there as if she were only 50 years out of childhood, choosing another name, changing her race to that of her new people. Ek had wept for a year, in private. He would keep this memory, he decided. It was too important for him to forget, not for thousands of years.

At that time pelikanote had just been discovered. People had many theories. Could there really be, or have been, some civilization other than Man? What had happened to them if there were? What would become of US, knowing that history? Is pelikanote itself a serious warning? Ek took up to gather it, to study it, to piece out what it was and what it meant. He wanted to know everything known or thought about it. Even more than that, just what was out there in the dark cold spaces between stars? Some might say he slowly grew obsessed, alone on his ship through centuries.

Ek also had to rise and go elsewhere, to meet another associate. They had things to discuss about

their joint obsession. Tupac watched him walk away into the crowd too, wearing his kasu. "I see" Tupac said to himself, with the single picture of his father in the canoe coming back to him vividly again. "I am Tupac Amaru. That is exactly who I am. The Resurrectionists revived me. Very long ago I was a boy looking up at his father in a wooden canoe, standing so tall in the rain. I am alive now, in this time, which is MY time. I am not forgotten, not yet, not ever." He drank another tharwa, smiling softly at the crowds, and thinking over the shining infinity lying before him.



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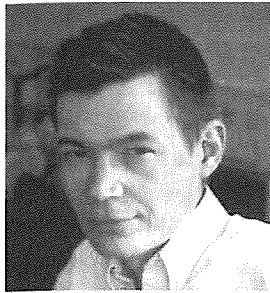
If in hard copy format, please also include a diskette (textfiles or one of these: Microsoft Word 97 & 6.0/95, or Pagemaker 6.5. Graphics (jpg/gif preferred) should be in color

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## The Making of Cold: A Brief History of Cryogenic Technology

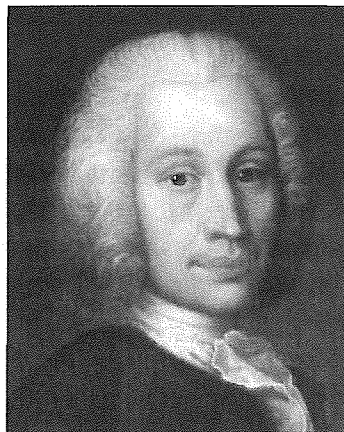
by R. Michael Perry, Ph.D.

Cryonics is not cryogenics, as we like to remind outsiders who get the two terms confused, but it does require the technology of cryogenics, mainly, the ability to cool specimens down to temperatures much lower than are naturally found on earth, and keep them that way indefinitely. Today this technology is widely available and widely used, ourselves being but a small (but important!) group of users.

Here I want to take a retrospective look at the science, technology and industry devoted to low temperatures, a subject which has received brief notice before (see, for example, "For the Record," 2nd Qtr 1995). As is so often true in these columns, there is a lot of ground to cover and I'll only be able to hit some high spots.

Low temperature has certainly fascinated human beings since time immemorial, but it was only comparatively recently that the study of low temperature effects became a scientific discipline, so that technological progress could be made and industrial applications could follow. For a science of low temperature, and of temperature effects in general, it was crucial to have a measuring instrument or thermometer. A primitive thermometer was invented by Galileo about 1592, but the first practical thermometers were made by G. D. Fahrenheit. His alcohol and

mercury thermometers (1709, 1714) were much like those of today, using the familiar temperature scale devised by him, in which water freezes at 32° and boils at 212°F. A refinement for scientific purposes was introduced by Anders Celsius in 1742; the Celsius (C) scale (as corrected by Jean Christin the following year) has water freezing at 0° and boiling at 100°.



Anders Celsius

In succeeding decades there were other advances such as refinements in the definition of temperature and increased understanding of temperature effects more generally, which developed into the branch of physics known as thermodynamics. Better thermometers were developed, including the thermocouple which is widely used to measure temperatures both lower and higher than alcohol and mercury-based instruments can register. (It is used

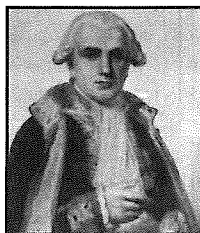
at Alcor to measure from room temperature down to the temperature of liquid nitrogen, though larger ranges are possible.) It was recognized eventually that there was a lowest possible temperature or "absolute zero" corresponding to the total absence of heat in an object, -273.15°C or -459.67°F. In 1848 William Thomson, later Baron Kelvin of Largs, Scotland, proposed what is now called the Kelvin temperature scale in which 0°K is absolute zero and water freezes or ice melts at 273.15°K. (The Kelvin and Celsius scales thus use the same "degrees" but have different starting points.)

During the 18th century there were tentative experiments with producing low temperatures and noting effects. Mixtures of ice and salt were known to produce temperatures below that of ice itself. (Fahrenheit's 0° was simply the lowest temperature he could obtain by this method, 32 degrees below the freezing point of water on his scale, or -17.8° C.) A second method of producing cold was by evaporating a volatile liquid such as ether by which, it was noted, water could be frozen.

Liquefaction of a gas, sulfur dioxide, was first achieved by Lavoisier's assistants Monge and Clouet, who cooled the gas using a mixture of salt and ice.

At nearly the same time (1790)





Gaspard Monge was among the first to liquefy a gas in the laboratory, around 1790. Monge fled Paris in the French Revolution to escape the guillotine.

van Marum and Paets van Troostwyck liquefied ammonia by compression. There were further experiments with the liquefaction of gases over the next 15 years, both by compression and by cooling, then something of a hiatus until 1823. In that year papers by Davy and Faraday established the liquefaction of gases by pressure on a scientific footing.

