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A Publication of the Immortalist Society

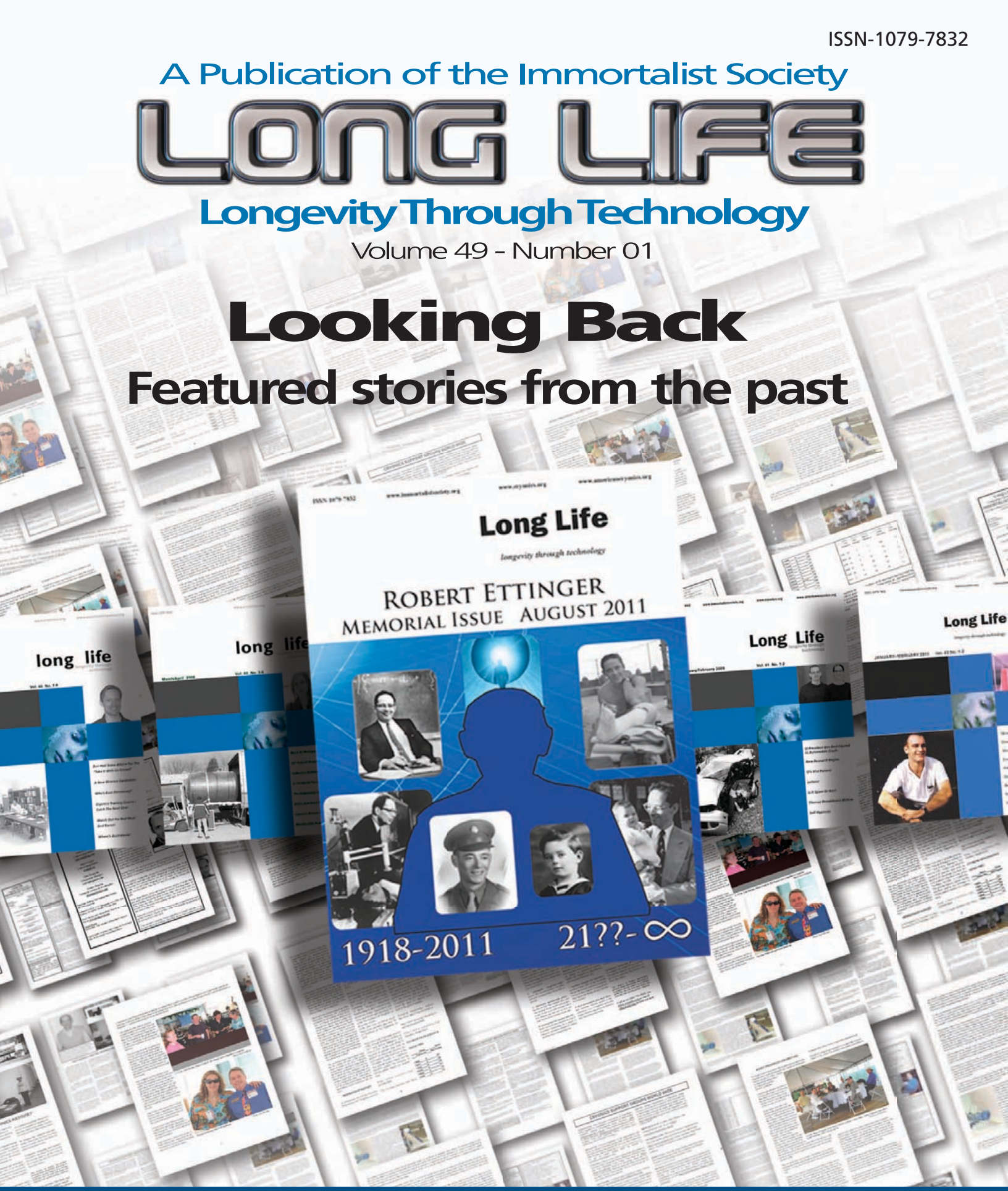
LONG LIFE

Longevity Through Technology

Volume 49 - Number 01

Looking Back

Featured stories from the past



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www.americancryonics.org

Who will be there for YOU?

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

Suspended Animation fields teams of specially trained cardio-thoracic surgeons, cardiac perfusionists and other medical professionals with state-of-the-art equipment to provide stabilization care for Cryonics Institute members in the continental U.S.

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Call 1-949-482-2150

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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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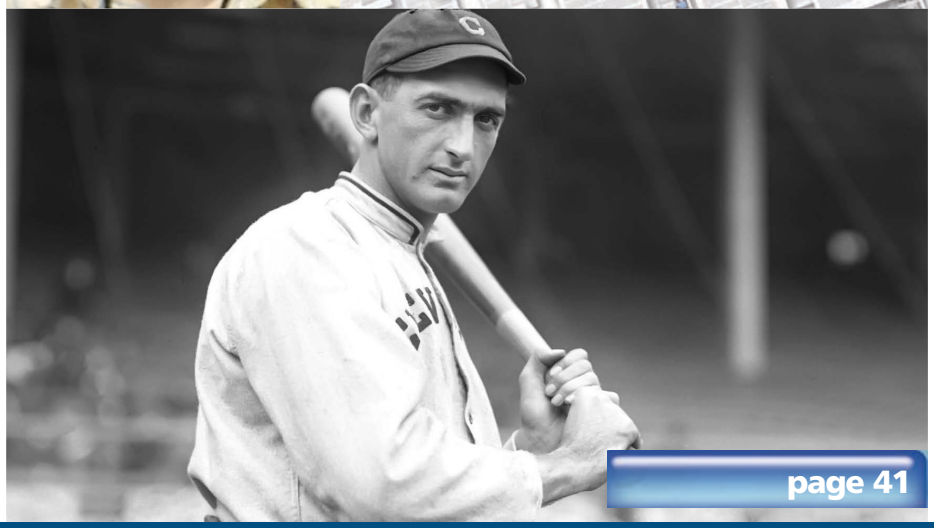
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LONG LIFE
MAGAZINE

