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LONG LIFE

Longevity Through Technology

Volume 50 - Number 02

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The Immortalist Society wishes to thank the American Cryonics Society (ACS) and cryonics trusts managed by ACS for sponsoring non-subscriber mailings for this edition

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www.cryonics.org | www.americancryonics.org

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Don't wait to make your plans. Your life may depend on it.

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CRYONICS INSTITUTE
Technology for Life

Why should You join the Cryonics Institute?

The Cryonics Institute is the world's leading non-profit cryonics organization bringing state of the art cryonic suspensions to the public at the most affordable price. CI was founded by the "father of cryonics," Robert C.W. Ettinger in 1976 as a means to preserve life at liquid nitrogen temperatures. It is hoped that as the future unveils newer and more sophisticated medical nanotechnology, people preserved by CI may be restored to youth and health.

1) Cryonic Preservation

Membership qualifies you to arrange and fund a vitrification (anti-crystallization) perfusion and cooling upon legal death, followed by long-term storage in liquid nitrogen. Instead of certain death, you and your loved ones could have a chance at rejuvenated, healthy physical revival.

2) Affordable Cryopreservation

The Cryonics Institute (CI) offers full-body cryopreservation for as little as $28,000.

3) Affordable Membership

Become a Lifetime Member for a one-time payment of only $1,250, with no dues to pay. Or join as a Yearly Member with a $75 inititation fee and dues of just $120 per year, payable by check, credit card or PayPal.

4) Lower Prices for Spouses and Children

The cost of a Lifetime Membership for a spouse of a Lifetime Member is half-price and minor children of a Lifetime Member receive membership free of charge until the child turns 18 years of age.

5) Quality of Treatment

CI employed a Ph.D level cryobiologist to develop CI-VM-1, CI's vitrification mixture which can help prevent crystalline formation at cryogenic temperatures.

6) Locally-Trained Funeral Directors

CI's use of Locally-Trained Funeral Directors means that our members can get knowledgeable, licensed care. Or members can arrange for professional cryonics standby and transport by subcontracting with Suspended Animation, Inc.

7) Funding Programs

Cryopreservation with CI can be funded through approved life insurance policies issued in the USA or other countries. Prepayment and other options for funding are also available to CI members.

8) Cutting-Edge Cryonics Information

Members currently receive free access to Long Life Magazine online or an optional paid print subscription, as well as access to our exclusive members-only email discussion forum.

9) Additional Preservation Services

CI offers a sampling kit, shipping and long-term liquid nitrogen storage of tissues and DNA from members, their families or pets for just $98.

10) Support Education and Research

Membership fees help CI, among other things, to fund important cryonics research and public outreach, education and information programs to advance the science of cryonics.

11) Member Ownership and Control

CI Members are the ultimate authority in the organization and own all CI assets. They elect the Board of Directors, from whom are chosen our officers. CI members also can change the Bylaws of the organization (except for corporate purposes).

The choice is clear: Irreversible physical death, dissolution and decay, or the possibility of a vibrant and joyful renewed life. Don't you want that chance for yourself, your spouse, parents and children?

To get started, contact us at:

(586) 791-5961 • email: cihq@aol.com

Visit us online at www.cryonics.org


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LONG LIFE
MAGAZINE

A publication of the Immortalist Society

ORGANIZATION NEWS

FEATURE STORIES

ONLINE PDF HYPERLINK COMPATIBILTY

Since different browser configurations handle pdf links differently, if you have trouble opening any hyperlink(s) in the magazine, try these steps:

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2. Download the pdf file to your desktop. Open downloaded file in Adobe Reader or your preferred PDF viewer.
3. Change PDF viewing settings / extensions on your browser (*advanced users only*)
4. Try a different browser (especially if you're using Internet Explorer.) We recommend Google Chrome.

You've signed up for Cryonics Now what should you do?

Welcome Aboard! You have taken the first critical step in preparing for the future and possibly ensuring your own survival. Now what should you do? People often ask "What can I do to make sure I have an optimal suspension?" Here's a checklist of important steps to consider.

- ☐ Become a fully funded member through life insurance or easy pre-payments

  Some members use term life and invest or pay off the difference at regular intervals. Some use whole life or just prepay the costs outright. You have to decide what is best for you, but it is best to act sooner rather then later as insurance prices tend to rise as you get older and some people become uninsurable because of unforeseen health issues. You may even consider making CI the owner of your life insurance policy.
- ☐ Keep CI informed on a regular basis about your health status or address changes. Make sure your CI paperwork and funding are always up to date. CI cannot help you if we do not know you need help.
- ☐ Keep your family and friends up to date on your wishes to be cryopreserved. Being reclusive about cryonics can be costly and cause catastrophic results.
- ☐ Keep your doctor, lawyer, and funeral director up to date on your wishes to be cryopreserved. The right approach to the right professionals can be an asset.
- ☐ Prepare and execute a Living Will and Power of Attorney for Health Care that reflects your cryonics-related wishes. Make sure that CI is updated at regular intervals as well.
- ☐ Consider joining or forming a local standby group to support your cryonics wishes. This may be one of the most important decisions you can make after you are fully funded. As they say- "Failing to plan is planning to fail".
- ☐ Always wear your cryonics bracelet or necklace identifying your wishes should you become incapacitated. Keep a wallet card as well. If aren't around people who support your wishes and you can't speak for yourself a medical bracelet can help save you.
- ☐ Get involved! If you can, donate time and money. Cryonics is not a turnkey operation. Pay attention and look for further tips and advice to make both your personal arrangements and cryonics as a whole a success.

CRYONICS INSTITUTE
Technology for Life

LONG LIFE

A quarterly publication of the

Immortalist Society

24355 Sorrentino Ct. Clinton Township MI 48035-3239

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Secretary: Royse Brown • Treasurer: Rich Medalie
Director-at-Large: Stephan Beauregard

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CI EXECUTIVE REPORT

Dennis Kowalski - President, Cryonics Institute

Dennis Kowalski - CI President

Hello All

We are coming up on election time again and it's time we think about who we want on the CI Board of Directors. CI's leadership is comprised of fully-funded members who themselves hope to be cryopreserved in the future. If you meet those criteria and would like to run for a Board position and potentially have a hand in CI's leadership and decision making, this would be the time to seek out information and to submit your nomination. If you are interested in running for office, please submit your request before the due date **of July 30th** to cihq@aol.com. If you are not sure about the requirements to run for office, please give us a call at 586-791-5961 or email cihq@aol.com in advance of the due date. CI is uniquely democratically run and thus our members have a vested interest in how CI is managed. It is important to choose wisely.

We currently have four excellent incumbent directors that I wholeheartedly endorse and recommend for your consideration. The four directors up for election this term include Constance Ettinger, CI's Contract Officer, Pat Heller, CI's Treasurer, Joe Kowalsky, CI's Assistant Secretary and Paul Hagen, CI Director. All of these directors have announced their intentions to run and I wish them all the best of luck.

I hope that you are happy with the progress at CI so far and endorse the direction that we are heading. If you like what you see, please give your support by voting and showing your approval for all the positive work that is being done.

Whether you yourself run for election or not, please remember that CI is a member run organization and that there are many other ways to volunteer and help out. Donations of time and money are always welcome and they make us stronger. If you would like to volunteer or donate money please see http://www.cryonics.org/donate/ or send me an email at dennis@cryonics.org.

Things are moving along at CI very swiftly as we have recently expanded in Clinton Township to accommodate additional operations here in the Michigan area and westward. The Cryonics Institute currently has more members signed up and more whole body suspensions than any other organization and we are growing at a faster pace as well. If positive growth is what you want, and you agree that there is strength in numbers, then we can all be proud of this expansion for both CI and cryonics itself.

I would also like to announce the addition of a new fulltime staff member at CI to assist with the increasing workload and growth we are experiencing. I am very happy to introduce our newest employee and handy man, Mike McCauley. If you happen to see him at our AGM please welcome him aboard. Mike has proven to be a hardworking and dedicated person and that is just what we need at CI. He provides additional depth and redundancy to our organization and I wish him a long and prosperous future with the Cryonics Institute. Welcome to CI Mike - we're certainly glad to have you on our team!

There is still a lot of work to be done. And that work starts with each and every one of us. I say it nearly every time I speak, that what we do as individuals to prepare in advance makes all the difference. I would like to again remind everyone to take a moment to review your own suspension plans and see what you can do to improve them a little more. We have included "to do" lists in the magazine and helpful information in the Resources section of the CI website. Please take advantage of those materials and also share your experiences, both good and bad, so that we can all learn and have the best chance to see the future.

Recently a very public figure in the cryonics movement, Robert Nelson, passed away and is now CI patient number 170. Nelson helped to found the Cryonics Society of California which was the first organization to actually permanently suspend a person (James Bedford) using the concepts of cryonics created by CI's Robert Ettinger. Bedford was frozen by Nelson on Jan 12, 1967, breaking new ground and taking the concept of cryonics from an intellectual dream to a physical reality. In this regard Nelson was a pioneer who paved the way for the rest of us to follow.

Nelson's life was a wild roller coaster of raw enthusiasm and initia-

tive as well as controversy and, yes, failure. Despite his early successes and efforts, the Cryonics Society of California was eventually dissolved which led to the infamous Chatsworth disaster in which nine suspended people ended up buried or cremated. Sadly, the fallout from this led to lawsuits and a whole lot of bad PR for the nascent cryonics community as well as the tragic loss of potential life.

Many people in the media and even some within the cryonics community vilified Nelson as a scam artist for letting the disaster occur. Others like CI's Robert Ettinger were kinder in their assessment of Nelson. They saw him as a simple do-it-yourself guy who got in way over his head. I myself spoke with Robert Nelson and believe the latter as Robert Ettinger did. I believe Nelson had good intensions but perhaps wasn't the best planner or businessman. He was impulsive right till the end and was a bit of a leap-before-you-look person - which, unfortunately, we still see sometimes in cryonics today.

However, we really did learn a lot from Nelson both positive and negative. Nelson was correct that waiting for perfect circumstances to get started would probably have cost the cryonics movement many years and many lives. Even Ettinger was surprised at the delay in action after his famous book was published. There are even some who argue that we shouldn't be freezing people right now. They argue that the idea is still premature and the technology isn't perfected. I say "Tell that to the people who can't wait that long." How many people die of terminal illness waiting to get an experimental drug because of pencil pushers who don't want to take chances or assume any risk?

We also discovered that expecting ongoing cryonics maintenance payments from a preserved person's family on a handshake deal was a very bad business decision. One of Nelson's chief problems was caused by skeptical surviving family members simply stopping their payments. Today, responsible cryonics organizations require full payment or proof of funding up front.

Ultimately, I think Nelson was a good person with real flaws and rather than focus on the negatives I want to celebrate what we learned from him. Say what you will about Nelson, but he was a pioneer and those who came after him learned and benefited from everything he did in one way or another.

Ironically, before he died Nelson made one more mistake that we can learn from. Upon review of his case report you might notice that he was not perfused, and frankly, was almost not suspended at all. He put off funding verification with CI, even after repeated warnings. I am not sure why he did this but it reveals to me that Nelson himself was not immune from his own flaws. I don't think he was a bad person. He simple had very human faults and weaknesses. For good or bad it was who he was.

In the end, I am very happy that this was straightened out by his family and CI who worked hard to honor this man's wishes. The final lesson of Robert Nelson was not to take planning for granted and to make sure you have done all you can to eliminate problems before they happen. Can you look in the mirror and say you have done all that you can? If there is any doubt in your mind, please take some time to look at our resources and to check and double check your own situation. Your fate will most definitely depend on it.

Let's try to learn from past mistakes rather than repeating them.

In closing please don't forget about our 2018 AGM. Details are below as well as on the following page.

The 2018 Annual General Metings of the Cryonics Institute and the Immortalist Society will be held Sunday, September 9th at the ConCorde Inn Hotel & Conference Center in Clinton Township, MI. beginning at 3:00 p.m. local time.

Rooms at the ConCorde Inn are on a first-come, first-served basis, so please make your reservations now. **Regular rates are $139.99 but reduced to $89.99 if you mention you're with CI or use promo code 0908CI**

http://www.concordeinns.com.