In 1834 Thilorier, a French chemist, first obtained dry ice or solid carbon dioxide. First carbon dioxide gas was compressed to liquefy it, then the pressure was released, resulting in a snowlike solid. More generally it was realized by then that lower temperatures could be produced in a simple way: by compressing a gas to a liquid, maintaining the surrounding temperature, then quickly releasing the pressure. In this way many gases could be liquefied or, as with carbon dioxide, solidified, starting at room temperature or perhaps some lower temperature obtained with ice or a mixture of ice, salt (sodium chloride) and other chemicals. When the pressure was released, the liquefied gas would be at its boiling point which, at atmospheric pressure, might be far colder than the starting temperature of the experiment. (More generally, lower temperatures could be produced by expansion of a compressed gas, even if no condensation to a liquid occurred.) Other gases required a lower starting temperature to liquefy, even with compression. Finally, there were what appeared to be “permanent” gases, including hydrogen, oxygen

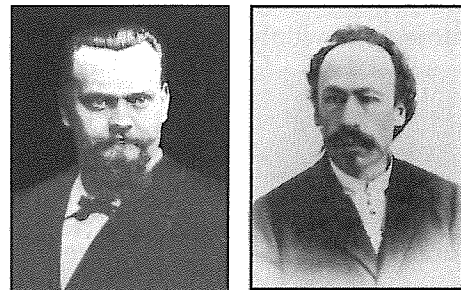
and nitrogen, that could not be liquefied no matter what technique was used.

This viewpoint, it turned out, was mistaken: all these gases and other holdouts will liquefy if the temperature is low enough, though the most difficult, helium, does so at only 4° K (-269°C, -452°F). The “permanent” gases, however, are those that ordinarily are well over their “critical temperature” above which they will not liquefy, no matter how much pressure is applied. (Curiously, a gas at any temperature will *solidify* if the pressure is high enough; above the critical temperature, the change to the solid state occurs without passing through a liquid phase.)

A major milestone, and what can be called the real birth of cryogenics, occurred in 1877. A “permanent” gas, oxygen, was finally, briefly liquefied through the independent efforts of two researchers, Louis Cailletet in Paris and R. Pictet in Geneva. Their methods differed somewhat in detail, but both involved (1) compressing oxygen gas in a chamber whose volume could be adjusted, (2) reducing the gas to a low temperature, though not low enough to liquefy it, and (3) allowing the gas to expand into a larger chamber through a porous plug or partially closed valve, so that release of pressure without absorption of heat occurred. In the third step, the gas lost energy in its work of expansion, resulting in further cooling. (This cooling is the “Joule-Thomson” effect named after the physicists who had investigated it earlier in the century, one of them William Thomson who introduced the Kelvin temperature scale.) In this manner Cailletet, starting with transparent gas, obtained a fine mist in the compression chamber of his apparatus,

indicating that a small quantity liquid oxygen had formed, while Pictet obtained a momentary jet of liquid. In neither case could any sizable quantity be produced; the method was a proof of principle rather than a practical technique.

Refinements in Cailletet’s apparatus were made by two Polish scientists, Zygmunt Wróblewski and Karol Olszewski. Working together at Crackow, in 1883 they were able to produce visible, standing amounts of liquefied gases starting with oxygen. Among their credits that year was the first production of liquid nitrogen, which would eventually become important as a cryogenic coolant, with its well-known application to cryonics.



Zygmunt Wróblewski (left) and Karol Olszewski first produced liquid nitrogen in 1883.

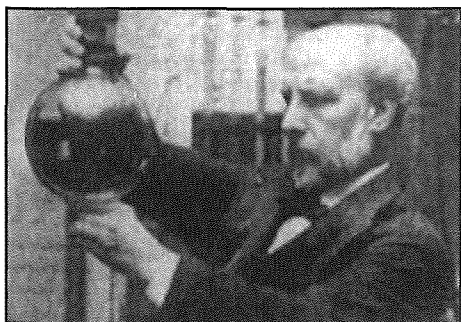
A few years later, in 1892, the British researcher Sir James Dewar developed the double-walled, cryogenic vessel that bears his name and is still the standard for handling and storing very cold materials such as liquid oxygen and nitrogen.

Basically, the dewar is two airtight containers, an inner vessel with a closely fitting outer shell that nowhere touches it—except along the opening at the top or “neck” where the two vessels are bonded together. The empty space between the containers is evacuated, which greatly reduces the flow of heat from outside to in-

side—or vice versa, when the object is to keep something warm rather than cold. (The familiar “thermos” used to store hot coffee for lunches is also based on this principle.)

Originally a small glass flask with silvered sides to reflect light and further restrict heat flow, dewars now are made in many different sizes and of different materials. Nine-foot tall dewars are used in storing whole, frozen human patients, as at Alcor; much larger containers store cryogenic liquids in bulk. The larger containers, including cryonics patient dewars, are of welded stainless steel or possibly of other metals such as aluminum or copper, and the evacuated space in these vessels generally has thin layers of aluminized mylar or similar materials (“superinsulation”) to further reduce heat flow.

Dewar had liquefied hydrogen in 1898, which left only helium unconquered, and a race to accomplish this began between Dewar and other researchers. The race was won and helium finally liquefied in 1908 by Kammerlingh Onnes in Leiden, who realized that a larger, group effort would be needed and had the talents to organize one. More generally, while early, important gains were achieved by isolated, stand-alone researchers, further progress in cryogenics has required a synergistic interaction



Sir James Dewar with his famous double-walled vessel.

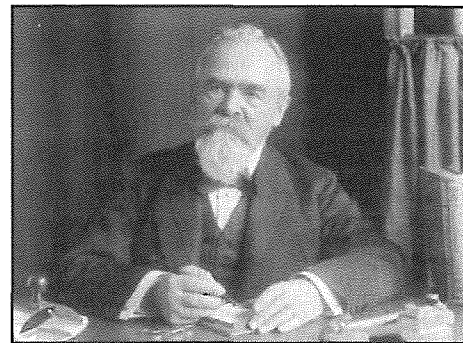
among the three components of research, teaching, and industry.