A publication of the Immortalist Society

ORGANIZATION NEWS

FEATURE STORIES

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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

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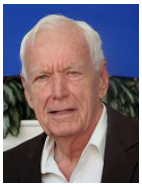

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In response to Immortalist Society Vice-President Debbie Fleming's thinking about reprinting some articles from the past, it was decided that this time, we would "turn the clock" back and try to look at some viewpoints and interesting articles from a couple to three decades back. Two articles by Robert Ettinger are included in the "Legacy Continues" column that appears as a standard feature of this magazine. Dr. Mike Perry is featured in an article he wrote in reply to one of Bob Ettinger's writings from "back in the day". Dr. Corey Noble (pen name of a prominent cryobiologist) is featured in a look at a cryobiological view of cryonics from some time back. Finally, Dr. Thomas Donaldson writes extensively on what would now be known as "nanotechnology". The term had first been used in 1974 but at the time of Dr. Donaldson's writings, it wasn't yet in widespread use.

In addition to the above, we have a tribute to long time cryonicist, and former President of the American Cryonics Society, Edgar Swank, who recently was placed under the care of the Cryonics Institute. My article on the ACS inspection of CI, as well as my regular "Final Thoughts" column appears as well as the usual CI Executive Report by Dennis Kowalski. So, sit back, relax, and take in all the good thinking about cryonics. And, if you haven't already, join us today!!

CI EXECUTIVE REPORT

Dennis Kowalski - President, Cryonics Institute

Dennis Kowalski - CI President

I have great news to report! The Cryonics Institute has exceeded expectations and growth and we are now the largest cryonics provider in the world, leading the way in affordable whole-body cryonics. I think that we should be proud of our accomplishments in this area and not be afraid to promote what we are doing well. At the same time, we must realize that our membership gains pale in comparison to the larger majority of people who are not signed up for cryonics. There are 7.5 billion people out there who have not chosen cryonics, so even with over 1,500 members we definitely have our work cut out for us.

Looking back at what we do well versus where we need improvements is an important step in realizing our goals. We have to take stock in what works and avoid what doesn't.

What have we done well at CI?

I think affordability is a large part of our success. Over the last 40 years we have been able to balance our budget efficiently, not by raising prices or dues, but by cutting spending and realizing economies of scale. We are always looking for ways to do things more efficiently and we pass those savings on to you, our members. The trap of spending money on frivolous or nonessentials is strong everywhere. We see this in family budgets all the way up to those of the government. Certainly organizations like ours are not immune. It is easy to get nickeled and dimed to death, but CI has thus far resisted the temptation to get caught up in unnecessary spending. It would be easy for CI to boost prices and spend money on endless side projects or excessive salaries. In fact, labor costs can be the single largest factor in running a business.

We have strategically kept our paid work staff to a functional minimum while utilizing enthusiastic volunteers when needed. We hire people to do work based on each job at hand and not simply for the sake of having extra staff. There is no benefit to having to pay a bunch of people to stand around looking for things to do. At CI we have enough people working to get the job done - no more and no less.

CI is fiscally conservative and it has paid off. Every dollar we save is another dollar that you have. You can use these savings either to sign up more family members or to use on your very own standby. Whether you use your money to invest in your own local standby or organizations like SA or Cryonics UK, you have a choice. You are not bound into a one-size-fits-all cryonics plan. I think most people with common sense see that CI is a substantial and capable company that can provide some of the highest quality services anywhere at a very reasonable price.

Regarding pricing, some people believe that we currently don't charge enough. For forty years we have been proving these people wrong. We are simply just that good at what we do. When you look at CI's spending vs our income ratio you can you can see that even though we do not take in as much as other companies we are extremely efficient, and that's what makes the difference. This is a key economic indicator in long term survivability. The ability to stay within budget is a critical requirement for being able to last decades or even centuries into the future. We are proud of our record of financial stability, service and continuous growth and improvement.

What do we need work on at CI?

I say it every issue and I will say it again here. The major weakness in cryonics, not just at CI but with all of cryonics, is standby. Go ahead look through the case reports or ask anyone with case experience... "What are the greatest problems facing people who want to get suspended?" The biggest problems are apathy and inertia. We put things off. We procrastinate. People think they can sign up and all their problems are over. Some people think that all they have to do is tell their family and provide some funding upon death. Some don't even sign up in advance and then it's too late when they need our services. Without membership and contracts in place there are inevitably crucial delays and roadblocks to suspension.

Some people let their proof of funding lapse, and this also results in unneeded delays.

When some people sign up they can be reclusive or quiet about their involvement in cryonics. They may not wear identifying bracelets or necklaces or carry wallet cards. These items bring attention to your wishes when you can't speak for yourself and let EMT's and surviving fmily members know about your plans to be preserved with CI. But if no one at CI knows you are sick or even deceased, it's impossible for us to help you. This is why we have standby manuals and encourage members to do some basic planning and preparation in advance. We can provide you with quality assistance and save you a lot of time and money, but ultimately, only you can make the correct plans for your own situation.