I always enjoy the chance to meet members in person to share ideas and perspectives on cryonics and the Cryonics Institute and the Annual General Meeting offers members the opportunity to meet other members and guests from around the world. It also gives people the chance to meet and talk with Officers, Directors & Staff, including myself.

I would also like to note that our meeting is open to the general public, so if you aren't a member but have been thinking about signing up for cryonics this is a great opportunity to have your questions answered in person to help you decide. I also encourage you to bring a friend or family member along if you are a current member and would like to introduce them to cryonics. I am proud to say we have had more than a few non-member guests who joined us for the meeting and left as CI Members.

Tours of the CI facility will be available prior to the meeting from approximately 12:00 p.m. to 2:00 p.m. on Sunday. Please note, CI staff is very busy preparing for the meeting on this day, which is why the facility is closed to both members and the general public outside of these scheduled times. So if you would like to visit, please plan accordingly to come between 12:00 and 2:00.

We will also be hosting the popular "Night Before" Social and Dinner event at 6pm on Saturday, September 8th at Sajo's Restaurant. This informal dinner is always a great time to socialize and meet new people, so I encourage you to attend. However, please remember, guests are responsible for their own checks.

Finally, we do ask the courtesy of an RSVP if you plan on attending. For more meeting information and to confirm attendance, please send email to CIHQ@aol.com or phone (586) 791-5961.

Annual General Meeting

The annual meeting offers an excellent opportunity to see the facility, learn more about cryonics, meet members and guests from around the world, get updates on the Cryonics Institute & Immortalist Society and to talk to Officers, Directors & Staff.

The Annual General Meeting usually lasts about 2 hours, featuring reports from CI Board Members, guest speakers and a few other surprises. The Immortalist Society Meeting will follow directly after the CI AGM, and typically lasts about 45 minutes.

CI will be providing light snacks and beverages at the meeting, but no formal dinner arrangements. Guests are invited to dine prior to the meeting or, preferably, socializing with new friends and associates after the meeting concludes. The ConCorde Inn has a restaurant on-site, and there are several excellent dining locations nearby.

Location

The ConCorde features a unique reception area adjoining the main meeting room, an outdoor seating area, plus a lounge, pool & fitness center and other amenities we're sure everyone will enjoy. Rooms at the ConCorde Inn are on a first-come, first-served basis, so please make your reservations now.

★ **CI Discount:** Regular rates are $139.99 but reduced to $89.99 if you mention you're with CI or use promo code 0908CI

http://www.concordeinns.com. • **586-493-7200**

Facility Tours

Tours of the CI facility will be available prior to the meeting from approximately 12:00 p.m. to 2:00 p.m. on Sunday. The facility will be closed to both members and the general public outside of these scheduled times, so if you would like to visit, please plan accordingly.

Night Before Dinner and Social

CI will be hosting a "Night Before" Social and Dinner event at 6pm on Saturday, September 8 at Sajo's Restaurant. Everyone is welcome, but please remember, guests are responsible for their own checks.

SAJO'S.net

36470 Moravian Clinton Twp, MI 48035: 586-792-7256

RSVP

The AGM is open to the general public, but we request that we be informed if you will be attending. For driving directions, more meeting information and to confirm attendance, send email to CIHQ@aol.com or phone (586) 791-5961.

Everyone is Welcome!

Our meeting is open to the general public, so feel free to bring a guest or join us yourself if you're not a member!

Sunday, Sept. 9

3:00 p.m.

MEETING:
Sept. 9 3:00pm

ConCorde Inn Hotel & Conference Center
44315 North Gratiot Avenue
Clinton Township, (Michigan) 48036 (USA)

FACILITY TOURS
Sept. 9 12:00-2:30pm

Cryonics Institute Facility
24355 Sorrentino Court
Clinton Township, MI 48035-3239

NIGHT BEFORE SOCIAL
Sept. 8 6:00-10:00pm

Sajo's Restaurant
36470 Moravian
Clinton Township., MI 48035

Worldwide Cryonics Groups

AUSTRALIA: The Cryonics Association of Australasia offers support and information for Australia & nearby countries. caalist@prix.pricom.com.au. Their Public Relations Officer is Philip Rhoades. **phil@pricom.com.au** GPO Box 3411, Sydney, NSW 2001 Australia. Phone: +6128001 6204 (office) or +61 2 99226979 (home.)

BELGIUM: Cryonics Belgium is an organisation that exists to inform interested parties and, if desired, can assist with handling the paperwork for a cryonic suspension. The website can be found at **www.cryonicsbelgium.com**. To get in touch, please send an email to **info@cryonicsbelgium.com**.

BHUTAN: Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authorities in Thimphou & Paro. Contacts : Jamyang Palden & Tenzin Rabgay / Emails : **palde002@umn.edu** or **jamgarnett@hotmail.co** Phones : Jamyang / 975-2-32-66-50 & Tenzin / 975-2-77-21-01-87

CANADA: This is a very active group that participated in Toronto's first cryopreservation. President, Christine Gaspar; Vice President, Gary Tripp. Visit them at: **http://www.cryocdn.org/**. There is a subgroup called the Toronto Local Group. Meeting dates and other conversations are held via the Yahoo group. This is a closed group. To join write: **csc4@cryocdn.org**

QUEBEC: Contact: Stephan Beauregard, C.I. Director & Official Administrator of the Cryonics Institute Facebook Page. Information about Cryonics & perfusion services in Montreal for all cryonicicts. Services available in French & English: **stephan@cryonics.org**

CHILE: Community oriented to provide reliable information on human cryopreservation, as far as technical scientific as well as other practical aspects. Dissemination, awareness and education on issues related to the extension of life in general and cryonics in particular. Contact José Luis Galdames via **galdamesjoseluis@gmail.com** or via Facebook at Crionica Chile.

FINLAND: The Finnish Cryonics Society, (KRYOFIN) was established in 2008 and is an organization collaborating with all nearby groups and organizations. Contact them at: **kryoniikka.fi** Their President is Antti Peltonen.

FRANCE: SOCIETE CRYONICS DE FRANCE is a non profit French organization working closely with European cryonics groups. For more information: J.Roland Missionnier: phone: 33 (0) 6 64 90 98 41 or email: **cryonicsnews.inpi@yahoo.fr** • **Facebook group**

GERMANY: DGAB There are a number of Cryonicists in Germany. Their Organization is called "Deutsche Gesellschaft für Angewandte Biostase e.V.", or short "DGAB". More information on their homepage at **www.biostase.de**. If there are further questions, contact their Board at **vorstand@biostase.de**

GERMANY: CRYONICS-GERMANY is an active group providing cryonics support, including a special 8-member Standby Response Team. Members from Germany or Internationally are welcome to join. at **http://cryonics-germany.org**. Direct inquiries to **contact@cryonics-germany.org**.

INDIA: Can help Cryonics Institute Members who need help for the transport & hospital explication about the cryonics procedure to the Dr and authority in Bangalore & Vellore Area. Contacts : Br Sankeerth & Bioster Vignesh / Email : **vicky23101994@gmail.com** Phones : Bioster / 918148049058 & Br Sankeerth / 917795115939

ITALY: The Italian Cryonics Group (inside the Life Extension Research Group (LIFEXT Research Group)) **www.lifext.org** and relative forum: **forum.lifext.org**. The founder is Bruno Lenzi, contact him at **brunolenzi88@gmail.com** or Giovanni Ranzo at: **giovanni1410@gmail.com**

JAPAN: Hikaru Midorikawa is President Japan Cryonics Association. Formed in 1998, our goals are to disseminate cryonics information in Japan, to provide cryonics services in Japan, and eventually, to allow cryonics to take root in the Japanese society. Contact **mid_hikaru@yahoo.co.jp** or **http://www.cryonics.jp/**

NEPAL: Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authorities in Kathmandu. Contact : Suresh K. Shrestha / Email : **toursuresh@gmail.com** Phone : 977-985-1071364 / PO Box 14480 Kathmandu.

THE NETHERLANDS: Dutch Cryonics Organization is the local support group since 2002 and able to provide advice, standby, perfusion and shipment 24/7, in case of need. We are an active group utilizing the latest equipment. New members from The Netherlands welcome.

E-mail: **info@cryonisme.nl**
website: **http://www.cryonisme.nl**

NORWAY : Can help Cryonics Institute Members who need help for the transport & hospital explication about the cryonics procedure to the Dr, funeral home and authority at Sandvika. Contacts : Gunnar Hammersmark Sandvika Begegravelsesbyraa / Phones : 011-47-2279-7736

RUSSIA: KrioRus is a Russian cryonics organization operating in Russia, CIS and Eastern Europe that exists to help arrange cryopreservation and longterm suspension locally, or with CI or Alcor. Please contact **kriorus@mail.ru** or **daoila.medvedev@mail.ru** for additional information or visit **http://www.kriorus.ru**. Phone: 79057680457

SPAIN: The Spanish cryonics group in Sociedad Crionica **www.sociedad-crionica.org.** The president is Dr. Lluis Estrada. This is a large group of people, and those interested in cryonics are welcome to contact them at **info@sociedad-crionica.org.**

SWEDEN: **www.kryonik.se** or Facebook: Svenska Kryonikföreningen. Initially, the society will focus on providing information and assistance to those who wish to sign up for cryonics. Eventually, we also hope to provide practical assistance in cases, possibly in collaboration with other European groups.

SWITZERLAND: **www.cryosuisse.ch**

CRYOSUISSE The Swiss Society for Cryonics is an active group with over 30 members. To join, **email info@cryosuisse.ch**

UNITED KINGDOM: Cryonics UK is a nonprofit UK based standby group. **www.cryonics-uk.org** Cryonics UK can be contacted via the following people: Tim Gibson: phone: 07905 371495, email: **tim.gibson@cryonics-uk.org**. Victoria Stevens: phone: 01287 669201, email: **vicstevens@hotmail.co.uk**. Graham Hipkiss: phone: 0115 8492179 / 07752 251 564, email: **ghipkiss@hotmail.com**. Alan Sinclair: phone: 01273 587 660 / 07719 820715, email: **cryoservices@yahoo.co.uk**

Can help Cryonics Institute Members who need help, funeral home, transport at London. Contact : F.A. Albin & Sons / Arthur Stanley House Phone : 020-7237-3637

INTERNATIONAL: The Cryonics Society is a global cryonics advocacy organization. **www.CryonicsSociety.org**. They publish an e-newsletter *FutureNews*. Phone: 1-585-643-1167.

Please note, this list is provided as an information resource only. Inclusion on the list does not constitute an endorsement by Long Life magazine or our affiliated organizations. We urge our readers to use this list as a starting point to research groups that may meet their own individual needs. We further note that readers should always use their own informed judgment and a reasonable amount of caution in dealing with any organization and/or individual listed.

Please send any corrections or changes to the address below. If you know of, or are considering starting a support, standby or other cryonics-related group in your area, please send details to

dg@dgmedia-design.com.

Cryonics Institute Membership Statistics:

As of July 2018, the Cryonics Institute has 1,536 members, up 11 from our last report. Of the 1,536 Members, 235 have arrangements for Suspended Animation Standby and Transport.

There are 170 human patients and 154 pet patients in cryopreservation at CI's Michigan facility.

CI continues to be an industry leader in terms of both membership and practical affordability for all.

CI MEMBERSHIP

JULY 2018

* New Members = Increase in Membership since last issue

Members	1,536	Pets	154
Assoc. Members	192	DNA/Tissue	269
Patients	170	SA	235

TOTAL **1,898**

Cryonics Pioneer Robert Nelson Cryopreserved

By Jim Yount

On June 16th, 2018 Robert Nelson (aka Robert F. Buccelli) became CI's 170th patient at the age of 81. Robert's first term of life ended June 10th 2018 in Southern California. He died suddenly from natural causes. Robert Nelson is the man who froze the first man and wrote of the event in his widely-read book appropriately and simply named *We Froze the First Man*. Robert is now at the Cryonics Institute and frozen to liquid nitrogen tempature. A brief report on Robert's cryopreservation can be found at: *http://www.cryonics.org/case-reports/the-cryonics-institutes-170th-patient*.