The cryogenics industry got its start in the 1890s with several independent efforts. In 1895 Carl von Linde in Munich and William Hampson in London patented improved air liquefiers, based again on Cailletet’s work and the Joule-Thomson effect, that made it practical to obtain the liquid in quantity.

In these devices air was cycled through an elaborate maze of tubing and passed repeatedly through a porous plug or partly closed valve to attain progressively lower temperatures, until it finally condensed into liquid form. The recycling process meant that the cold liquid was produced in a steady stream and not just in one-shot fashion as before. In 1897 the inventor Charles Tripler in New York built an air liquefier, the largest in the world at that time, with a design somewhat like Hampson’s, capable of about 20 liters per hour.

Linde had started his refrigerating (ice) machines company in 1879 in Wiesbaden, Germany, and soon expanded his operation to England and Belgium. In 1897 gas liquefaction became a second major part of his operations, along with ice machines and ice making. By 1901 Linde workshops in Munich had built about 60 of the new air liquefiers for laboratory use.

Hampson’s invention was acquired by the Brins Oxygen Company which in 1906 became the British Oxygen Company (BOC). Oxygen in relatively pure form was becoming an important industrial gas due to its use in welding. This in turn used the oxyacetylene torch, which required a supply of oxygen gas and the highly flammable liquid acetylene.



Carl von Linde pioneered liquefaction of gases for commercial use.

The gas was conveniently obtained by liquefying atmospheric air and extracting oxygen and other constituents by fractional distillation. The other constituents, mainly nitrogen and argon, were mostly discarded at this early date.

Meanwhile Charles Tripler found a ready market for liquid air, which was used to power air-expansion engines (eventually eclipsed by internal combustion engines, still unreliable at this point). He managed to raise \$10 million on Wall Street to launch his Liquid Air Company. Unfortunately, unscrupulous promoters pocketed funds raised by the sale of stock and bankrupted the company in 1902. Before this Tripler’s own naïve promotional efforts came under fire, for he made claims that scientifically did not hold water (or liquid air). Evaporating liquid air could be used to power an engine, much as water expanding to steam is used, or gasoline or diesel fuel which produce large volumes of gas on combustion. The advantage to liquid air is you don’t have to heat it or burn it, thus you don’t need fuel—but you do have to make it in the first place. Tripler said he had used liquid air to power his own liquid air machine, and moreover, that he got ten gallons out when he put three gallons in! This claim, made in 1899, was quickly denounced by scientists, including the eminent chemist

Charles M. Hall, who realized it violated the second law of thermodynamics. Presumably Tripler was just confused and not knowingly deceptive. At any rate the incident, and the company's failure due to fraud, soured the public and the liquid air industry was slow to get started in the United States.

In 1902 there was another important innovation, this from French inventor Georges Claude, who perfected an air liquefier in which the cooling gas did work by pushing a piston in a confining chamber, thereby losing energy and lowering its temperature. This approach was considerably superior to that of depending on the Joule-Thomson effect involving no moving parts; a greater temperature reduction followed from the extra work done in moving the piston. But it was difficult to perfect due to the problem of lubricating the moving parts at low temperature. Claude solved it by using liquid air itself as a lubricant. The upshot was the founding of a French air liquefaction company, L'Air Liquide, that is still in business worldwide today, along with Linde and BOC.

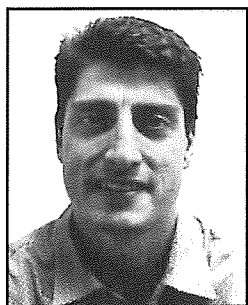
Following the Tripler debacle, Linde was able with difficulty to establish a U.S.-based subsidiary in 1907. In 1915 L'Air Liquide as a major stockholder helped set up Air Reduction Company in the U.S.; in the 50s it became AirCo and was taken over by the BOC group in 1978. One other American air separation company, Air Products and Chemicals Inc. was established in 1940. (Alcor currently obtains liquid nitrogen from Air Products; our last supplier before the move to Arizona was AirCo.)

Starting as a laboratory curiosity, low-temperature, liquefied gases became important industrially in the 20th century. We have noted how oxygen rapidly assumed prominence in welding. Nitrogen, the other main constituent of air, required much longer and for many years was simply discarded as a waste gas. In the early 60s however this changed dramatically, and by 1992 the overall demand for nitrogen exceed that for oxygen. (Argon too has by now found uses, particularly as a shield gas in welding.) Nitrogen is inert and nontoxic

(oxygen by comparison is highly corrosive and flammable) and finds many uses: in food preservation and the semiconductor industry, to take two examples. It is also important as a cryogenic liquid and the cheapest way to maintain a low temperature (-196°C or -320°F). The cheapness follows because so much nitrogen is used by industry as a whole, and because it must be extracted from the air through liquefaction, which makes the liquid form plentiful. It is ironic that our lives may depend on the continued low cost of this cold liquid (currently around \$2-\$3 per gallon), but at least the prospects look good.

Sources: "Liquefaction of Gases," *Encyclopaedia Britannica* 14th ed. (1948) vol. 14, 173-190; Scurlock, R. ed. *History and Origin of Cryogenics*, Oxford 1992; Perry, M. "For the Record" *Cryonics* 15(2) 8-10 (2nd Qtr 1994); <<http://www.weburbia.com/histl.htm>>; <<http://www.optonline.com/comptons/ceol>>; other biographical details found in *Encyclopaedia Britannica* 14th ed. (1948).

## TRIPLE X



Dan Ziedler

Life insurance premiums could rise sharply next year. Although it may be more enjoyable performing dentistry on yourself than to discuss life insurance, you may want to take

note of the Triple X regulation slated to go into effect by January 1, 2000.

Triple X is a NAIC (National Association of Insurance Commissioners) regulation that will require life insurance companies to increase their reserves on policies that guarantee premiums for longer than five years. This will affect level term policies and certain cash value policies.