If you haven't done so already, please make sure your paperwork is in order. Make sure your funding is in place and start reading our standby materials to get a better understanding of the process and preparations that are required. If you don't take these simple steps now, then you are truly rolling the dice and your odds aren't going to be nearly as good as if you had just invested the time to make even the most basic preparations. Please act now not later.

In other news, some very promising and exciting advances in cryobiology have been reported.

Scientists developed a new way to safely thaw frozen tissues with the aid of nanoparticles. They produced and used silica-coated nanoparticles filled with iron oxide, which were then infused into tissues before chilling them to cryogenic temperatures. Later, the researchers used a magnetic field to warm frozen biological tissues infused with these nanoparticles. The tissues warmed rapidly and uniformly at about 10 to 100 times faster than previous methods. The samples were warmed as fast as 260F or 130C per minute. What happened? None of the rewarmed tissues displayed signs of harm from the heating process, and they preserved key physical properties such as elasticity.

Moreover, the researchers were able to wash away the nanoparticles from the sample after thawing. Tissues tested were human skin cells as well as pig heart valves and arteries. Most importantly, the tissues tested were larger in size (up to 50mm) than the relatively small (1-3mm) samples used in previous experiments. The larger tissue sample size holds out hope that eventually these processes will be applicable to whole organs and eventually whole bodies.

This is very interesting indeed and is something that we will be looking at more closely in the future. While this process doesn't stop damage when going from warm to colder cryogenic temperatures, it does significantly help when going from cryogenic to normal temperatures. Most of the damage from ice crystallization happens during this transitionary warming phase. Perhaps a combination of lower concentration cryoprotectants and these new nanoparticles could open the door to organ cryopreservation as well as improved lower toxicity cryonics procedures for our patients. These type of breakthroughs certainly do not hurt us as they bring conventional cryobiology further down the road from preserving simple tissues to trying to stabilize more complex organ systems.

In closing, I invite you all to make plans now for the 2017 AGM. Please see the AGM article in this issue of Long Life for all the details.

Hope to see you all there!

Respectfully,
Dennis Kowalski - CI President

Cryonics Institute Membership Statistics:

As of April 2017, the Cryonics Institute has 1,384 members, up 34 from our last report. Of the 1,384 Members, 212 have arrangements for Suspended Animation Standby and Transport.

There are 151 human patients and 136 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

Increase in Membership since last issue

APRIL 2017

Members	1,384	Pets	136
Assoc. Members	181	DNA/Tissue	248
Patients	151	SA	212

TOTAL **1,716**

Worldwide Cryonics Groups

AUSTRALIA: The Cryonics Association of Australasia offers support for Australians, or residents of other nearby countries seeking information about cryonics. 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. Volunteer & Official Administrator of the Cryonics Institute Facebook Page.

For more information about Cryonics in French & English: stephanbeauregard@yahoo.ca

DENMARK: A Danish support group is online. Contact them at: david.stodolsky@socialinformatics.org

FINLAND: The Finnish Cryonics Society, (KRYOFIN) is a new organization that will be working closely with KrioRus. They would like to hear from fellow cryonicists. Contact them at: kryoniikka.fi Their President is Antti Peltonen.

FRANCE:
SOCIETE CRYONICS DE FRANCE is a non profit French organization working closely withEuropean cryonics groups. For more information : J.R. Missonnier: phone: 33 (0) 6 64 90 98 41or e-mail: cryonics news.inpi@yahoo.fr.

Can help Cryonics Institute Members who need help for the transport & hospital explication about the cryonics procedure to the Dr and authority in Toulouse Area. Contact : Gregory Gossellin de Bénicourt / Email : cryonics@benicourt.com Phone : 09.52.05.40.15

GERMANY: 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.

GREECE: Greek Cryonics Support Group. Sotiris Dedeloudis is the Administrator. Find them at: http://www.cryonics.gr/

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/ index.html

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.

NETHERLANDS: The Dutch Cryonics Organization (http:// www.cryonisme.nl) is the local standby group and welcomes new enthusiasts. Contact Secretary Japie Hoekstra at +31(0)653213893 or email: jb@hoekstramedia.nl

* Can help Cryonics Institute Members who need help, funeral home, transport & hospital explication about the cryonics procedure to the Dr and authority at Amsterdam with branches in other cities. Contact : Koos Van Daalen / Phone (24 Hours) +31-20-646-0606 or +31-70-345-4810

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

PORTUGAL: Nuno & Diogo Martins with Rui Freitas have formed a group to aid Alcor members in Portugal. Contact: nmartins@nmartins.com or visit www.cryonics.com.pt/

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: Giulio Prisco is Secretary of the Spanish Cryonics Society. Website is http://www.crionica.org.sec. He lives in Madrid and he's a life member of CI and is willing to serve as a contact point for Europeans. He can be contacted at: cell phone (34)610 536144 or giulio@gmail.com

SWITZERLAND
www.CryonicsSwitzerland.com or www.ria.edu/cs

UNITED KINGDOM: Cryonics UK is a nonprofit UK based standby group. http://www.cryonicsuk.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. Website is 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.

ACS Inspection for 2016

By: York W. Porter

Voting Member, Cryonics Institute

President, Immortalist Society

Member, Board of Governors, American Cryonics Society

As part of an annual attempt to help insure quality care in cryonics, and as a representative of the American Cryonics Society, I conducted an inspection for 2016 of the Cryonics Institute on behalf of ACS. Some information was received subsequent to the meeting. Observations were made by myself on the date of the annual meetings of the Cryonics Institute and the Immortalist Society. I have been attending meetings of both organizations for about the past thirty years, except for one, and am very familiar with the CI facility itself as well as the general aspects of operations of the Cryonics Institute, including an excellent familiarity with the main personnel and Board Members of the Cryonics Institute, in particular Mr. Andrew Zawacki, who serves as one of the full time employees of CI, and who also serves on the CI board as it's Chief Operations Officer and as Board Secretary.