We Froze the First Man is a first-hand account describing in detail the cryopreservation of California psychology professor James Bedford, PhD. This occurred back on/around January 12, 1967. At that time Nelson was the President of the Cryonics Society of California and became directly involved in the freezing of Doctor Bedford. Other cryopreservations followed under the auspices of the Cryonics Society of California (CSC) which, at that time, was led by Nelson.

In 1979 Nelson and others were sued by relatives of cryonics subjects under CSCs care. These subjects had been accepted for long-term cryonics care in cryostats housed in an underground vault in the Chatsworth cemetery in Southern California. Sadly, and deeply regrettably to all persons interested in the then nascent field of cryonics, it appeared that the maintenance of several individuals in liquid nitrogen lapsed and the efforts at Chatsworth totally failed.

According to the Los Angeles magazine (April 3, 2014) the relatives of those kept in the vault ended up winning a judgment of $800,000. This event lead to Nelson dropping out as an active participant in cryonics for many years and his being shunned by many cryonicists.

In his more recent book *Freezing People is (not) Easy* Nelson tells his version of those times. While Chatsworth is a subject in cryonics with many different viewpoints, according to this account, lack of money was one of, and perhaps the prime cause of this disaster. For many of the early cryopreservations, the cryonics company accepted patients on the promise of relatives to pay yearly costs to keep the person frozen.

Part of this policy was just humanitarian in nature and was an attempt to help as many individuals as possible that were interested in the concept of cryonics. It also may have been due to the fact that cryonics, in its early days, was receiving a great deal of publicity and was felt by some participants in the endeavor to be on the verge of taking off and becoming a normal societal practice. If that were the case, then the initial and ongoing expenses of these initial cases taken in for what were more or less simply altruistic reasons would be covered by the influx of very large numbers of later individuals availing themselves of this revolutionary new concept.

Whatever the reason for the catastrophe and whatever ones viewpoint is concerning Nelson's actions, it is now the practice of several cryonics organizations to only accept patients who are fully funded. That is, where the funds provided are adequate to keep the patient cared for far into the future.

CI founder Robert Ettinger, who wrote the introduction to Nelson's first book, remained Nelson's friend even through the years when Nelson was not welcomed by many other cryonicists. Over the more recent years, however, perhaps because of Mr. Ettingers friendship, Nelson attended a number of cryonics gatherings including at least one annual meeting of the Cryonics Institute. During this general time period he renewed acquaintance with Curtis Henderson.

Curtis Henderson had been president of the Cryonics Society of New York during the time when Nelson was president of the Cryonics Society of California. There was a keen and bitter rivalry between these two companies.

It is interesting to note that now both Nelson (patient #170) and Henderson (patient #95) are patients at the Cryonics Institute. They wait in cold sleep in cryostats in the same neighborhood! In a meeting witnessed by the editor of *Long Life*, the two individuals met at least once at Robert Ettingers house many years ago and engaged in what was a relatively cordial conversation with each other and with those present in the room.

In my last conversation with Robert Nelson, he informed me of a movie that is supposed to be in the works based upon his book *Freezing People is (not) Easy*. I will certainly be among the moviegoers lined up to buy tickets because I can say from first-hand experience that Robert Nelson is right. Freezing people is *not* easy.

Cryonics Protocols at the Cryonics Institute: Research and Practice

Part 3: Cryoprotection

Introduction

In this 4-part series we will review cryonics protocols at the Cryonics Institute (aka "CI"), discuss recent research to validate and improve cryonics protocols, make recommendations to improve those procedures, and discuss future research directions in the field. Each installment will cover a single topic: (1) Patient Monitoring and Standby, (2) Stabilization, (3) Cryoprotection, and (4) New Research and Future Developments.

Cryoprotection

In our first two installments we discussed cryonics patient monitoring, standby, and stabilization procedures. In this installment we will discuss the central element of cryonics: cryopreservation. To understand the remainder of this article it is important to distinguish among a number of relevant concepts:

Cryopreservation: The preservation of cells or organs at very low temperatures (typically ranging from -80°C to -196°C).

Vitrification: (in cryobiology) A form of cryopreservation in which ice formation in cells or organs is inhibited by turning the tissue into a glass.

Cryoprotection: The procedure that prepares a cell or tissue against ice formation prior to cryopreservation.

Straight Freezing: (in cryonics) The cryopreservation of a cryonics patient without cryoprotection.

Cryoprotectants: chemicals that are introduced with the intent of minimizing freezing damage to cells and tissues.

All cryonics patients in long-term storage are cryopreserved. Since vitrification is a relatively recent (21st century) procedure in cryonics, not all cryonics patients have been vitrified. Of the patients that have not been vitrified, some have received some degree of cryoprotection and others have been "straight frozen." It is essential to understand these distinctions to understand discussions about cryonics. Many scientists still think that all cryonics patients are "straight frozen" and claim that freezing of the brain precludes future revival, an ignorant and unfortunate perspective that remains widespread. Sometimes cryonics advocates think that all of today's cryonics patients are vitrified, which is mistaken as well, because not all cryonics patients are cryopreserved under conditions that allow cryoprotection, let alone vitrification. This may be due, for example, to unexpected and/or unavoidable delays from the time of the individual's clinical death until the procedures associated with cryonics can begin.

In this article we will confine ourselves to contemporary vitrification technologies and the Cryonics Institute's protocol in particular. This means that we will omit discussion of neuro- or brain preservation and focus on whole body cryopreservation as that type of cryopreservation is the goal of CI.

Vitrification in cryonics

As a general rule, there are two methods to achieve vitrification at low temperatures. The oldest approach involves cooling rates that are so rapid that ice crystals cannot form. These cooling rates need to be so fast that this approach does not work for complex organs, let alone entire human bodies. Another approach, pioneered by the cryobiologist Gregory Fahy, is to replace the blood and liquid parts of the cells with such high concentrations of cryoprotectants that ice cannot form. As the temperature decreases these cryoprotectants will get more and more viscous ("thick") until they undergo a transition into a glass. The temperature at which this occurs is called the glass transition temperature. Different vitrification solutions have different glass transition temperatures but the major vitrification solutions used in cryonics have a glass transition temperature between -110°C and -125°C (-166 Fahrenheit to -193 Fahrenheit).

The best way to think about cryopreservation is to imagine a continuum ranging from complete freezing without any cryoprotectants to complete vitrification achieved through the effective use of cryoprotectants. In the case of a straight freeze, where cryoprotectants aren't used at all, ice formation is at its maximum. In the case of complete vitrification there is no ice at all. In cryonics, the outcome of a case can theoretically be at either of those extremes, but a more typical outcome is some point in between. How much ice is formed in a cryonics patient depends on several factors such as the response time of the team assigned to care for the patient, the quality of cryoprotection carried out, and the strength and efficacy of the vitrification agents. As has been discussed in the two prior installments, good patient monitoring and prompt stabilization of the patient favor inhibition of ice formation and need to be, as far as reasonably possible, a top priority in cryonics.

Can all ice formation be inhibited in a cryonics patient? Under ideal conditions it is reasonable to believe that this objective can be achieved in the brain because its high energy demands make it one of the most vascularized organs in the body. Since cryoprotectants are introduced

into the cryonics patient's body using the circulatory system, the numerous blood vessels in the brain, generally speaking, allow cryoprotectants to be delivered with great efficiency. The degree to which the whole body of a human can be 100% vitrified is unknown at present but preliminary evidence from cryonics-associated cryobiology research labs indicates that a very good job can be done there, too (although, perhaps, still not 100%). Although many cryonicists prefer to cryopreserve the whole body, there is no disagreement among all cryonicists that the most important organ is the brain and the evidence for brain vitrification is persuasive. This was further substantiated in 2018 in a major scientific breakthrough (see below). In our research at Advanced Neural Biosciences we use an *in situ* brain cryopreservation model. This means that we look at the effects of various cryoprotection protocols without taking the brain out of the body. This approach is highly relevant to today's Cryonics Institute procedures since the practice of leaving the brain intact inside the skull is standard procedure with individuals under the care of CI.

Vitrification at the Cryonics Institute

Both major cryonics organization (Alcor and CI) use vitrification technologies. The vitrification solution of Alcor is named M22 and the vitrification solution of CI is named VM-1 (which stands for "Vitrification Mixture One"). Both vitrification solutions are based on the principle that high concentrations of cryoprotectant can inhibit ice formation in tissues subjected to extremely low temperatures. VM-1 was identified and validated by Russian cryobiologist Dr. Yuri Pichugin while he was employed by the Cryonics Institute to guide its research program. Pichugin looked for two important properties for CI's vitrification solution: (1) strong protection against ice formation, and (2) low toxicity. Cryoprotectants have the advantage of preventing and/or greatly decreasing ice formation. They also have the downside that they can be toxic (damaging) to tissues and cells. Dr. Pichugin's work tried to look at both sides of this situation and he worked to try to find a suitable answer that would deal with both the benefits of protecting against ice formation and reducing the toxicity of cryoprotectants.

VM-1 consists of 35% ethylene glycol and 35% dimethyl sulfoxide (w/w). It is introduced in a carrier solution called m-RPS-2---which consists of potassium chloride, glucose, and TRIS (alternatively called THAM). VM-1 is a potent vitrification solution that can completely inhibit ice formation at low cooling and warming rates. The strong glass forming ability and stability of VM-1 is evidenced by the following research findings. Pichugin did not observe ice formation or devitrification when 20 ml glass vials of 60% and 65% VM-1 were cooled and warmed with cooling and warming rates as low as 0.1°C per minute. Pichugin also tested 65% VM-1 solutions with "homogenized rat brain tissues containing natural nucleators" (a "nucleator" is an impurity in water which favors freezing.). This method did not show visible ice crystals after 14 days at dry ice temperature (-78.5°C). The stability of large volumes (2 liters) of VM-1 was also investigated and no ice crystals were observed after 21 days of storage at dry ice temperature.

Pichugin also tested VM-1 toxicity in a hippocampal slice model using a potassium / sodium (K+/Na+) viability assay. Nerve cells work, in a very fundamental sense, by moving sodium and potassium in and out of the nerve cell. In order to do this, two basic things must exist. The first is an intact cell membrane. The second is the existence and viability of a so-called "sodium-potassium pump" (also known as an "ion pump" since the potassium and sodium involved in nerve cell function are in ionic form and have opposite but equal electrical charges). This "pump" is a natural process in the nerve cell that maintains one chemical (potassium) on the inside of the nerve cell membrane and the other chemical (sodium) on the outside of the membrane. The aim of Pichugin's efforts was to measure cell membrane integrity and ion pump functioning after cryoprotectant exposure, vitrification, and unloading. ("Unloading" is the removal of the cryoprotectant and the replacement of it by a solution that is compatible with normal cell functioning).

The hippocampus is an area of the brain that functions in the preservation of memory and the acquisition of knowledge. Using rat hippocampal brain slices, exposure of those slices to VM-1 was compatible with ~ 81.6% viability recovery This relatively high viability result fell only slightly short of his own measures of the viability measurements for M22, Alcor's vitrification solution, despite VM-1 having only 5 ingredients and being significantly cheaper.

At the *Cryonics Institute* VM-1 is introduced in 3 steps: First a 10% ethylene glycol solution is introduced. Then there is a 30% ethylene glycol step. Finally, a 70% VM-1 solution is used. The reason why the last step is higher than the concentration that is necessary for stable vitrification (in the 60%-65% range) is because the vitrification agent is delivered through the blood vessels by passive perfusion of VM-1 into the cells/tissue. Therefore, the concentration of VM-1 in the circulatory system needs to be held at a higher concentration than desired in the tissue in order to make VM-1 "flow", so to speak, from the circulatory system into the cells/tissues. It also needs to be higher than the target concentration to reach the appropriate concentration in a timely manner. If VM-1 was perfused at 60% or 65% it would take a very long time to reach the concentration necessary to prevent ice formation.

Under ideal conditions (minimal delay between pronouncement of death, cooling, and the start of cryoprotection) VM-1 is believed to eliminate ice formation in the brain. If the delay between circulatory arrest, cooling, and the start of cryoprotection is overly long, ice formation will occur despite the use of vitrification solutions. This is true for any vitrification solution utilized and for any cry-

onics services provider and only reinforces our recommendations from parts one and two of this series to try to move rapidly and in an organized fashion at the point of clinical death of a cryonics patient.