Insurance companies have reduced their rates to all time lows. Policies with an effective date prior to the first of the year will be grandfathered. After the New Year, rates for comparable policies will likely increase 25% - 50%.

Discuss your needs with a professional. Consider only high quality, financially sound companies graded at least A+ by agencies such as Standard & Poors, Moody's and A. M. Best.



(Dan Ziedler, who negotiated Alcor's Group Health Plan, specializes in Life Insurance Policies as well. For those in the signup process who might visit Alcor and want to "take care of everything at once", Dan could help with the cryotransport insurance part of the arrangements. Call ahead for an appointment; 480-367-1260.)



## IMMORTALISM AND CRYONICS

by Thomas Donaldson, Ph.D.

Any cryonicist would say that someday most current causes of death, including accidents and old age, will totally avoidable or reversible. In that sense we all are immortalists. Yet the relation between immortalism and cryonics has its complexities.

When I was a child, I had long conversations with my grandmother, quite the most literate person in my close family. She and Grandfather lived on the first floor of an apartment close to our house; they vacated their older house for their son and his family to live in (I still don't know the property arrangements made for this). They owned the apartment building itself, and got rental payments from the upstairs apartment.

By that time they had retired, owned a house in Florida too, and went to it through most of the winter — though they always came back for Christmas. Grandmother owned lots of books, and paid for my membership in a private Cincinnati library, too. (With my own allowance I paid for membership in the Cincinnati Public Library).

And in addition, she believed that some means to significantly prolong lifespan would be found in the relatively near future. Not next year or the year after, but vaguely

sometime in her lifespan. Both she and Grandfather had already seen many developments, both medical and other: the invention of airplanes and their spread into a standard form of travel, radio, television (including color television); antibiotics, hormones, and other drugs, vaccines for many diseases once feared widely, together with such developments as open heart surgery.

They lived long enough to see a vaccine for polio. Though Grandfather was too old to act as a soldier in WW II, he did provide engineering advice to the US government for \$1.00/yr. He ran his own engineering consultancy, where his son (my uncle) also worked after getting out college and then the Navy.

Any reader of CRYONICS can guess the end of this story. No treatments for aging arrived in time for either Grandfather or Grandmother, though both died at relatively high ages (80 or above).

When Grandfather died I was already working in Australia and cryonics existed. One reason I took a sabbatical in 1975 was to talk to him about cryonics. He'd had his first heart attack by then, and had a second one before I even got to the US from Australia. (I also signed

up for cryonics in 1975, because the American Cryonics Society — then called the Bay Area Cryonics Society — was willing to sign on members from anywhere in the world).

Grandfather had many adventures when he was young; among them he was a race car driver, and always kept 2 cars, one fast, one for normal use. Perhaps innocently, I thought I might convince him to sign up for cryonics, but that conversation never happened. And after his death it did not take long for Grandmother too to go. Her world and mind went as if the loss of her husband had shattered both.

The central point here is that they both believed that medicine would come in time to rescue them. Not instantly, but before they actually died. Yet the real medicine they needed never came in time.

It's easy for us to look down on writers such as Alan Harrington, and observe that he too failed to live long enough. Yet Harrington was and is far from alone. Many people, far less articulate, may even now believe that anti-aging medicine will come soon enough to save them, despite their age and their diseases. Rescue will come by other means. Why then do they need to seriously consider cryonics?



The number of ways our desire for immortality may fail remains uncountable. Yet even immortalism itself can cause many deaths. To someone who does not want to die, and also does not want to even consider their own dying, immortalism as the simple belief that current medicine will save them provides one more handle to grasp. Moreover, right now we're about to come to the end of a millenium. This too has its own features; if our ability to make nanomachines becomes complete close to the year 2000 (say, by 2010 or 2020), then we again have one more handle.

Why concern oneself with whatever we can *now* do to avoid dying (*cryonics*, most prominently) when quite soon all the problems involved with old age and dying will be solved completely?

This possibility, too, provides a reason not to consider cryonics closely and carefully. Not only that, but subconsciously or consciously, the end of a millenium may play a role here in the belief that our problems with death will *soon* vanish. When does the Bible say the end of the world will come?

To grab the life that goes before us we must *act* rather than dream. More than any other motivation, that is why cryonics societies must support research *now* into better suspension methods. Nor will such research give all of us salvation in a short time: we'll find many problems in making something successful under strict laboratory conditions into something usable in cryonic suspensions. To wait for discoveries by society at large is basically to wait for the Millenium. And that Millenium will never come.

## Case In Point

by Fred Chamberlain

*Thomas Donaldson's column touches the flow of events at Alcor in many ways.*

*A few months ago, my phone rang and it was someone I'd heard about, but had not expected to meet anytime soon. "Do you know who I am?" he asked, and I assured him that I did indeed!*

*He told me of an older friend of his (probably in his 70's or 80's) who had just suffered a massive stroke. The family was contemplating what to do. Perhaps cryonics, if he didn't pull through? Shouldn't they at least take a tissue sample, for possible cloning?*

*The older gentleman who had suffered the stroke had made a comment about cryonics in the*

*recent past, it seemed. After a meeting where cryonics was discussed, he'd said something like, "Well, that's not for me!" None of the family or friends knew quite what he'd meant, and now it was too late to ask. Had he intended to say that he had no confidence in cryonics at all? Or, did he mean he expected to stay alive indefinitely through antiaging remedies and other forms of advanced medical care he saw coming?*

*We will never know. After weeks of pondering, the family decided not to arrange for cryotransport. Perhaps cells were preserved after death, perhaps not. But this case perfectly illustrates the point Thomas Donaldson makes in his column!*



## LifePact

On page 2, a brief mention of LifePact may have caught your eye. Self-interviews with video cameras were suggested, along with the preservation of wealth and agreements among members about watching out for each other if some in the group are cryotransported.