Physical Plant

The CI facility is in a small industrial park located at 24355 Sorrentino Court in Clinton Township, Michigan. The CI building is a relatively nondescript but functional structure in said industrial park, surrounded by other apparently similarly constructed buildings. The building's exterior is neat and orderly and the parking area is well maintained. On entering the building, one is faced with a tidy and well cared for interior which includes a small office area, rest area, and filing cabinet room in the front of the building, with associated coat closet/utility closet and a rest room facility for use by staff and visitors.

A well-tiled floor now exists throughout parts of the building, giving a more professional appearance to the area. This floor covering will also be more utilitarian than the floor covering which preceded it and should stand up better to foot traffic throughout the parts of the building in which it has been installed, along with making spills of any kind relatively easy to clean up.

A fairly good sized room, more centrally located in the building and which is just off the area which holds the cryostats (and which had previously been used in years past for member meetings), has been upgraded to serve as a functional and attractive Memorial Room. This room can also double as a meeting/conference room when needed.

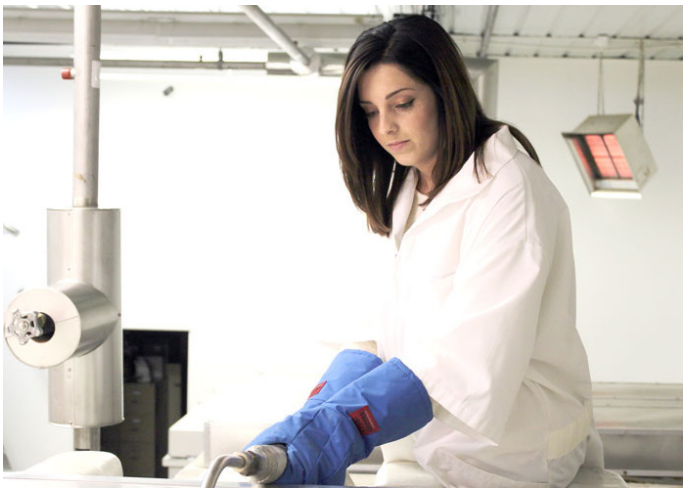
At the time of this inspector's visit, a flat screen television in the Memorial Room was running a "loop" of photographs of some of the individuals who are already under the care of CI. This provided a nice "personal touch" to my and others' visit to the Institute and helped to emphasize that the general topic of cryonics is centered on the value of each individual's human life and the reasonable possibility that future medical science may be successful in assisting individuals under the care of CI.

The cryostat area was fairly large, with an available adjoining restroom (handicapped accessible) for workers/visitors, and an area in a side room where individuals received by CI, and who are going to be undergoing the procedures associated with cryonics, can receive any preparation needed prior to being "cooled down" and ultimately placed in cryostats at the ultra low temperature of liquid nitrogen. The work area was neat and orderly and quite presentable to any potential visitors/possible members. The cryostat area is gradually filling up as more individuals are received to be placed under CI's care and although ample room remains for probable immediate needs, discussions have begun, at least in a preliminary way, as to how CI should proceed to deal with this.

Three options for extra space seem available. First would be the expansion of the present facility. Given the limited amount of land, this would seem to possibly necessitate building vertically with perhaps some sort of steel frame construction surrounding the present facility and supporting an additional floor(s). The second option would be to buy an entirely different and larger facility in another location. The third option would be to purchase an available building, either in the industrial park itself or in another location in the general region as a second facility. At the present, it does not appear that CI will face any immediate storage difficulties so this is not a pressing problem but the fact that the organization relatively recently has just reached over 150 patients under its care does cause the issue to begin to have more merit. To this inspector's understanding, thinking is ongoing within CI and its Board of Directors as to what options are available and how best to proceed in future years.

In the very back of the facility is a utilitarian work area that is separated from the general patient/visitor area by a wall and some doors. An attic area exists for storage of various supplies and materials. The

work area seems well stocked with tools and supplies as would be needed by CI personnel. At the very back of the building, after exiting outside through a side door from the work area of the facility, one turns to the right and comes upon a large bulk storage tank which is enclosed by dual chain link fencing, both gates of which are secured with locks. The bulk tank represents CI's present methodology of receiving new supplies of liquid nitrogen. This is both a saving in liquid nitrogen purchases over smaller delivery methods that CI used in its earlier days, as well as offering a "reserve" of liquid nitrogen in case supplies were to be delayed in being received, or if there should be a short term increased need for additional liquid nitrogen between deliveries. The bulk tank appeared to be in excellent condition. The present method of filling most cryostats is with a nozzle and hose through the top of the cryostat with a worker utilizing a metal "catwalk" that exists between the cryostats. Liquid nitrogen flows from the bulk tank through the hose utilized by the CI worker and into the cryostat.



CI employee Hillary McCauley filling cryostat

As a measure to help insure continuity of service, CI maintains accounts with more than one liquid nitrogen supplier. Invoices looked at by the ACS inspector appeared proper and in good order and seemed to reflect proper purchase amounts for the number of cryostats in use.