There remain three important questions concerning VM-1:

1. What is the effect of VM-1 on the fine structure of the brain?
2. How well does VM-1 cross the blood brain barrier?
3. Is VM-1 an appropriate solution for whole body patients?

The effect of VM-1 on the fine structure of the brain

It is often assumed that if a vitrification solution has low toxicity, its effects on the structure of the brain should be benign, too. After all, if a vitrification solution leaves the viability of brain cells intact, it would seem that the aggregate of these cells should look good as well. There are a number of reasons to question this line of reasoning. The most elemental reason is that the low toxicity of VM-1 was validated in an isolated brain slice model, that is to say in a sample of the rat brain which was limited in length, width, and thickness. This *may* not tell us much about its effects on the whole brain. As we will discuss below, VM-1 penetrates isolated brain slices better than the whole brain. As a consequence, it is possible that VM-1 exposure produces poor ultrastructural (the structure that can only be seen with an electron microscope) preservation in the brain, despite producing good viability readings in the individual, but smaller brain slices Dr. Pichugin worked with.

In 2017 *Advanced Neural Biosciences* collaborated with the Hirsch Foundation in Germany to screen multiple brain cryoprotection and chemical fixation protocols. This was to address the concern that neither Dr. Pichugin nor other labs (including our own) had been able to produce evidence of well-preserved brain ultrastructure after brain cryoprotection and/or cryopreservation. After testing a number of loading and unloading protocols, we identified a protocol that produced the best electron micrographs of a brain cryoprotected with VM-1 (using CI's cryoprotection protocol). These images are comparable to the electron micrographs that have been produced of Alcor's M22 solution and constitute a very important achievement. What sets these images apart from healthy control images, however, is that, like Alcor's M22 results, they clearly illustrate the dehydrating effects of vitrification solutions on the brain. Structural components of the brain (myelin sheaths, synapses, etc.) can be identified but the fine structure of the brain has a dense appearance (see Figure 1).

Still, these images constitute a substantial improvement over past VM-1 electron micrographs which showed extensive membrane damage and empty "ghost" cells. It should be noted that the method of preparation of electron micrographs is often crucial to how accurate those images are to the actual state of the material being examined. That is to say that electron micrographs cannot automatically be looked at as totally and fully representing the state of things in the tissues that are being examined with the electron microscope. How cryopreserved brain tissue is chemically fixed and prepared for electron microscopy is often of crucial importance and the better results that we obtained reflect improved chemical fixation and preparation protocols. The older images with membrane damage and empty "ghost" cells may well represent less than optimal preparation for viewing with the electron microscope rather than actual damage incurred by the experimental protocol being tested.

It is important to emphasize here that these new images reflect exposure to full concentration VM-1 before cryogenic cooling only (cryoprotection). Full-fledged *in situ* cryopreservation of the brain requires that the cryoprotectant is carefully removed (unloaded) from the brain after cooling to -130°C before chemical fixation and preparation for electron microscopy, a procedure that has not yielded comparably good results to date. (*Below will be found the brain after VM-1 exposure in Figure 1. Figure 2 represents a control (untreated) image).*

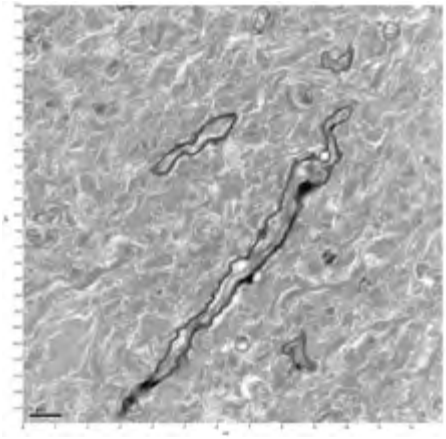

Figure 1 Compressed myelinated axons in a rat brain after VM-1 exposure

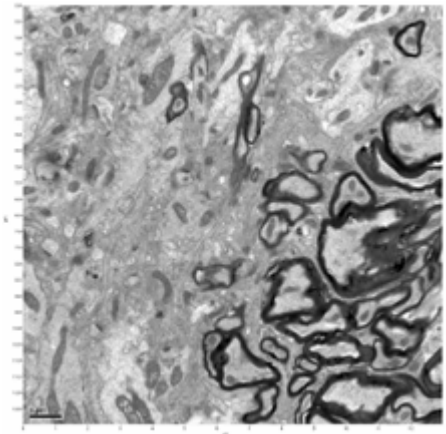

Figure 2 "Control Image"

VM-1 and the blood brain barrier

The blood brain barrier (BBB) is a highly selective membrane that allows passage to water and substances essential to neural function but protects the brain against large and unknown substances. As a general rule, cryoprotectants have poor BBB penetration. This phenomenon is further aggravated by the fact that the high concentration of cryoprotectants in contemporary vitrification solutions tends to draw water across the BBB and into the circulatory system. In "ideal" (non-ischemic) conditions the brain can shrink to about 50% of its original size when

perfused with a concentration of cryoprotectant necessary for vitrification, an effect that is observed with all major vitrification agents and in species ranging from rats to humans. The CT scan below of an Alcor patient after the introduction of Alcor's vitrification agent shows severe dehydration of the brain. The orange and purple parts of the image inside the oval shaped skull (which is white in this image) are the brain tissue and they show how much the brain has shrunk. In life, normally the brain occupies more or less the entire space inside the skull although some relatively mild shrinkage of brain tissue due to aging can be noted in medical CT images of living patients.

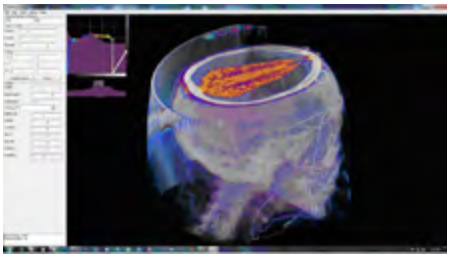

Figure 3 Severe dehydration of the brain in a cryopreserved cryonics patient

We know of at least three different approaches to improve BBB penetration of VM-1. The first is to open the BBB with a so-called blood brain modifier. Dr. Yuri Puchugin discovered that adding detergents (like sodium dodecylbenzenesulfonate or sodium deoxycholate) in low concentrations to the vitrification solution eliminated cryoprotectant-induced dehydration. If the right concentration is chosen, shrinking of the brain can be avoided without producing weight gain (edema) in the rest of the body. Prolonged ischemia also leads to BBB breakdown, but it is generally agreed that tolerating more damage to the fine ultrastructure of the brain to prevent shrinking is a contra-productive idea and long periods of ischemia compromise the quality of brain perfusion, which would be a big price to pay for improved BBB penetration.

Another approach is to identify cryoprotectants that *can* penetrate the brain (so called "brain-optimized cryoprotectants"). There is emerging evidence in our lab that such cryoprotectant combinations exist but not all of these combinations have the low toxicity of solutions like VM-1 and M22 or can be used at high concentrations. At this point in time, opening the blood brain barrier with blood brain barrier modifiers is the preferred approach. Research is currently underway to study the effects that cryoprotection protocols that modify the blood brain barrier may have on the fine structure of the brain.

VM-1 and whole-body cryopreservation

Introducing cryoprotectants to the whole body of a patient has been associated with weight gain and swelling (edema), particularly of the abdomen, as large volumes of the perfusate diffuse into the tissues. The tendency of glycerol to produce less weight gain (for an identical concentration) than DMSO was a reason for Alcor to switch to the former agent during the 1980s and 1990s. The degree to which the newer generation of vitrification agents cause weight gain in whole body patients remains to be fully understood. The challenge here is to separate edema weight gain secondary from ischemia from weight gain resulting from the use of vitrification solutions as such. Prolonged periods of warm and cold ischemia make vessels leaky and it is often difficult to tell whether perfusion problems and edema are the result of ischemia or the vitrification solution. In our lab we do not observe weight gain in the rat when VM-1 is used to perfuse the whole body. Whether this result will extend to humans is currently unknown because local human cases with minimal ischemia and prompt cryoprotection are regrettably scarce.

While the *Cryonics Institute* only accept whole body members its cryoprotection protocols for the rest of the body have evolved. During part of Ben Best's tenure as President of the Cryonics Institute, cryoprotection of the head was given absolute priority and cryoprotection of the rest of the body was omitted unless requested. The current protocol calls for whole body cryoprotection if reasonably achievable with high priority to the brain, but a review of recent case reports reveals reports of poor perfusion and edema when whole body cryoprotection is attempted with the exception of a notable and recent case in March 2018 (CI patient Linda Deutsch). Alcor uses a specifically-designed whole body formulation of M22 for its whole-body members but there have not been enough whole-body Alcor cases that also have negligible ischemia to know whether this whole-body formulation is sufficient. In our research, similar to the result we obtained in a lab setting with VM-1, we have not seen weight gain with either version of M22 (neuro or whole-body), but other labs may have different experience, and some of this may be species-dependent.

Improved whole body perfusion has been reported for vitrification solutions with increased concentrations of oncotic agents (large molecules that keep fluids in the circulatory system like albumin does in human blood). While Pichugin considered the increased viscosity ("thickness") of these solutions undesirable, this may be the price that must be paid for better whole-body perfusion. In our own lab we have identified other methods to stabilize weight gain during loading and unloading of VM-1 such as replacing some of the penetrating cryoprotectants (like EG and DMSO) with larger, non-penetrating, cryoprotectants (like polyvinylpyrrolidone).

Cryoprotection of the ischemic brain

As much as we would like all cryonics cases to be timely and flawless, practicing cryonics today means some patients will be cryopreserved in a compromised condition and delays are going to happen. Understanding the effects of delayed response and long transport times has been one of our main projects

at our lab and, we believe, is one area of research that helps ANB stand apart from other investigators in the field of cryonics. We have discussed these results and their implications in a number of articles for *Long Life* in great detail but will summarize some of the most pertinent findings here.

As has been reiterated in this series on multiple occasions, the greatest enemies of a cryonics patient are time and temperature. In an ideal case, stabilization starts immediately after pronouncement of legal death, followed by cryoprotection and long-term maintenance. In many cases there will be some delay and/or the patient spends a long time on water ice en-route to the cryonics facility. When there is no, or inadequate, blood flow to the brain this is called cerebral ischemia. When the patient's temperature is still at normal body temperature we call this normothermic ischemia, which can also be thought of as an example of "warm ischemia". When the patient is cold (but not frozen) this is called cold ischemia. Both warm and cold ischemia are detrimental to good patient outcomes but since damage occurs faster at high temperatures, converting a patient from a state of normothermic ischemia to cold ischemia can reduce damage.

What is the relationship between ischemia and cryopreservation? It is sometimes assumed that patients who spend a prolonged time at room temperature or who receive long transport times to CI will get vitrified with more damage to the fine structure of the brain. Unfortunately, ischemia itself affects the quality of cryoprotection. After blood circulation stops a number of adverse effects set in including, but not limited to, blood clotting, red blood cell aggregation, accumulation of fluids in cells and organs, and swelling of the brain. As a result, circulation of the cryoprotectant in the brain is incomplete and compromised. Timely administration of heparin can address some of these events (e.g., blood clotting) but not all, and some patients do not receive any medications at all. One consistent and robust finding in our lab is that as the duration of ischemia increases, the ability to cryoprotect the brain will get progressively worse. Despite circulation of the vitrification solution, ice formation will occur in many areas of the brain.

As discussed in our previous installment, if we would manage to replace the blood of the patient with a so-called organ preservation solution (MHP-2 produced the best results) prior to transport, ice-free cryopreservation of the brain may still be possible after *up to 48 hours of cold ischemia*. In many sub-optimal cases, however, we would not expect rapid cooling and blood washout to occur prior to transport of the patient to CI. Is it possible to modify CI's cryoprotection protocol to achieve better results in such cases?

As a general rule, administration of medications after transport and prior to starting cryoprotection is futile because most of these drugs aim to intervene in processes that have already occurred. One notable exception to this might be drugs that dissolve existing clots. Think of medications such as t-PA used for stroke victims.