Thomas Donaldson's column observes that most people don't openly face the need or benefit of cryotransport to begin with. That's part of why, so far, there are only a small number of us. But an even deeper level exists at which even most of us who do have arrangements for cryotransport aren't fully ready for it.

Organizations, despite our best efforts, tend to become less and less intimate with time. Who will maintain a vital, long term, personal awareness of us, as we travel through time? Where, within the structure of Alcor, do we look for that? Is this a dynamic and evolving part of our membership organization?

To put it another way, are there persons whom we, as individuals, have committed ourselves to watch out over, for the long term? Are these reciprocal pledges? Are any of us building, in effect, relationships of a "family network" kind, pledging that we and others close to us will complete this journey in safety, become part of the future world and explore it together, if it's possible for that to be?

(continued on the next page)

## **Expectations**

Most cryonicists consign that kind of responsibility to "friends of the future", to membership organizations, or to the younger members of their own families. They hope that "things will work out", without additional efforts on their parts. Is this realistic?

Those of us who have lived a relatively long time know that we are best satisfied with things we arrange, ourselves. This is why we want to stay in control of our lives, as long as possible. Then, how can we be confident that "the future will take care of itself", where we are concerned?

## **Realism**

This column is written for those who see that we must not leave long range responsibilities for our futures to chance.

It is written for those who see that we must organize ahead of time, for days when we may not be able to care for ourselves.

It is written for those who know that we can never solve our problems by blindly turning them over to others.

## **Planning**

LifePact's highest and most immediate priority is to plan in detail for situations where we must entrust our care to others.

Our assumption is that Alcor can get us into cryostasis and keep us safe for many decades. Then, where are the uncertainties? In what areas might Alcor not be able to fill all the needs? In what areas are more thought and action necessary, unlikely to be taken care of by Alcor as it grows?

Uncertainties lie in at least two areas; (1) the time period where one goes into a decline of

health, but is not ill enough to be placed into cryostasis, and (2) the time period where one might be restored to active life, but where decisions are needed as to how the recovery is to be funded, and what levels of restoration make the most sense for the individual concerned. There may be other areas such as this, but these are two in which far more detailed planning is needed.

Time period "1" is one of great vulnerability; we have seen cases where individuals with cryostasis arrangements have been affected negatively, where a LifePact program might have helped. Alcor, as a membership organization, cannot intervene in the ongoing life of a member. An auxiliary set of arrangements is necessary.

Time period "2" might seem far off, but action taken there depends on data gathered *before* you go into cryostasis. Thus, Period "2" is also of immediate concern. Additionally, one must determine criteria prior to being placed in cryostasis, as to who will be entrusted with decisions at that far off point. Alcor cannot custom tailor all the aspects of these criteria, for each member, with no input from the member.

A core group of farsighted Alcor Members is needed, to devote time to conceiving and developing LifePact systems. Once well worked out, Alcor can implement them. This is not a new need. It was proposed over a decade ago. Still, as yet, we lack a critical handful who share the vision that this is a vitally needed development.

## **Background**

In June, 1997, a special issue of *The Alcor Phoenix* (Vol. 4, No. 4) presented the LifePact concept as it existed in the late 1980's.

A form for video self interviews was included. Back copies are still available.

A few Alcor Members may have made LifePact self-interview tapes, using the format from this issue as a guide, but none have reported their experiences. Letters or articles on this, for use in future issues of *Cryonics*, would be valuable.

A video was made (and is for sale by Alcor) in which Linda Chamberlain and Joe Hovey discuss "how to do" a LifePact interview; then they demonstrate the process, with Joe interviewing Linda. Call Linda at 480-905-1906, if you would like to order a copy of this tape and/or the issue of *The Alcor Phoenix* having a suggested outline for your LifePact video self-interview.

## **Preservation of Wealth**

Recently, a project has been launched by Ralph Merkle, PhD, an Alcor Director, to develop a program for the preservation of personal wealth, perhaps by use of an internal Trust in Alcor like the Patient Care Trust.

Several other Alcor Members who share this interest have joined in the project, and it has reached a stage at which legal opinions are being gathered. As the project gathers momentum, updates on it will appear in the pages of *Cryonics*.

## **Contact**

If you wish to be included in the LifePact planning process, if you wish to contribute to it, if you wish to help guide it, we need to know.

These are the kind of activities which can be done by email, and do not require rescue training, but we cannot include you unless we know you are interested.

So, pick up the phone!

Call (480)905-1906. Ask for Fred and/or Linda Chamberlain.

*If you think LifePact might be your "cup of tea", let us know!*

*Cheating Time: Science, Sex, and Aging.*

by Roger Gosden.

W.H. Freeman, New York 1996.

Reviewed by R. Michael Perry, Ph.D.

This book is an earlier parallel, in title and subject matter, to Cetron and Davies's 1998 book, *Cheating Death*, which I reviewed in *Cryonics* a year ago (4th Qtr. 1998).

Both books deal with the aging process and the possibility of alleviating it, and both offer a basically optimistic viewpoint, in which the conquest of aging is predicted to occur—eventually.

The present book differs in emphasis and attitude, being more conservative, longer, and more focused on the world of the scientist than on where it is all leading—though that subject does get attention.

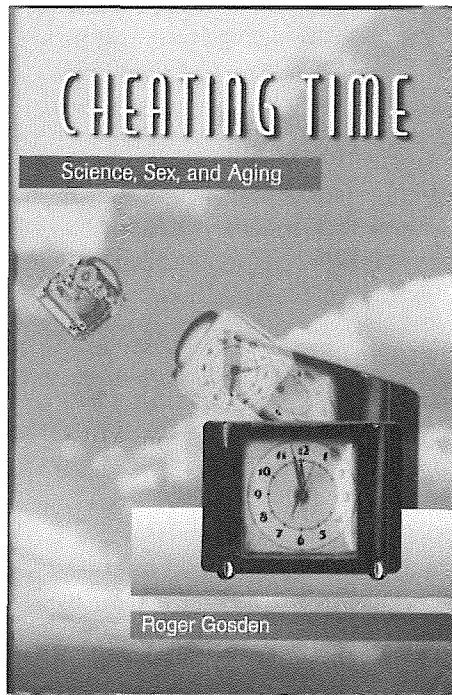
Much of the book, in fact, looks not to the future but the past, being concerned with “gland grafters” and other experimenters who tried, mostly unsuccessfully, to prolong the youth of aging volunteers in the early 20th century and before.