Cryostats/Cool Down Box

While CI did for several years construct its own "in-house" cryostats, it now has these manufactured by an outside company. The product of this outside company has been, to date, extremely reliable and no failures have been noted during their use. All cryostats at the facility were intact with no visible signs of leaks/malfunction at the time of this inspector's visit. Due to their fiberglass construction, however, repair of same, if ever needed, should be readily accomplishable. The efficiency of cryostats at this point has been such that projected use of liquid nitrogen has been less than what CI originally thought would be necessary per patient. Any savings in operational expenses obviously means increased patient safety due to the ability of invested funds to "go farther" and build up more capital/principal down through the years. This is obviously a plus in a cryonics operation.

It should be noted as a matter of interest by individuals who are new to the concept of cryonics, that the cryostats do not require electricity to operate in terms of storing patients as they are, in essence, large thermos bottles that hold patients and liquid nitrogen and which only allow heat transmission at a very slow rate. Liquid nitrogen does not "boil" in them similar to water in a pan on a hot stove but instead slowly evaporates to then be replaced by CI workers on a regular basis.

The "cool down box", which is used to gradually lower patients to the ultra cold temperature of liquid nitrogen, appeared to be in good working order.

In terms of emergency electrical power being needed (lights, computers, cool down box operation, perfusion pump, etc.) a 10 kW generator is available to provide that.

Personnel

The Cryonics Institute has had as its main employee, since around 1985, Mr. Andrew Zawacki. Mr. Zawacki, as mentioned earlier, also serves on the CI Board of Directors where he is able to provide significant information concerning day-to-day operations to other members on the Board of Directors. Mr. Zawacki is well known to be quite honest and polite, and to be a very pleasant person to deal with. He is a quite valuable employee to CI's operations and is known to have a wealth of knowledge both about CI and also about procedures utilized in cryonics in general.

A relatively recent addition to the CI staff has been Ms. Hillary McCauley. Ms. McCauley is a quite intelligent young woman who will, in this inspector's estimation, gradually become a very valuable member of CI operations as well. One of her primary qualifications is that she has formal training in Mortuary Sciences and has been a licensed funeral director since April 28, 2015 (Michigan Mortuary Science License Number 4501007964). Ms. McCauley, like Mr. Zawacki, is a quite pleasant person to deal with, knowledgeable and personable, obviously intelligent, and quite willing to assist potential and existing members of CI. Her formal training in mortuary sciences dovetails quite nicely with the efforts of CI in dealing with funeral directors on behalf of CI and its members. The ability of any individual to "speak the lingo" of a profession is, of course, an asset in dealing with that profession in any area of work.

Mr. Dave Fulcher is a part time employee of CI and has been so for quite a number of years. The combination of experienced staff in terms of Mr. Zawacki and Mr. Fulcher, combined with what would seem to be an outstanding personnel selection in terms of Ms. McCauley would seem to put CI in an excellent position, as concerns personnel, for the foreseeable future. It also is allowing CI, in the person of Ms. McCauley, to gradually prepare the next generation of workers and supervisors for its facility.

Governance of CI

The Cryonics Institute is an organization in which the day in, day out operational control is given to a 12 person Board of Directors. Voting members of the Institute, which can be generally defined as those that have paid a membership fee (either on a one-time basis as a lifetime member or as a "yearly member", pay "dues" on an annual basis, for at least three years) and that have fully funded and up-to-date arrangements for cryonic suspension and a signed and completed cryonic suspension contract, vote on an annual basis for one third (presently this numbers four) of the Board of Directors at each annual meeting.

CI uses, as is fairly common in many corporations, so called "cumulative voting". This is a type of voting in which each voter (voting member) is given a total number of votes equal to the number of positions up for election. In the case of normal operations of CI at this point in time, this would mean four votes are allotted to each voting member at each annual election, since one-third of the twelve members of the Board of Directors are up for election at each annual meeting.

A voting member may then cast all four votes for one person or may divide their votes in any combination they wish, i.e., two votes for one person, two votes for another person, one vote each for four persons, etc. The persons receiving the top four number of votes in the election become the new board members.

One of the advantages of this method of voting is that it allows a relatively small group of voters to insure that at least one person sympathetic to and/or agreeing with their viewpoint is elected to the Board of Directors at each annual election. In the case of CI, a group consisting of only twenty percent of the members casting all their "four votes each" for one candidate, plus one additional member willing to cast at least one vote for that particular person, can insure that in any contested election (five or more candidates running), that their preferred candidate gets elected.

While the election of a particular candidate to the Board does not, of course, insure that the "far less than a majority" group can automatically get their way, it does insure the possibility of placing an individual in a position of great oversight capability. This occurs since, as a member of the Board of Directors, the individual elected would be privy to any documents, actions, Board minutes, etc. that the organization has, as well as engaging in direct and active participation in Board meetings. This person may argue for a particular position, make motions at Board meetings, oversee expenditures, seek guidance from CI's legal counsel, etc. This is, again, a possible consequence of the use of cumulative voting that results in insuring that a "dictatorship of the majority" would be very, very difficult to carry out.

Further, the utilization of this same voting strategy over a period of years by the same group of voters would insure that they could elect three of the twelve board members on a continuous basis. That is to say, they could elect one member of the Board in the first year to serve a three year term, another member of the Board in the second year, and a third member of the Board in the third cycle of Board elections. (After the "third" cycle, all board members elected in the first year come up for election again). As mentioned in general above, while this is not a majority by any means, it is, nevertheless, a very significant number of individuals able to engage in "watchdog" functions on the Board of Directors, if nothing else.