One approach would be to keep perfusing for as long as we can in the hope that some of these clogged and narrowed vessels will eventually open up and are recruited back to the patient's circulation. Our research shows that as the duration of ischemia increases, increasingly larger volumes of perfusate are needed to reach the concentration necessary for vitrification to occur. There are a number of concerns about this approach for patients with long delays. If damage to the structure of the brain has advanced sufficiently enough, there is a risk that circulating a vitrification solution for an extended period will further destabilize this damaged brain structure. Another concern is that prolonged perfusion of an ischemic brain will produce extreme brain swelling. Since the brain is contained by a hard skull, this will produce a situation in which the brain is pressed against the skull, risking mechanical injury; that is to say the brain will be injured by the brain being forcefully pressed against the wall of the skull by the swelling.

A final concern is cryoprotectant toxicity. We do know that the fine structure of the brain can tolerate exposure to high concentration of VM-1 for a specific period of time. The ultrastructural effects of circulating large volumes of VM-1 for a prolonged period of time in an effort to reach a sufficient concentration to prevent freezing are unknown and caution is advised here, too.

We have found a number of protocol changes that appear to improve cryopreservation of the ischemic brain. Increasing the viscosity of the vitrification solution by modifying the carrier solution improved outcomes. Another approach that worked was to step up the concentration of the steps more aggressively or even omit some steps. Perfusion of straight VM-1 without any preceding steps (i.e., 10% EG and 30% EG) seemed to counter perfusion impairment but this approach contradicts basic cryobiology practice and could produce massive membrane damage and compromised brain structure. A common suggestion is to increase perfusion pressure in compromised organs. In our research (which has been substantiated in other labs, too), this turned out to be contra-productive. Lower perfusion pressures (between 80 mmHg and 100 mmHg) improved cryoprotection of the ischemic brain and mitigated brain swelling.

As is often the case, prevention is better than a cure. While we have gathered a lot of detailed knowledge about what works and what does not work in cryoprotection of the ischemic brain, the most sensible approach remains to secure rapid response, rapid cooling, and a quick transport to the cryonics facility.

In our upcoming and final installment, we will summarize our most important findings, review current areas in cryonics research and development, and make some specific recommendations to further improve patient care at the *Cryonics Institute*.

If I Had A Million Dollars…..

By: Neal VanDeRee

Immortalist and Officiator at The Church of Perpetual Life in Hollywood Florida

Introduction by York W. Porter, President, Immortalist Society

This issue's installment of what one would do if they had a million dollars to spend towards cryonics and life extension is written by Neal VanDeRee, who serves as the Officiator of the Church of Perpetual Life. The website for the Church of Perpetual Life may be found at http://www.churchof-perpetuallife.org *and more detailed information about this organization and it's mission may be found there. In a brief excerpt, however, from the website's home page, the "mission" of this group is as follows: "We hold faith in the technologies and discoveries of humanity to end aging and defeat involuntary death within our lifetime. Following the prophetic writings of Nikolai Fedorov & Sir Arthur C. Clarke, a founding tenet of Perpetual Life is that indefinitely extended, healthy lifespans are Desirable, Attainable and Our Ultimate Destiny".*

I am imagining that I inherit an unexpected $1,000,000! How nice to have free money fall from the sky!

As an Immortalist, what would I do with $1,000,000? How would I invest this to better ensure that the longevity community's desires for unlimited lives be furthered? How to better invest in age reversal or Cryonic research?

I believe in the idea of setting up trust funds or some legal instrument that could grow interest and allow money to be paid out indefinitely to fund important causes, but as an entrepreneur I think I would prefer to see greater income than simple interest, being derived from such a lovely windfall. In addition, I don't see myself handing the money over to a group of people hired to invest it, so I would direct the investment of the funds myself.

And, in doing this, I would want some of the investment to act as seed funds to some entrepreneurs that are also Immortalists.

Having said all this, in the back of my mind comes the idea and argument of how things might change in the world if the right start research was funded.

The idea that if a certain program or treatment or research could succeed wildly and would blow the doors wide open on age reversal world wide...that one spark that could ignite the passions of all of humanity to work towards age reversal and finally defeat death. A light year leap in some area, like a solution to cryonics where an animal was suspended and revived OR absolute proof that aging was

reversed in a group of people. Something that would energize society to embrace age reversal on a large scale, akin to the space race of the 1960s.

Here is what I would do. Here is how I would "carve $1,000,000 up".

I would take half of it and create a seed fund for Immortalist Entrepreneurs, seeking out those people that are true Extreme Longevity Enthusiasts that believe that they have an idea or product that will generate a large amount of money and carefully review their business plans and make investments.

Two such people that immediately come to mind are REAL people that have approached me with REAL proposals and ideas that are very exciting and things that I would like to be a part of. One which my friend Charlie has created involves software and social media that I believe all the of the millennials will certainly love and could grow rapidly and be on par in with Instagram and used in platforms like Facebook. This is an idea that I am sure will throw off millions of dollars annually, once he gets it started, and so, create a great capital base to further fund the laboratories and experiments in all facets of age reversal research.

The other project was presented to me about a plant based product. A natural herb used in Asia that is presumed to have regenerative properties. With this young woman, I would fund her project to grow and harvest this herb AND create a board of advisers to systematically seek out other herbs and unconventional techniques that people are using where they claim to have found cures for different diseases. I believe in the idea that many of our solutions to age reversal and curing the disease of aging will be found in nature.

There are several species that do not appear to age, and to investigate in depth WHY they do not age. There are species that can be frozen hard as a rock and come out of this frozen state with no problem, so I would research HOW they do this and help those researchers working in these fields.

I would naturally contribute $100,000 to the Church of Perpetual Life to further the work being done with that wonderful institution. I would feed another $200,000 donation to the newly formed "Rescue of Our Elders" organization would be money well invested. The Society for the Rescue of our Elders is a private association seeking to reverse human senescence today, and I would definitely join several of the studies, personally.

As a cryonicist and member of Alcor, I would donate $100,000 to assist with research in cryonics. As I have a deep seated FAITH in age reversal within our lifetime, I do not believe that I will require a cryonic suspension, BUT I also have many aged and ill friends that I believe WILL require a cryonic suspension, and out of love for them and respect for their lives, I would research several laboratories working to make better cryonic suspensions available now, and invest in them.

The final $100,000 I would set aside and use to help fund a movie that would portray age reversal and cryonics in positive light. So many wonderful ideas are demonized and ruined by Hollywood movie makers, who have wrongly decided that life extension is selfish and the future of the world will be a ruined desolate place

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Looking Back:
Mae Ettinger At Asimlomar

(Editor's note: The Immortalist Society Vice-President, Deb Fleming, made an excellent suggestion a while back that Long Life should have a regular column called "Looking Back" in which articles of interest from prior issues appear. The column below, from the February, 1990 issue of The Immortalist, as Long Life magazine was known in those days, is one such offering).

Introduction by York W. Porter, President Immortalist Society

I first met Mae Ettinger when I drove to the Detroit region for my very first cryonics meeting. Back in those days the meetings of both the Cryonics Institute and the Immortalist Society were held at the very lovely home of David and Connie Ettinger. Mae and I hit it off well from the start. In an incident that I still generally remember from a subsequent meeting, Mae and I laughed about the fact that we voted in favor of a motion on the floor that then was defeated by opposing votes from everyone else in the room. We kidded each other that we represent the "quality part" of the organization.

Mae worked at, among other things earlier, doing counseling work in the latter part of her life. In an earlier part, she did the initial typing up of the both The Prospect of Immortality and, in later years, Man into Superman. In a personal conversation with me, she stated that when she first met Robert Ettinger and he paid her for her help in typing up Prospect, she thought he was "a little cracked… but I needed the money." We both laughed over this, as she later became an

invaluable member of the folks trying to push forward the concept Mr. Ettinger had outlined. She also became an invaluable member of the organizations he formed and she was a founding member of the Cryonics Institute. She served for many years as the editor of the publication you are reading now. Mae became the second wife of Mr. Ettinger in 1988. (Mr. Ettinger's first wife, Elaine, had passed away earlier). In the year 2000, she was placed under the care of the Cryonics Institute, which she and Ettinger, among others, had been instrumental in founding.

In the following article which first appeared in this magazine in September

of 1990, Mae deals with a common question about cryonics, which is how persons now under the care of present and future cryonics organizations will adjust to being revived in a world that in all probability will be considerably different from how the world existed when they were subjected to the procedures associated with cryonics.

Adjustment and Readjustment in Cryonic Reentry: Closures and Beginnings

By: Mae Ettinger

(Based on a talk at Asilomar, Aug. 25, 1990)

The major thrust of cryonics has, up until now, been technologically oriented out of necessity. In order to realize the prospect of immortality, it is essential that the medical technology to accomplish successful suspension and reanimation be perfected.

With the advent of nanotechnology we can see at least the outlines for accomplishment of effective cryonics procedures. It now seems to be the appropriate moment to consider the psychological aspect of cryonics. In some ways we are going to be displaced persons in a more extreme sense than anyone previously.

From one point of view, the problem may seem trivial or even pointless. We are still uncertain how completely we will retain our present identities when we awaken in the future, and we are equally uncertain about what the future will hold in other respects. It most probably will be filled with astounding new discoveries with all the accompanying changes that must inevitably occur. But, with what we know now, all we can do is speculate, positively because we are a hopeful and adventurous group. One way of handling the unknown ahead of us is to simply wait until we encounter it. One does not scramble up a tree with no tiger in sight, even though they are known to be in the neighborhood. We go about our business and wait until one is in sight before taking action.

There is nothing wrong with this attitude, except it does not satisfy everyone. It may be adequate for those who are predominately left brain oriented, translate that males. But it will not suffice for those who are more right brain influenced, and this ncludes most females and a fair amount of males. These are people to whom relationships mean a great deal, who are home and family oriented, who live in the here and now and who most likely are not as adventurous as some.

When I began to examine my own feelings about adjustment and readjustment to reentry, I realized that I had not thought about the matter to any great extent. I suspect most cryonicists have not. We have been doing what we had to do and thinking and writing about ways to get our bodies in the future. Tackling the problem of our personalities has been left for when there would be more time available, and people willing to spend it on this subject. The up-loaders, or is it down-loaders, have taken a typically technological view; put us on tape and play us back. This does not satisfy me, and I'm sure others, who are more subjective in their viewpoints. It is in truth of little benefit to plan psychologically for the future, because, while we can speculate, we really have no hard knowledge to guide us into functional decisions.

Although nanotechnology offers us great potential for physical regeneration, and the biochemical aspect of technology has produced some relatively effective drugs for certain emotional states, there is an aspect of our awareness that remains not amendable to any kind of environmental intervention at this time, and we can have no assurance that it will be in the future. It is the product of our individual experiences and because each life is unique, it is entirely unique. We may find some similarities, but even siblings reared together in a family unit, are not identical in their sensitivities and emotions. Nanotechnology may restore brain cells, but whether it can restore a psychological self is not certain.

Several writers, Fred Pohl for one, have stressed that our "identities" or orientations, attachments, loyalties, sense of place, and so on, are tied to our interpersonal relationships, and to some extent to our positions in the work place and in society. Loss of relationships is viewed by many as being so damaging as to make life extension of doubtful worth.

The two statements I hear most frequently when I talk to noncryonicists are: 1) "I would be miserable returning to a world in which I knew no one, had no family, no friends, no home, and no job"; and 2) "Once is enough for me".

The first statement reflects the feelings of uncertainty and concomitant anxiety that lie in the minds of most people when faced with thoughts of an unknown and probably very different future. The second reflects the dissatisfaction with the life they now have and pessimism about any possible future improvement.

Since no one knows what the future will hold for any of us, how we think about living, whether now or in the future, may be more important than what we think about it.

Cryonicists may have an opportunity to lead the world not only in regard to cryonics, but in a way of thinking and behavior that will fit not only ourselves as cryonauts, but those who are not adventuring into the future with us, whether they be loved ones, or the general public, whom we would like to convert to desire for extended life.

The philosophical concept I have in mind can be traced back to Epictetus, a Greek philosopher of the first century, AD who had studied the Stoic philosophy, which flourished from the forth century BC in Greece, and in Rome in the second and first centuries. With the advent of Christianity, Stoicism went out of favor. The main thrust of Stoicism is that humans must live by reason to create a good society. To be more exact, humans must live as rational beings to achieve the good lives that they desire.