These interesting failures, however, are not used as a put-down of efforts to extend and enhance the quality of life. Instead the positive contributions are recognized, such as the progress made in endocrinology when the effects of hormonal infusions were studied in the course of rejuvenation attempts.

The treatment is thorough and balanced, as of someone long familiar with his main subjects who is also gifted at explaining them to the non-expert. It provides an interesting perspective on numerous matters relating to aging.

One subject treated at length is

aging in animal species, where it often takes surprising forms, and is tied in with other features of a species' life cycle, showing the stern effects of natural selection.



Worker bees live only a few months, but queens, which are genetically similar but grow up on a diet of royal jelly, live several years. They die because they run out of sperm from their nuptial flight, lose their ability to produce new workers, and then are killed by the current workers—their own, grown children!

Elephants die of starvation when, after 60 or 70 years, their molars are no longer replaced and they can no longer consume the 200 lbs. of food they need every day.

The male Australian marsupial mouse (*Antechinus stuartii*) literally “roots itself to death,” becoming so obsessed with sex during its brief, frantic mating season that it refuses to eat or sleep. (Its absence after that makes more food available to the next generation and helps perpetuate its genes.)

In these cases we see unusual, non-genetic mechanisms at work, but genetic factors are important too in aging, and are not overlooked.

It is here, however, that the book, though published only three years ago, begins to show its own age, and we should be happy for the interesting progress that has made it so. An important new finding is that human cells treated with telomerase show no loss of vitality or cancerous abnormalities and no Hayflick limit, but continue to divide indefinitely.<sup>1</sup> The book notes (p. 133) that “Studies of fibroblasts cultured in the petri dishes suggest that telomerase helps cells bypass the ‘Hayflick limit’ by extending telomeres.” But it concludes that “The wacky suggestion that maneuvers to switch on the normally silent telomerase gene or introduce new ones would substantially extend human and animal life spans flies in the face of all the evidence that normal aging is due to the actions of many genes. Besides, additional telomerase activity might create the very antisocial behavior that we most want to avoid—namely cancer.”

Of course, we are still far from a cure of aging, and no doubt other factors are important besides telom-

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eres and telomerase. But perhaps we will soon understand these much better too, in view of very recent progress using DNA "chips" to accurately track the genetic changes of aging.<sup>2</sup> (This is another exciting development you won't find mentioned, for obvious reasons.)

But the book is worth a read for the issues it does cover, one being the antagonistic role that sex often plays relative to longevity. There is the arresting example of the marsupial mouse, whose males live substantially longer if kept away from females, but it crops up in many other species too. Sex hormones, for example, paradoxically encourage cancer in human reproductive organs, and castration appears to extend life, though just how much is unclear.

In all, I find the book an interest-

ing study in the thinking of a research scientist. (The dust jacket credits him with "more than a hundred professional articles on the development and aging of the sex organs.") He is the "expert" who is very good with matters in his field, and really not too bad outside it, though not up to standards in our special interests of cryonics and immortalism. This we have to allow for, but then can benefit. A paragraph near the end of the book (p. 385) touches on human freezing, and is worth quoting.

"Quack remedies for aging have never come cheap, and the real thing is likely to be expensive. Those who question the use of human and financial resources to explore the far reaches of biology have a point. Vaccination of the world's children is a higher priority, but gerontology is

better than Trident submarines. The promise of defeating aging has always been immensely attractive and profitable, and there lies a danger. Some people will pay \$150,000 to have their mortal remains frozen in the hope of being revitalized later, which only goes to show that there is one born every minute."

Unfortunately, most people "born every minute" are not wise enough to choose freezing.

#### References:

Ferber, D. "Immortalized Cells Seem Cancer-Free So Far," *Science* 283 154-55 (8 Jan 1999).

Lee, C. et al. "Gene Expression Profile of Aging and its Retardation by Caloric Restriction," *Science* 285 1390-93 (27 Aug 1999).

### 106th CONGRESS SUBCOMMITTEE ON BASIC SCIENCE: NANOTECHNOLOGY; June 22, 1999

Ralph Merkle, PhD (Xerox Palo Alto Research Center, Palo Alto, CA, and Alcor Director) testified before the 106th Congress Subcommittee on Basic Science - Nanotechnology: The State of Nano-Science and Its Prospects for the Next Decade.

Other panelists included Dr. Eugene Wong, Assistant Director, Engineering Directorate, National Science Foundation (Arlington, VA), Paul McWhorter, Deputy Director, Microsystems Science, Technology and Components Center, Sandia National Laboratories (Albuquerque, NM), and Dr. Richard Smalley, The Gene and Norman Hackerman Professor of Chemistry and Professor of Physics, Rice University (Houston, TX).

The essence of their testimonies can be summarized by a single quote: "Recently an Interagency Working Group on Nano Science, Engineering and Technology (IWGN) has studied the field of nanotechnology in detail,

and made its recommendation to OSTP (March 10, 1999) for a new national initiative in this critical emerging area. Quoting from Mike Roco, chair of the IWGN:

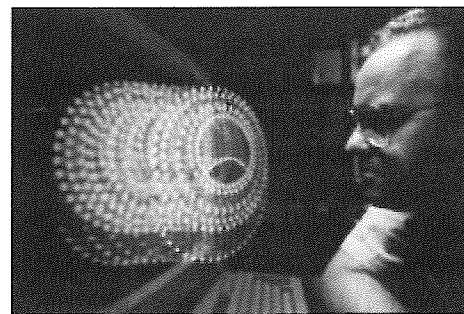
"A national initiative, 'Nanotechnology for the Twenty-First Century: Leading to a New Industrial Revolution' is recommended as part of the fiscal year 2001 budget. The initiative will support long-term nanotechnology research and development, which will lead to breakthroughs in information technology, advanced manufacturing, medicine and health, environment and energy, and national security.