In terms of particular officers, CI is set up such that voting members elect persons to serve on the Board of Directors and then the twelve members of the Board of Directors determine who shall be the President, Vice-President, Secretary, Treasurer, and Contract Officer of the organization. (The Board may establish other offices but the voting members present at the next annual meeting must approve these in order for those offices to be retained). This arrangement makes even the President of the organization, who has (generally speaking) CEO status, to be placed in a position where they must be quite cognizant of the wishes of the majority of the Board of Directors and, hence, of a relatively wide number of members in the organization. Further, the President is subject to assignment of duties as specified by the Board of Directors, which acts as a further check on abusive power by any one individual within CI.

While as in any organization, a strong willed and forceful personality might be able to greatly influence the operation of things, it is obvious to this inspector that no one person can establish a "dictatorship" without a fairly total abdication of responsibility among the Board of Directors and of the membership as a whole.

Further safeguards of democracy within CI are represented by the fact that members of the Board of Directors may be removed without cause by the membership (subject to provisions within the Michigan Nonprofit Corporation Act). Only five percent of the membership (or five members, whichever is greater) may stop new or non-customary action by the Board of Directors or of the corporation's officers and a special meeting of the membership must be called. Two persons

who are members of the Board of Directors may do the same. (This particular provision gives great "check and balance" power to the minority group utilizing strategic voting under cumulative voting procedures as outlined above). The action of the Board is, in either case, then "suspended" until either a majority of a quorum at a membership meeting votes to confirm it or until a petition representing the majority of the members is presented.

An additional power of the membership is the ability of them to pass corporate resolutions ("standing rules") that can control operations of the organization. These may be passed by a majority of a quorum at a scheduled meeting or may be brought into effect by a petition signed by two-thirds of the voting membership. These would be binding on the operations of the corporation, as long as they are consistent with local, state, and federal statutes/regulations.

In an additional provision that keeps democracy at the forefront, it only requires ten percent of the members (or ten members, whichever is more), to send a petition that would result in a special meeting of the membership. A majority of the Board of Directors may do the same. Thirty days notice must be given to the membership as to the date of the meeting, whether called by the Board or by some of the members. Members may vote by proxy (either general or specific) on any issues that come before a meeting of the membership. Board members may also use proxies in Board meetings.

Without further belaboring the point, the reality is that safeguards for democracy within CI are ample. As in any organization, nothing can fully insure the proper operation of that organization except an involved and informed membership and Board of Directors. Further, it is always necessary for well-meaning people to be willing to be assertive in the face of what might be considerable opposition, no matter how valid a viewpoint may be. (Mimicking, of course, the road cryonics itself has had to take).

The tools do clearly exist, however, in the structure of CI governance for various viewpoints to be heard and voted on and for seemingly oppressive and/or erroneous actions by the Board of Directors to be challenged and/or negated/reversed. Any member concerns about apparent irregularities in the operation of CI (if any) and any suggestions for improved CI operations have avenues readily available for which they may be dealt.

Financial/Legal Matters

In terms of financial matters within CI, it is noted that at least three individuals serving on the Board of Directors have work experience/training in the field of organizational and/or professional finances. This helps to insure that one of the main avenues for organizational failure, inadequate attention to its finances, is greatly decreased. As an additional method of "self-checking", one of these individuals does, from time to time, go to the CI facility for an informal "audit" of CI financial operations. This has been going on for several years and to date no irregularities or problems have been found.

The financial statement that should be found attached to this report (Long Life editor's note: This information will be printed in the next edition. It can be found online at http://www.cryonics.org/resources/ci-annual-financial-reports)is provided annually to members at the annual meeting, as well as being placed on both the websites of the Cryonics Insitute and the Immortalist Society. Further, the Immortalist Society, as has been its custom for several years, places both its own financial statement, as well as the financial statement of CI, within the pages of its magazine. The provision of a printed written record published independently of CI helps, in a minor way, to maintain a clear record of CI's financial activities, i.e., the record may not be changed without it being noticeable to someone double-checking such figures. The provision of that record on both CI and IS websites allows access of that financial information to numerous members who may have financial expertise themselves. It also allows anyone on the Internet to look at CI finances with a critical eye to errors and/or potential problems.

In terms of legal protection of CI's operation, the Institute has utilized, for years, the services of David Ettinger, who is Robert Ettinger's son, as its legal counsel. Mr. Ettinger is well familiar both with Michigan law and with the particular challenges that have been faced down through the years by CI in dealing with legal/regulatory situations. On top of that, the Institute is fortunate to have on its Board of Directors, two individuals who are also formally trained in the law and both of whom have graduated from law school (though, at present, both work in other areas than direct legal practice). This combination has, in this inspector's opinion, greatly helped to allow CI to avoid legal problems to begin with which, due to the sometimes organization threatening expense and time involved in litigation, has helped greatly in making sure CI has survived and prospered.

Internal Quality Controls/General Security

CI has, within the past couple of years, instituted a set of internal inspections. This is a very positive thing as it enhances quality assurance at CI. As in the area of hospital work, which this inspector has been engaged in (with the exception of a one year period) since 1974, efforts within an organization to maintain high standards, coupled with an "outside" look by independent agencies/individuals, serve to strengthen an organization's efforts towards safe and effective operations. CI is to be commended for implementing this strategy within its own organization and ACS will monitor these reports, as

they come out from time to time, in helping to insure quality control in cryonics in general and in CI's case in particular.

In terms of the security of the building, an electronic surveillance company is hired and there is an alarm system as well as numerous cameras placed throughout the CI campus to help decrease the possibility of break ins/disruptions to daily operations. The cameras are accessible to CI employees with a cell phone app. Stickers announcing the use of electronic security measures are posted prominently to dissuade any persons of ill intent.

In terms of patient records, these are kept in multiple locations, both inside and outside of the building, in secure, confidential, and fire resistant areas.