Humans are frequently described as irrational, and they certain do utter what seem to be irrationalities at times and behave in what seems to be irrational manners. But are they in truth irrational or are they operating with belief systems that are based upon unsound premises?

Epictetus had a canon of philosophical beliefs which have been preserved through the efforts of a pupil, Flavius Arrianus. The tenet that I found so fitting for those who need to think about saying goodbye to the present and hello to the future is as follows: "It is not what happens to a person that causes distress but the way the happening is perceived".

While this may seem simplistic and hardly worth mentioning because it is so much a truism, actually it is of major consequence in the way people look at life and death, and it is not an articulated part of the philosophy of life that informs our national ethos, or that of any other society. Cryonics is an example of this concept in action. I doubt, however, that anyone up to now has thought about it in just this way. I know I had not until I concentrated on it.

Cryonicists do not perceive death as merely an ending; it is also a beginning, or perhaps I should say a

prelude to a beginning. It is a door that we hope to open into the future.

The cryonics concept is one of positiveness and hopefulness and is affirmative of life., It is eminently rational if we use the definition: rational thought is that which is developed by logic from a sound premise. The underlying belief of cryonics is rational in that it is based upon the reality of scientific and technological progress. Our rational interpretation of death is removed from the interpretation prevalent in our society, which remains atavistic to a very large degree.

As this relates to closures and beginnings we can know that if we live our lives in a rational manner, we will go into the future and encounter it rationally. It is this message that we need to disseminate to those who fear death and who either refuse to think about it or accept nihilism as natural and right.

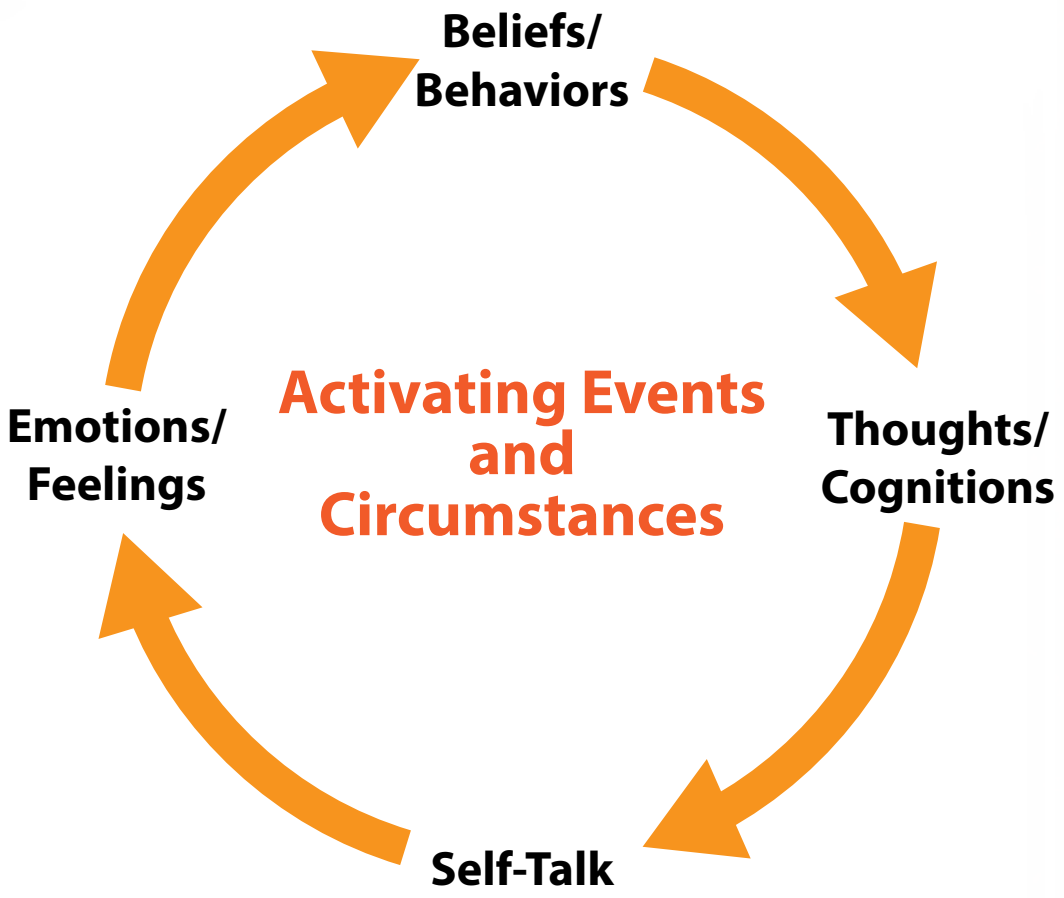
Such pessimistic interpretations of existence remind me of an uncle I had, long since rotted away. He started to eat a piece of cherry pie one day and found a worm in it. The worm was well cooked and offered him no threat, but he was operating from a premise that held one tiny bit of foreign matter in his pie as being total pollution. Some would have merely removed the part with the worm in it and gone on eating, perhaps prudently inspecting each bite before ingesting it. Others might have tried another piece of the pie. In some cultures the worm would have been relished as an added delicacy. My Uncle Charley, although he lived for many years after the incident, never ate another piece of cherry pie, even though it had been his favorite.

Uncle Charley does not stand alone in his negative response to misperception. Those who reject cryonics are doing the same thing in one way or another. Dr. Rowe's remark about reconstituting hamburger is another example. It bears no resemblance to reality, but it has become a part of the lore of cryonics skeptics, who have been taught, as most have through history to follow others rather than apply their own rational analysis to the situation. The hamburger thing is totally irrational and in fact ridiculous, and in fact, is a blot on the science community that one of its own has made such an ignorant statement. It is also a black mark against those who publicize it in their ignorance.

The most well known modern proponent of the concept of rational behavior informed by rational thinking is Albert Ellis, Ph.D., a clinical psychologist who developed his version as a form of therapy which he called Rational Emotive Therapy (RET). He first introduced his concept in his book, A Guide to Rational Living in an Irrational World, in 1961.

Dr. Maxie Maultsby, director of the Psychiatry Outpatient Department of the University of Kentucky Medical Center further developed RET into a practical method of application he first called Rational Self-Conseling (RS-C). In his later writings he changed it to Rational Behavior Therapy (RBT), which also is a subgenre of cognitive therapy. Dr. Maultsby gives us quite specific guidelines by which to measure whether or not we are thinking rationally.

Basic Theory of RET, RBT, and RSC



When an event or circumstance occurs in our lives we form interpreatations of it or thoughts. These cause emotions, which result in reactions, that is behavior. If we interpret an event or circumstance negatively, as Uncle Charley did, we will have negative feelings, and negative beliefs and behavior, which become habitual. We have all encountered individuals who think negatively about everything and constantly complain about everything and whose premises are not rational.

As a therapist I know that the only effective place to intervene is at the point between the event or circumstances and the thoughts it evoked. This is true also of those who would be rational beings. At any point after that it is too late. It is our thoughts that determine our emotions and our behavior, not the other way round.

Having assimilated the rudiments of the philosophy, we are ready for the set of questions that Dr. Maultsby originated to enable us to decide whether or not we are thinking rationally (parentheses mine).

1. Is the thought true? (Does it reflect reality? Is it rational based upon a sound premise?)

2. Does it get me what I want quickly? (Or as quickly as possible?)

3. Does it help me to feel the way I want to feel? (without self deception?)

4. Does it keep me out of trouble I don't want? (and am better off without?)

5. Does it lead me to protect my life?

If most of the answers are negative, one is doing irrational thinking.

Let's look at this framework in relation to cryonics.

1. Is the concept of cryonics true? Yes, based upon our knowledge of a material world and advances in medical science up to now.

2. Does it get me what I want quickly? Not quickly; it may take a very long (objective) time, but it will be as quickly as possible.

3. Does it help me to feel the way I want to feel? Yes. Although I enjoy being alive and want to continue to live as long as I can manage, death holds no negative meaning for me, and the future holds great promise.

4. Does it keep me out of trouble I don't want? If rotting away is trouble, most definitely so.

5. Does it lead me to protect my life? Yes, to the nth degree.

If one used this model for rational thinking, which leads to rational emotions, which cause rational behavior, cryonics is imminently rational.

By implication then cryonicists are rational people. Perhaps their dual purpose can be to promote both cryonics and the concept of rational living.

But even if we don't accept this suggestion, we can be assured that our adjustment to both leaving our present lives and entering our new future lives will be smoother and more comfortable because we are rational beings and we know it.

As a postscript, I would like to mention a practical way to spread our message. You might want to have going away parties periodically. You could invite all your friends and relatives to either a private or organizational party focused on the possibility that you might be frozen in the coming year and you want to get your goodbyes taken care of. There could be a presentation of our philosophy, brief reports on technical progress, plans and hopes for after the thaw, songs and stories, and that sort of thing. If nothing else, it would make them more aware of the concept of cryonics as a rational way to leave them with, so to speak, your hand upon the doorlatch of the future.

References:

Ellis, Albert and Robert A. Harper, A Guide to Rational Living In an Irrational World, Prentice Hall, 1961

Mason, Richard L. Managing Your Feelings, Kentucky State University, n.d.

Maultsby, Maxie C., Jr. Help Yourself to Happiness Through Rational Self-Counseling, Marlborough-Herman, 1975

Robert Ettinger: *The Legacy Continues*

Introduction by York W. Porter, President of the Immortalist Society and Executive Editor of Long Life Magazine

The Legacy Continues: Robert Ettinger on "Back to Basics"

Preliminary remarks by York W. Porter, President, Immortalist Society:

Robert Ettinger was a realist when it came to cryonics. Having a background with a Master's Degree in mathematics and also a Master's Degree in physics, he was well grounded both in the tenets of logic and the fact that "wishful thinking" just doesn't get it done. He had no interest in "pie in the sky" types of concepts that didn't have some sort of solid basis in the real world. In this article, from April of 1989, Mr. Ettinger talks about "back to basics" in his approach to the fundamental question of whether cryonics has a reasonable chance of working. With all the complexities that sometimes can be brought up concerning cryonics, from it's sociological impact to religious aspects to financial aspects and other interesting (and sometimes quite lengthy) topics, the "Father of Cryonics" knew well that, at bottom, all those discussions were predicated and were only worthwhile depending on whether the concept he developed was a reasonable thing to do.

The fundamental logic of cryonics is, of course, very simple and impeccable. You have basically nothing to lose (except, for most folks, a few relatively easily managed life insurance premiums) and, at worst, you'll just remain in the state of death which is where you would have been anyway! Unlike decisions, even "life and death" ones in everyday medical care, where different choices may have very significant impacts on one's future life/end of life/state of disability, cryonics only comes into play when every other reasonable option has been exhausted and current medical therapy has failed to allow the individual to stay alive.

Mr. Ettinger, however, was interested not only in a more persuasive argument than that. He was also interested in whether the concept he had developed would "pass muster" in terms of what the so-called "reasonable person" would do. Although he wrote a more technical paper on the subject, what follows below is similar to his claim for his original work, The Prospect of Immortality, wherein he basically stated that he was wanting to write the book so that anyone that could get his money's worth out of reading a newspaper should be able to follow the arguments outlined and the information provided.

A similar approach is taken here. With some primitive graphics generated with only a typewriter/basic word processor and the logic of his text, Mr. Ettinger shows that going "back to basics" is a smart thing indeed to do.

BACK TO BASICS

By: R.C.W. Ettinger

As announced last month, the Immortalist Society has scheduled the First Cryonics Science Court for April 22. Since then, we have been busy trying to round up participants and organize proceedings, including background information for participants and audience (jury).

Assuming the reader has read the last six pages of this issue of *The Immortalist*, and some of our other introductory material, we now make a further effort to clarify the case for cryonics, and put it in a probability theory framework.

We hope to make a persuasive case that cryonics is not only rational as a long-shot, desperation measure when all other hope fails, but in fact is not a long shot at all, but rather (from the standpoint of scientific probability) odds-on for success.