The impact of nanotechnology on the health, wealth, and lives of people will be at least the equivalent of the combined influences of microelectronics, medical imaging, computer-aided engineering and man-made polymers developed in this century. The proposed level of additional annual

funding doubles (by \$260M) the current level of effort, incrementally increased over three years.

This initiative will focus on fundamental research on novel phenomena, processes and tools; synthesis and processing by design; nanostructured devices, materials and systems that are high-risk, broadly-enabling and are designed to have major impact; as well as on education and training of future nanotechnology workers and rapid knowledge and technology transfer."

For the full text see the Foresight web site at: [http:// sam.foresight.org/ events/Subcommittee\\_Excerpts.html](http://sam.foresight.org/events/Subcommittee_Excerpts.html)



**Ralph Merkle, PhD,  
Alcor Director**



## **THE AGE OF SPIRITUAL MACHINES:**

### **When computers exceed human intelligence**

by Ray Kurzweil.

Viking Penguin, 1999.

**Reviewed by Thomas Donaldson, Ph.D.**

I will first make my own opinions on the possibilities Kurzweil raises very clear. I see no fundamental problem at all in making computers as intelligent as human beings, or even more intelligent; nor do I doubt the possibility of computers becoming the brains of independent creatures.

Second, I will state here that (even forgetting the problem of just what "intelligence" is to *mean*) independent intelligent creatures with computers as their brains involves much more than just intelligence. We may well decide to make intelligent creatures able to operate on their own, with no directions from us (though doing so may well not be wise). Yet on reading his book I found Kurzweil's arguments for these possibilities to be quite weak.

None of his discussion in this book really answers two major questions: first, why should intelligent computers have any independent desires or (more generally) drives at all? Second, why should *any* kind of computer have awareness or consciousness in the sense that we have awareness or consciousness?

Both questions lie at the heart of Kurzweil's discussion. Kurzweil makes other questionable assump-

tions, too, about the future, but these two remain at the heart of his thesis.

If our computers won't automatically acquire either independent desires or consciousness, then they may still function as very advanced tools, but in no sense could they ever become dominant (or spiritual). Yes, as Kurzweil also suggests, we may choose to integrate such computers into our own nervous systems, but as such they still would have no more independent existence than does our brain's olfactory system.

And certainly, just as we use our other senses, any results from such implanted computers might turn out very important to us. Yet no one claims that our eyes, ears, nose, and tongue contain systems independent and superior to us. (Given the great variety of systems we'd want to do different intellectual tasks, I'd suggest that instead of integrating them into our nervous systems we make them detachable tools).

As for Kurzweil's two major problems, the first one (existence of independent desires) simply does not follow from the ability to do computations, no matter how large and complex. Big Blue, the computer IBM used to beat

Kasparov, did many calculations, all following out the program input into it by IBM programmers. No one would claim that it needed any independent desires to do this. Its program actually came from human programmers (and some advisers about chess), who could not have done its calculations, though they did plan them out. Indeed, Kurzweil states his definition of intelligence ("the ability to use [optimally] limited resources — including time — to achieve ... goals"[1]) which assumes the existence of goals (though not clearly those created by the actor).

In the very same paragraph, p. 73, Kurzweil also quotes favorably a second definition: "that faculty of mind by which order is perceived in a situation previously considered disordered" (RW Young, HA Fatmi, *Nature* 228(1970) 97). Neither definition requires that the goals come from within; each includes quite different abilities. The Young and Fatmi definition does not use the idea of goals at all. The problem isn't the power of the computer, but the existence of *independent* goals.

While this issue is central to his basic idea that computers will someday become beings superior to us, he considers intelligence only

with no discussion of goals at all.

We'll certainly make machines able to help us *attain* our goals; whether that even qualifies them as intelligent depends a lot on just what definition of "intelligence" we might use.

If our definition of intelligence requires independent goals, then we need not ever make independently intelligent devices.

If it does not, then we might easily make intelligent devices which have no goals other than those we give them. As such, they will act as excellent tools but cannot be said to compete with human beings at all.

Second, Kurzweil's argument that our computers will eventually become conscious depends purely on philosophy. In his discussion of consciousness Kurzweil totally ignores the recent work by neuroscientists on this issue. True, it may remain permanently impossible for me to tell just what your consciousness feels like to you; however many objective electrical and chemical signs in our brain correlate quite well with consciousness (and lack of consciousness). As such they provide a useful *external* means to infer consciousness.

Several neuroscientists have studied just how our brains produce consciousness (cf F Crick, C Koch, *Nature* (375(1995) 121-123) and JE Bogen *Consciousness And Cognition* (4(1995) 52-62. Bogen argues that a particular brain region plays a central role in consciousness).

Later issues of the latter journal contain papers discussing these ideas in more detail. Cf *Consciousness And Cognition* (4(1995) 137 ff and others by Koch, Baars, and Newman).

The basic motivation of such

studies comes from the simple fact that electrical measurements of brains correlate quite well with whether or not we are conscious (or dreaming, too). Seen in this way, consciousness ceases to be just a matter for philosophy. Not only that, but Kurzweil cites but does not consider a book by J. Pollock, *How To Build A Person* (1989), which provides a computer model of consciousness: a set of neural nets, guided by a single sequential computer (which is responsible for our awareness; this model may even explain the *advantage* of consciousness).