A local fire station is located about two and a half miles away at 21250 Fifteen Mile Road. The Clinton Township Police Department is at 37985 Groesbeck Highway, which is about four miles away from CI although, of course, officers on patrol may be in a different location at any one time. CI uses the KNOX-BOX® Rapid Entry System for approved non-destructive first responders.

CI maintains both land and cell phone lines.

Conclusions:

The Cryonics Institute is a long-standing provider of cryonics services. Its governance structure lends itself to relatively easy oversight by its members and by its Board of Directors, with an understandable and necessary amount of due diligence on their part. Several "checks and balances" exist in its bylaws that should help it maintain stable operations given a reasonable diligence by the membership/Board of Directors. It contains several individuals of special expertise on the Board of Directors that enables these individuals to help insure that CI is operated in a safe, efficient, legally correct and financially stable and efficient manner. The physical plant is well maintained, is reasonably secure, and is relatively near both fire and police assistance. Electronic security measures are in place. Monitoring of safe air levels in the building exists with mechanical ventilation available as needed to keep air inside the facility at a safe level. A sprinkler system, installed some time back, and paid for in part by the financial assistance of a trust that is administered by the American Cryonics Society, serves to keep danger from fire very low in a building that is fairly fire resistant to begin with. Fire extinguishers exist as well. Fire department resources are relatively close by. Patient records are duplicated and kept in secure locations. All cryostats have proven to be very reliable and have resulted, in the aggregate, to a cost savings to CI patients due to their lower than expected use of liquid nitrogen. CI seems to be managing its finances in a way that should both be considered reasonably prudent and in a way that should alert the Board and/or diligent members to potential problems. At the moment, one issue on the horizon is what to do when the present facility becomes full of patients but that is, fundamentally and in a certain sense, a nice problem to have since it indicates growing success on the part of CI and in the acceptance of cryonics in general. Also, as mentioned before, this is not a pressing problem for the facility and leadership within CI is already thinking about this issue.

In summation, while no inspection regimen can guarantee proper operations, the Cryonics Institute seems to be continuing to function in a well thought out and rational way that bodes well for its continued existence and the well being of the individuals who are under its long-term care. While one cannot plan for very extreme and catastrophic events (i.e., the "Supervolcano" of Yellowstone Park erupting, the possibility of a giant asteroid hitting the planet ala the event that apparently occurred in the Yucatan peninsula region back in ancient times, etc.), CI is apparently working diligently within its manpower and financial resources to deal with reasonably dealt with possible threats to its continued existence and to its patient's safety. As more manpower and finances become available, it is only reasonable to expect those efforts will be redoubled and that CI will continue to improve its operations. As reported in a previous ACS inspection, CI's operations give a reasonable level of assurance that individuals under the care of CI are in no immediate danger and that the prospects of their continued long term storage and care, at least for the foreseeable future, are excellent.

(It should be noted by readers that the American Cryonics Society is a totally independent organization from either the Cryonics Institute or the Immortalist Society and the responsibility for the contents of this report lies entirely with the American Cryonics Society).

Annual Meeting Reminder

Just as a reminder, the 2017 annual general meetings (AGM) of the Immortalist Society and the Cryonics Institute will be on Sunday, September 10th, 2017. The CI meeting will begin at three p.m. and will be immediately followed by the IS meeting. Attendees should note that the location has been changed from that used in recent years. Normally membership meetings of these two organizations have been held at the CI facility. Due to the increase in the number of CI patients and the resulting lessening of meeting space, this time the meeting will occur at the ConCorde Inn Hotel & Conference Center, 44315 North Gratiot Avenue, Clinton Township, (Michigan) 48036 (USA). You may look at accommodation information on the internet at www.concordeinns.com. The main telephone number is 586.493.7300.

The AGM of the Immortalist Society will be held after the CI AGM on the same day at the same location. The two meetings generally last most of the afternoon. A free buffet dinner & social follow. The CI facility will be open to guests and visitors one hour before the meeting begins for those wishing to tour the facility.

Meetings offer an excellent opportunity to see the facility, to meet other members and persons interested in cryonics from around the world, to get a sense of the status of the Cryonics Institute & Immortalist Society and to meet organization Officers, Directors & Staff. Elections for IS Directors are held on the day of the annual meeting. Results of the CI election will be announced.

For those who come at least a day early, an informal dinner will be held on Saturday evening at a local restaurant. Members & the public are welcome to join us the night before the official annual meetings at Sajo's restaurant for a casual dinner and drinks. (Includes Vegan options). This will happen on Saturday, September 9, 2017 at 6 pm at Sajo's Restaurant, 36470 Moravian, Clinton Twp, (MI) 48035. This is not too far from the Cryonics Institute. (Note: Unlike the free buffet after the annual meetings, everyone is responsible for their own bill at Sajo's). For more information and for directions to the restaurant go online to Sajos.net. As mentioned, there is no charge for the buffet dinner/socializing after the annual meetings, but we need to know how much food to order so if you plan to attend, please let us know. If you aren't able to give advance notice, that's fine, we would love to have you attend anyway! Please remember that meetings are open to the public so if you aren't yet a member of either organization but would like to show up anyway, please don't hesitate to do so and bring along any friends. We'll be glad to have you!

If you are able to do so, though, please let us know if you intend to be at the meeting as this helps us in planning (but, again, don't hesitate to show up if you aren't able to let us know ahead of time). For driving directions, more meeting information and to confirm attendance, send an e-mail to CIHQ@aol.com, or phone (586) 791-5961 or write to the Cryonics Institute, 24355 Sorrentino Court, Clinton Township, Michigan 48035-3229.