QUANTIFYING ESTIMATES

The case for cryonics is the probability that future technology will be capable of restoring frozen patients to youthful good health, by reversing the effects of several types of damage; effects of the "fatal" illness of injury, including senile debility or old age: effects of deterioration during a short period of clinical death before and during cool-down; and freezing injury, including the effects of cooling, freezing, storage, and thawing. (Thaw damage is sometimes the worst aspect of "freeze" damage; but nobody will be thawed until that technology is perfected, hence a significant part of what we now call "freeze damage" will never occur in the first place). Some physicians and scientists actually refuse to put any burden or reliance on future technology, insisting that only techniques already proven successful are justifiable. But the question before this Science Court is not one of ethical propriety: it is simply the estimate of scientific probability of future revival and rejuvenation of frozen patients.

We can break this down into two parts. (1) How much damage have the frozen patients suffered? (2) How much damage is likely to be reversible in the indefinite future? As a very rough, crude first approximation, we can visualize the possibilities something like this:

Damage (especially to the brain) after senile deterioration and after freezing will be definitely greater than zero, but also (as we shall show) much less than 100%. Future repair capability will also be greater than zero (i.e., it will exceed present capability and will reverse at least some damage now termed irreversible), but will presumably be less than 100% (not capable of reviving someone vaporized by a nuclear explosion).

Schematically, we can estimate ranges of probability of damage and of future repair capability. If the damage estimate is very high and very narrow ("D's below), and the future repair capability estimate is very low and narrow ("R's" below), then the least damage is worse than the best repair capability—no overlap—and there is zero probability of future rescue.

0% .....DDD 100%

0% RRR 100%

If the damage and repair estimates are more moderate and wider ranging, we might have a situation like this:

0% DDDDDDDDDDD.....100%

0% RRRRRRRRR 100%

In this case, a repair capability in the reasonably optimistic range ("R's" toward the right) will suffice to reverse damage to the reasonably optimistic range ("D's" toward the left); there is considerable overlap. Of course, if the actual damage turns out to be near the high end of this estimate, and the best repair capability at the low end (even in the far future), then patients frozen by present methods are out of luck. For rescue, the realized "R" must be farther right on the scale than the realized "D".

Some cryonicists think a good case can be made that the damage estimate range should be rather low and narrow, and the future capability estimate range high and narrow, something like this:

0% DDD 100%

0% RRR.....100%

…so the worst case repair capability (left-handed "R") is still plenty good enough for the worst case damage estimate (right hand "D"), and rescue is assured (with whatever degree of confidence we esti-

mate these ranges).

Probability estimates in this context are tricky and subtle for most people (including most statisticians), but for a qualitative analogy it may be useful at this point to look at a famous instance of "speculation."

SPECULATIVE FORECASTING MOON ROCKETS

In the early part of this century, Robert Goddard in the USA, and Konstantin Tsiolkovsky in Russia, showed that rockets could be built for travel (e.g.) to the moon. The demonstration was based on simple, basic physics and math: all you need to get to the moon is enough explosive fuel and a method of controlled release.

Of course, many "minor" details remained to be worked out, and partly for this reason Goddard and Tsiolkovsky were mostly ridiculed or ignored in the scientific community. Technology yet to be developed included adequate refractories, electronics, metallurgy, and cryogenics, and the project required enormous funding—a national effort by the richest nation on earth.

In the early Sixties, when the moon project was actually activated by NASA, it was *still* "speculative" in the sense that much of the technology was still unborn or untested; we essentially relied on a sense of the sweep of history, a confidence that the remaining problems would indeed—somehow—be overcome. And they were.

REPAIR TECHNOLOGY: IS IT "FAR OUT"?

No one pretends that the technology to reverse senile debility and freezing damage would be anywhere near as simple as that for rocketry. But the outlook for biological repair is in some ways much *better* than was the outlook for moon rockets in Goddard's time.

For openers, we have the Precedent Principle on our side. Interplanetary rockets (like the wheel-and-axle) were unknown in nature; we had to do what had never been done. But physiological pathways for youthful good health already exist in our species; we have only to restore them. Microscopic service and repair robots for the human body already exist (e.g., the corpuscles of our blood and the enzyme molecules in our tissues); it is only necessary to engineer variations, with the appropriate controls.

Another enormous advantage is the incentive. Not many people were interested in rockets, and the payoff is still marginal, at least in the short term. But most people are interested in better health and longer life, and hordes of professionals in the biological sciences are already at work on the problem, either directly or indirectly (by study of the basic mechanisms of life).

Still another huge asset is the burgeoning electronics/computer industry, with its financial stake in pushing miniaturization to the limits. In our view, this virtually guarantees the vigorous emergence of nanotechnology, including the development of sub-microscopic computers to control the repair robots.

"TINY TECH": PIE IN THE SKY?

Some people are highly skeptical of the claims or prospects of nantotechnology or molecular engineering, perhaps mainly because the consequences of success are so awesome (and in some respects frightening). Are the proponents of nanotech air-headed visionaries?

Science is not democratic: when Einstein first found his new laws, he was a majority of one. Proponents of new ideas, almost by definition, start out in the minority. You can't reach a reliable conclusion by counting votes. Ideally, one should investigate the evidence himself, in detail, and form his own conclusion; but it can sometimes be marginally helpful to look at the people involved.

"Nanotechnology" (pertaining to machines a billionth of a meter in length, roughly a size comparable to atoms and molecules) was first proposed for development by Richard Feynman in a talk at Stanford in 1959. He suggested building tiny machines, which would then be used to construct still smaller machines, and so on down to the atomic scale. (Robert Heinlein had made a somewhat similar suggestion, although rather vague, in a science fiction story about "waldos".)

Feynman later won a Nobel prize in physics, and for this and other reasons is certified as one of the most brilliant minds of the 20th Century. It is a well-known lesson of history that a single can-do expert is more to be reckoned with than a hundred no-can-do experts—even though the latter are sometimes right, at least for the short term.

In the event, Feynman was not only quickly vindicated, at least in part, but even shown too conservative. In part, his suggested progression has been leapfrogged; the very recent developed scanning tunneling microscope and the atomic force microscope *already* allow some degree of direct observation, and even direct manipulation, on the atomic scale. There is furious activity in this area, with reams of research reports on an almost daily basis.

Finally, there is an elegant simplicity in the nanotech repair concept, assuming atomic scale manipulation. After all, frozen people are not destroyed; they have "only" had some of their atoms moved slightly into the wrong positions or combinations. Move them back, and there you are. (Nobody says it's easy.)

NATURE'S WAY: THE ONLY WAY?

Those who question the reversibility of old age, confronted with the Precedent Principle, may answer: "Yes, there is such a thing as youthful good health, but it can probably only be attained in one way—by being born and growing into it and briefly enjoying it. To restore it after the natural deterioration of old age is merely wishful thinking."

But we think a thoughtful review of history, and our knowledge of the workings of the world, point to optimism. For one thing, human intervention and improvement over nature is not new.

For a long time most people thought only birds and insects could fly, because humans never had and were thought too heavy to flap artificial wings successfully. But eventually humans did fly—better than birds or insects, faster and higher and safer and more economically. We still can't do precisely what the birds do in exactly the same way—but we fly through the air and we get where we're going. There are countless other examples on every level.

In the more pertinent area of human microbiology, successes are pouring in and mounting up, with every indication that the bulk of progress is ahead of us and not behind. Gene transplants are designed to fight inherited disease; new animals and microorganisms are patented. There are more biologists working now than lived in all the generations of the past, and they have brand new tools, including computers that in some cases can "do" experiments at a small fraction of the cost in time and money and effort that older lab bench methods would have required.

A couple of other points should be made concerning the advantage humans have over nature in construction and repair.

First of all, nature works through the partly random and very slow processes of evolution. It seems clear that existing life forms on earth, and their internal mechanism, represent only a tiny fraction of the possibilities. Man, not nature, invented the wheel-and-axle and

the pulley.

Second, nature lacks some of the resources available to humans, who e.g. can bring together materials from widely separated points on earth or under it, in combinations that could not ordinarily arise. "Doping" crystals with tiny specks of carefully selected and regularly placed impurities is strictly a human invention. Growing crystals in free fall (in orbit) is a technique that was not available to evolutionary nature.

Nature is impressive, to be sure, and we do not yet have full understanding of evolved life—its anatomy, physiology, and biochemistry. But humans work much faster than evolutionary forces by many orders of magnitude, and our computers faster yet by further orders of magnitude, and many observers of history think projections of future achievements are almost certain to prove too timid.

---Having reiterated a bit of background, we are ready to think a little more about probabilities.

PROBABILITY ESTIMATES: THEORETICAL BASIS

A probability estimate for an event (outcome of an experiment) is found in one way only—by drawing an analogy between the experiment at hand and a recorded sequence of similar experiments.

In those cases where use of probability theory is best known—e.g., games of chance or statistics of large samples—this is often easy, because the analogy is clear and the recorded sequence large with well defined parameters. But in most case of everyday life the situation is far different.

An example might be crossing the street. We are faced with this life-and-death calculation on a daily basis, and we long ago learned to do it intuitively and very quickly. We glance at the traffic, gauge speeds and trajectories, take the lights into account, factor in our knowledge of our own speed and agility, adjust for urgency and acceptable risk, and either go or wait. Sometimes we are painfully wrong, but usually we are right. (Squirrels are wrong more often, and have a much higher traffic mortality rate.)

We especially draw the reader's attention to the fact that this traffic estimating ability is learned early, and with a *relatively small background of personal experience*. We do not require huge databases for useful and reasonably reliable lessons.

Note also that this traffic estimate could be called "speculation about the future." We may never have encountered this precise situation before, but clearly the "speculation" is justified, and indeed essential.

Next, consider two more types of future speculation: (a) a governmental budget projection, and (b) an individual investor's long term investments.

(a) The budget projection could easily be wrong; many of the factors are highly uncertain, and governments have a built-in tendency to be over-optimistic. Even so, the projection is necessary and in some degree useful.

(b) A young conservative investor would not have to do much research to find a fairly safe and rewarding program. He need merely note that the long term trend of markets and economics is up; he notes also that this is not a sampling fluke, because it is grounded in ever-improving productivity based on technological advances. In other words, he looks at the sweep of history and draws the obvious conclusions. This approach is crude and quick and easy—but it is *scientific*, because it makes rational use of relevant information.

More detailed background can be found in my essay, "Cryonics: The Probability of Rescue," available from the Immortalist Society for $1 (free to full members).

PROBABILITY: AGE & FREEZE DAMAGE

We are finally ready to ask the reader, at least tentatively, to put cryonics in a probability framework. How good is the chance of rescue—revival and rejuvenation of frozen patients?

Remember that we exclude from consideration such hazards as war, civil disorder, business failures, economic catastrophes, and so on; we are concerned only with the technical outlook, assuming civilization endures. Will we ever achieve the technology to restore youthful good health to a patient frozen (let us say) beginning shortly after clinical death and by methods available today?

An explicit calculation could be made, by methods outlined in my essay mentioned above, but it really isn't necessary----any more than you have to sit down with pencil and paper before you cross the street. You just purge yourself of traditional language traps ("Dead is dead," "irreversible damage," and so on); correct any misconceptions about the nature and extent of freezing damage; and then *look at the sweep of history.*

Reasons to Join ACS

1) We have been in business a long time

We were incorporated in 1969; our first cryopreservations were in 1974. We are a Calilfornia nonprofit corporation formed to advance research into cryonics and cryobiology. Two well-known medical doctors, Dr. M. Coleman Harris and Dr. Grace Talbot, were among our founders which also included Jerry White and Edgar Swank. Jerry and Edgar are in cryopreservation at the CI facility.

2) We work closely with the Cryonics Institute (CI)

Starting with our first frozen patients, ACS has maintained funds to keep these patients frozen. This responsibility has required that we focus on a practical approach to managing our resources. By working closely with CI with it's ever increasing "patient load" we are able to keep long-term storage costs down while adding to the funds of both ACS and CI.

3) Initial Preparation by Suspended Animation, Inc and other Options

We don't have all the answers. Cryonics depends upon anticipating future technological developments, and taking action NOW to benefit from those breakthroughs. This means there is a speculative aspect to cryonics. We give our members a wide a choice of options which include initial preparation by Suspended Animation, Inc. We also offer less expensive options. See our website for all choices.