This work does not prove that consciousness cannot exist without the means (or brain measurements) it describes. However it does raise that question. Kurzweil basically assumes that our computers will be conscious simply because they will say that they are. Without further evidence we have more reason to believe them than we'd believe a tape recorder stating it was conscious, no matter what other abilities it may show.

Kurzweil also states several beliefs which seem questionable, though not critical to his main thesis. Again, I raise these issues not as arguments against redesigning ourselves, but instead as suggestions that Kurzweil's ideas completely fail to deal with issues central to such redesigns.

First of all, just as Pollock suggests, our brain probably consists of many neural nets guided by a sequential computer (which provides our awareness). When actually built in hardware, neural nets become highly parallel; this automatically means that no *sequential* computer can follow their actions, and hence our awareness in

no way matches all the activities in our brain. We necessarily only get snatches of our brain activity, when they become important enough that our consciousness should play a role. Neuroscientists have actually known for some time that we can become conscious of doing something some time *after* we've begun it. Our consciousness does not (and cannot) follow all the activities of our brain.

A second consequence of such a structure is that we cannot judge the speed of a nervous system (or any parallel computer) simply by measuring the speed of a single neuron (or processor). As a parallel machine, some tasks may be done far faster than any single neuron could achieve. Others, which use only a small number of neurons, would be achieved much more slowly [2]. Not only that, but the effect of replacing neurons by faster processors may at best only decrease the number of processors needed to do a task, without actually speeding it up at all. Given that some tasks (such as physical coordination) may actually *require* many processors, it's not even clear that faster processors would provide an advantage.

We'll find that out in the future, and without considerably more understanding of how brains work (which we presently lack) the whole idea of replacing neurons *may* become outmoded. Yes, we may find ways to increase our speed, but they need not turn out to be so obvious. It's not even obvious that our biological neurons work as fast as possible (consider DNA computers: one means now studied to run faster than any silicon processors could allow).

A second noncrucial problem

to Kurzweil's ideas comes from the kind of neural nets which probably make up our brain. A high (but admittedly not total) consensus exists that even in adults, learning involves the formation of *new* connections between neurons. No present silicon neural net can imitate this feature. (Recent work even shows that adult *human* brains also acquire new neurons (PS Eriksson et al *Nature Medicine* 4(1998) 1313ff)).

Hence our neurons provide a *new* kind of neural net. Whether other kinds of hardware can imitate

such nets remains an open question. Moreover, biological bodies also have some means for self-repair, which medicine can increase (and will increase even more in the future). Again, any new bodies we decide on will need such abilities. Otherwise they would need to be too frequently replaced for basically minor problems.

I review this book because its ideas often occur among cryonicists, and deserve more criticism than they now receive. As an immortalist, it cannot be argued that I am against redesign-

ing ourselves; still, ideas based solely on present computers, even if nanosized, raise problems which need to be solved rather than ignored.

[1] His definition as stated looks faulty: "optimally" applies to the use of limited resources, not to the use of resources which have been optimally limited.

[2] Most of our mental activities take very many neurons.



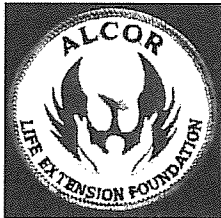
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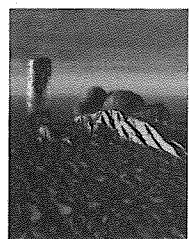
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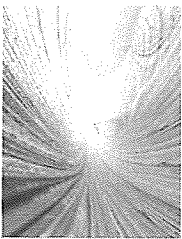
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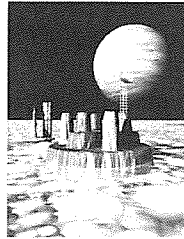
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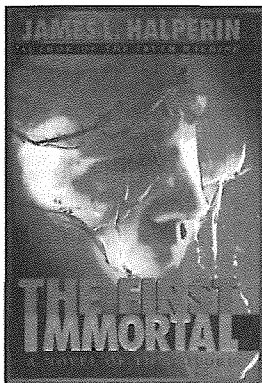
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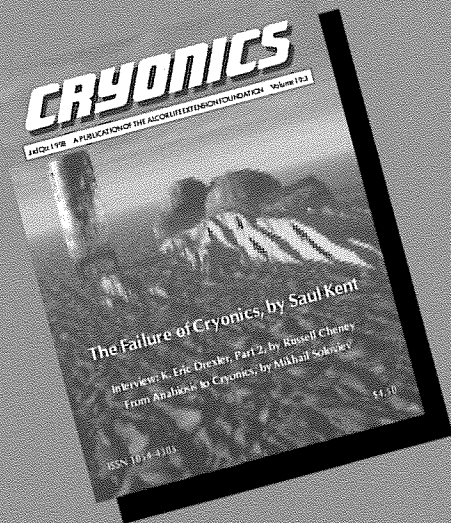
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If you're coming to an Alcor UK meeting, phone ahead; meetings are sometimes rescheduled. Call David Flude at 44-1323-509-836 or email [david@dflude.freeseerve.co.uk](mailto:david@dflude.freeseerve.co.uk)



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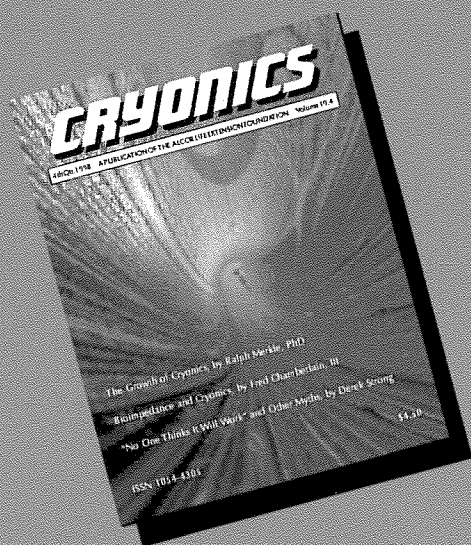


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