4) ACS Utilizes the Tools of Risk Management

The ACS program employs the tools and techniques of risk management, such as inspection and verification of good practices at facilities where ACS members are in cryostasis. Financial planning includes diversification and decentralization to help guard against adverse financial consequences for ACS assets..

5) ACS Sponsors Research

Some research programs of the American Cryonics Society have been very well publicized. The successful cool-down and recovery of Miles the Beagle led to appearances of ACS scientists on Good Morning America, The Sally Jessy Raphael Show, and The Phil Donahue Show.

6) ACS Maintains its Own Emergency Response

Long term storage should be centralized but stand-by and emergency response, by its very nature, is local. In that regard we maintain emergency response equipment and responders in the San Francisco Bay Area which can also can be deployed to most locations in the US.

7) ACS is a Democratic Society

One internal control, absent in some organizations, is the fact that ACS is a democratic organization. That is, our governors are elected from among the members, by the members. A number of procedures have evolved over the years, to help ensure that this electoral procedure is safeguarded.

8) ACS Patients have Live-Member Sponsors

To ensure that the obligation ACS has to people in suspension continue to be considered, ACS has a program whereby live members act as "Sponsors" on behalf of the people in suspension. Sponsors get reports of suspension facilities housing the patient, and information on investments used to benefit the continued suspension of that person. Whenever possible, a good friend or relative of the person in suspension is named as a Sponsor. We prefer that the Sponsor also be enrolled in our suspension program.

9) ACS Manages Growth

The strength of a cryonics society is not dependent upon how many people it has in suspension. There must be a reasonable allocation of resources to meet the obligation of those in suspension. Societies who accept underfunded or non-funded patients must then make up that deficit through raising membership dues or by receipt of an endowment. Both of these fund raising methods involve significant risk, with results considerably in doubt.

The American Cryonics Society is not a kingdom built on a house of cards. The balance between those enrolled in our pre-need suspension plan, those in suspension, and the allocation of resources between these two programs is balanced to ensure our survival and prosperity. We are not dependent upon luck, endowments, windfalls, or even growth to sustain us.

10) We Make use of Individual Trusts

While other societies have more recently begun using trusts, the American Cryonics Society adopted this technique as its primary recommended funding vehicle in 1982. The individual trust is a mechanism to isolate and manage risk, ensure some oversight, obtain acceptable tax treatment, and address various problems and requirements unique to each individual member.

11) "Freeze-Wait-Reanimate" is our Only Purpose

The American Cryonics Society is not a "Utopian" organization. We don't have a political agenda to transform our current political or social structure to make our version of a perfect world. That is far too ambitious an undertaking; and besides, we don't all agree on what political and social changes are desirable. We are a cryonics society: PERIOD. Our program is simple: freeze-waitreanimate. We support cryonics research, education, and information dissemination. That is what ACS is about. That is ALL ACS is about.

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An appointment is required for a personal visit or interview.

Final Thoughts

York W. Porter - Executive Editor

The Luckiest Girl in the World

I've always had an interest in aviation. I can remember when a plane going overhead at a relatively low altitude was a very big deal to me back in my childhood days. Although I don't have a pilot's license and don't own a plane, the ability of our civilization to have machines that can "ride on air" and can travel several hundred miles an hour in reaching their destination---well it seems almost miraculous to me. The ability to turn a trip of a couple of thousand miles down to a few hours would definitely cause awe among those from earlier centuries whose surface movement was generally restricted to however far or fast a horse could go.

As with any form of transportation, however, accidents can happen. In the 1960's a man and a woman would face the results of an airplane crash. The story that came out of that situation contains a big lesson for life in general and for those of us interested in cryonics in the particular.

The man's name was Ralph Flores, who owned a vintage aircraft and decided to fly from Alaska, where he was then living while working as an electrician, and visit his family who were still in California. Placing an ad on a local radio station for anyone who might want to ride along and help pay expenses, Flores was contacted by a blue-eyed beauty from Brooklyn who was on an extended, and apparently "do-it-yourself" trip around the world. Helen Klaban decided she would ride along with Flores to California where she would then try to see if she could make arrangements to sail to Hong Kong. They agreed on the sum of seventy dollars as Klaban's portion and set their sights on a successful journey by air to the sunnier and more hospitable climate that California would offer.

On February 1, 1963, the pair climbed aboard Flores' 1941 Howard airplane heading for San Francisco where Klaban could continue her slow trip around the world by crossing the Pacific by ship. Using a

navigation method not totally uncommon today, Flores planned to follow the Alaska Highway down through the Yukon and British Columbia. This method was similar to a friend of mine who said that in flying from South-Central Kentucky to Florida, he normally flew towards Atlanta where he encountered Interstate 75 and then, as a pilot whose time in the air was primarily in the day time, he simply followed I-75 visually as it winds it's way through Georgia and, ultimately, into the state of Florida.

At first Flores plan went fine as he flew to a city about 400 miles away from where he started whereupon he and Klaban were grounded for a couple of days by a winter storm. With some snow still falling and bitter cold with markedly sub-zero temperatures outside, Flores and Klaban finally took off. Having been a pilot for about ten years and having experience flying in the Arctic, Flores was unconcerned about the weather conditions that prevailed. Looking forward to what he thought would be a few hours of flying with improving weather along the way and with his wife and children waiting at his final destination of San Bruno, California, he confidently guided the plane into the air for the pair's two separate but nearby-via-air destinations.

Landing in San Francisco first with it's expected early February weather of in the 40's to 50's must have seemed like Florida weather to a individual living in sub-zero weather and probably greatly added to Flores desire to see his family. Unfortunately, the vision in Flores' head was never to happen the way he thought of it. Due to fog and snow, things had gotten to the point that Flores had gone considerably off course.

He then did a not uncommon thing, especially in the days of less sophisticated air travel. He decreased his altitude in order to try to get his bearings from the terrain below. Instead of succeeding at that, he managed to clip a wing against a tree that was about two-thirds the way up the side of a mountain that lay below him. (A similar thing happened in later years to a pilot in my general region who also dropped altitude to get his bearings. He managed to hit the side of a mountain that was the tallest structure in a rough general line between Chicago, Illinois and Miami, Florida. A friend of mine living in the region said that, thankfully, neither the pilot nor his wife were seriously injured but his wife was "mad as a wet hornet" over her husband striking the only possible thing he could have hit for hundreds of miles in either direction along that line!).

Both Flores and Klaban were understandably knocked unconscious by the impact of the crash. Waking about a half an hour later, and being very badly injured, Klaban's screams finally also awakened Flores. With multiple injuries himself that made his movements very, very excruciating, Flores still managed to make his way out of the wreckage and go around to Klaban's side of the aircraft. With what was no doubt a deeply painful effort, he managed to extricate her from the crumpled plane debris.

Luckily, within a short time of the crash, their failure to reach their destination had been passed on to the appropriate authorities and the Royal Canadian Air Force's search and rescue branch in Edmonton was dispatched to try to find them. Those efforts, as intense as they were, didn't result in success for four weeks and three days. During this time Klaban and Flores turned to the most basic and strongly "built-in" instinct that there is in humans and that is the instinct to survive. This was, sadly, no TV show where help would be there within an hour or two allotted for programs that entertain us on a daily basis. This was real life and they were faced with the real life task of surviving in absolutely horrid conditions that are terribly difficult for this author to even to begin to contemplate from the considerable comfort of the home I'm in as I write this.

For the first four days, they lived on the sparse food that was aboard at the time of the crash. Flores had not expected this to happen at all and had not packed any emergency provisions, in spite of the foreboding terrain he was flying over and the horrible time of year, weather wise, they were traveling in. Four tins of sardines, two tins of tuna, two tins of fruit salad and a box of crackers represented their entire food stores. Once these ran out, however sparsely used, there was simply no more to be had.

Flores, as he gradually recovered from his injuries, tried to snare rabbits. He also fashioned a slingshot out of tubing from one of the plane's tires. Neither of these efforts was successful in food gathering. There was simply no more food to be had and the pair only had the comfort, such as it was, of melted snow to quench their thirst and to help quell, albeit briefly, their hunger.

They huddled together to try to stay warm and used what was left of the fuselage of the plane as shelter. Clothing that Klaban had brought along served to insulate them to some degree from the horrendous cold. They were able to use motor oil and dead branches in the area to make fires. On a daily basis, search planes passed overhead but the forest canopy was so thick, the smoke from their fire never penetrated it enough to where rescuers could find them.

In a comfort to authors everywhere (well, at least authors, unlike yours truly, who turn out very high quality text), the two passed some of the time reading, with varying success, well known volumes such as the Bible, the Book of Mormon, Thoreau's Walden Pond, and Plato's Republic, some of which Klaben packed as part of her planned extended trip. They discussed religion, with Flores being a Mormon and Klaban being Jewish. They recited some poetry as well.

Finally, after the passing of a horrid month alone in the wilderness, they decided they would try to move down the mountain somewhat

in the hopes they would be more easily seen. They followed this by another move, around the middle of March, to a knoll where Flores had constructed a shelter out of tree boughs and some canvas from the plane's wing. He made a makeshift toboggan out of a piece of the wing's fabric in order to move what little gear they had.

The day after the move to the knoll, after expending tremendous hours and financial resources without success, the official search was called off. Nine days later, a private pilot, Chuck Hamilton, was delivering supplies to a hunting lodge when some smoke caught his attention. Initially continuing with his run, Hamilton decided that on the way back he would take a closer look. It was just the break Flores and Klaban needed.

Flores by this time had left the lean-to he had constructed on the knoll and was trying to hike out to the Alaska Highway, his original navigational aid. He didn't realize it was about fifty miles away. Flying back over the general area as before, Hamilton spotted the flash of a coffee tin Flores held in his hand. Flores, in his determination to maximize his and his companion's chances to survive, had also stomped an SOS in the snow with an arrow pointing in the direction of where Klaban was located. In almost utter disbelief, the pilot of the supply plane made the simple and astute decision to turn in the direction indicated by the arrow in the snow. Hamilton flew across the shelter where Klaban was located.

Helen Klaben's 49-day ordeal in the Yukon

Girl behind a Frozen Scream

by DORA JANE HAMBLIN and WILBUR JARVIS

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With little daylight left, the almost disbelieving pilot turned the plane towards the hunting lodge where he landed and informed the people there of his discovery and asked them to start out with a dogsled team to find Flores. He then flew back to Watson Lake and informed the authorities that evening.

The next morning Hamilton landed his plane at a nearby lake and set out on foot to head for the shelter he had seen from the air. About three miles later he found Klaben who simply said "I am so glad to know you. I'd like to kiss you, but I can't walk". Hamilton, at six-foot-two and around two hundred pounds, gently lifted Klaban, who was suffering from a crushed foot and gangrene that had set in and who had lost a great amount of weight after weeks with no food, and began his trip with her back to the hunting lodge. Hamilton fell again and again as his snowshoes kept getting caught in the deep snow that was along the way. Persevering, he met up at the lodge with the team that had rescued Flores and, after some food was provided, the two survivors of the crash that occurred on February 4th were flown out to a nearby airport. The day they were rescued in March, the temperature was just above freezing (Fahrenheit). That night it plunged to forty degrees below zero. Help had arrived just in time and against overwhelming odds.

Life is, for all of us, very difficult at times. Unlike TV dramas where "everything works out in the end", real life is filled with tragedies and struggles and times in which it's difficult to just keep going. The efforts of Flores and Klaban, however, to simply survive with the hope that better times could be ahead, but without the guarantee of those better times, stands as a beacon in human history and definitely a lesson in both life in general and cryonics in particular. No matter how bad things may seem, in the outstanding words of the poet Dylan Thomas "…rage, rage, against the dying of the light".

One thing Flores, with all his determination, might be criticized for was that he hadn't packed any survival gear. When Klaban asked him about this after the crash, he simply stated, "Well, we don't have any. I wasn't planning on a crash."

If you are thoughtful and with just a little small percentage of the determination of Klaban and Flores, you can greatly improve your chances of long-term survival. You can plan on things and you can certainly plan on using cryonics when the time becomes appropriate. Don't wait until you are "up against it" as Klaban and Flores found themselves. All sorts of people within cryonics are more than willing to be of help. Join us today. Get active today. You'll be very, very glad you did!

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