International Longevity and Cryopreservation Summit: Spain 2017

May 25-26-27, 2017, Madrid (International public) • May 29, 2017, Seville • May 30, 2017, Barcelona • Madrid – Barcelona – Seville, Spain 2017

Spain will host the first International Longevity and Cryopreservation Summit during May 25-30, 2017. Fundacion VidaPlus will be the main organizer of this world congress, with the help of other leading associations and organizations working on longevity, indefinite lifespans, cryopreservation, and other biomedical areas.

Longevity extension has been one of the dreams of humanity since the beginning of recorded history, when average lifespan was merely 20 years. Even starting the 20th Century average lifespans were just about 40 years in the first industrial nations, and starting the 21st Century average lifespans have doubled again to around 80 years in the most advanced countries. The possibility of doubling again lifespans is increasing rapidly again thanks to exponential technologies and new medical research and development. On a parallel front, cryopreservation has also advanced considerably since the first spermatozoids were frozen and successfully reanimated about half a century ago. Then followed eggs, embryos, many tissues and complete organs, in different kinds of animals, including some small mammalians. What will the future bring? Science and technology should lead the way!

Abstracts from participants are welcome for posters, papers and oral presentations until March 1, 2017. People interested in participating should go to our website (http://internationalcryonicssummit.com/) and follow submission instructions. Organizations interested in sponsoring our summit, and other media and institutional partners and allies should also contact the organizing committee through our website.

Edgar Swank on Skyway to the Future

By Jim Yount

In his first life-cycle 1940-2017 Edgar Swank lived just a bit too early for a flying car but we know one is in his future

On January 12, 2017 long-time cryonics activist Edgar Swank, age 76, became CI's 147th patient. Details of Edgar's cryopreservation are given in CI's patients report (www.cryonics.org/case-reports/t-1). What is not mentioned in the report is that Edgar "overfunded" his cryopresevation by contributing about twice what CI requires. He also provided extra funds to the American Cryonics Society. For those who can afford to do so, such donations can have a big impact on how well our organizations fare.

Rather than discussing the details of the ill health that lead up to his deamination, let's emphasize Edgar's zest for life and his ardent support of cryonics. Most notably, Edgar was President of the American Cryonics Society for more than 15 years and was one of ACS's founders. He also was a founder of the cryonics service company Trans Time, Inc. where he served many years on the Board of Directors . He was a Cryonics Institute director for several years and was a member and supporter of the Venturists.

In Vol. 38 No. 9-10 (Sept.-Oct 2006) I did an article on Edgar for Long Life magazine. Edgar liked that article, so, in tribute to him we are republishing that article in its entirely, except for using new pictures.

The following article is a reprint that first appeared in Long Life magazine in 2006

Meet Edgar Swank and his Flying Car

By Jim Yount

Edgar Swank has it all: a comfortable life, a loving wife, early retirement; but he can never truly be content without his flying car.

"What I want to know," he laments with what might well be a tear in his eye, "is where's my flying car?"

I can't help but sympathize with poor Edgar. They have been promising us flying cars since we were kids. Some of you surely remember those broken promises. Back in the 50s the folks who were rash enough to predict the future had us all flying around Jetson style in autos that were as much at home in the air as on the ground.

Like many cryonicists, Edgar grew up reading both science fact and science fiction. His father was a restless soul, forever moving his family around as he chased one dream or another, but finally settled in rural Washington State when Edgar was around 7 or 8.

Science fiction writers such as Asimov, Clark, and Heinlein were perhaps more stalwart friends than the childhood buddies Edgar would make and then lose as his family moved on. At any rate these speculators and tellers of tales imparted to young Edgar the hope of a fun-filled future with computers, robots, and flying cars. Edgar also awaits the availability of a personal android servant (female model), no doubt to pilot his flying car!

When Edgar's family arrived in Washington, they took up the rustic life. Edgar's Dad built his own home and planted a few crops, but was careful not to give up his day job. Green Acres had little appeal to Edgar, who would rather be studying science than digging potatoes. "The life of a farmer is just too much work. I was out of there just as soon as I got through high school," admits Edgar.

That early aversion to physical work served Edgar well. Since graduating from Washington State University in 1962 he has never had to dig a spud or hoe a row. Ask Edgar to pitch in to help with any physical task and he will quickly remind you that he is retired!

"My attitude towards physical work is just not to do it." He points out. "'Don't run if you can walk, don't walk if you can ride. Don't stand when you can sit, don't sit when you lie down," he says with a smile.

On the wall of his San Jose town house is the Swank Coat of Arms. I can well imagine that the Swanks of yore were among the nobility, leaving the hefting and heaving to the serfs. Still, when I picture Edgar as a potentate he fits much more into the far Eastern image. After all, the European Knights had to at least occasionally kill a dragon. Edgar would be much more at home being carried around in a litter,

At age six, Edgar was no doubt dreaming of a flying tricycle.

with fair maidens always on hand to feed him grapes!

There is no doubt that Herr Swank likes life on the comfortable side, has it that way, and intends to keep it so. In 1990 after working almost 30 years as a high level programmer at IBM, Edgar took advantage of the company's offer of early retirement for many of its senior employees. "They didn't have to ask me twice," admits our hero. "IBM put together a very sweet going away package: just too good to pass up."

Still, our boy must have done something at IBM besides sit around with his feet up on his desk. Also on the wall at Edgar's home is a framed copy of a US Patent (#4,641,274) awarded him for a clever program he designed while working for IBM. "Since I was an employee of Big Blue, the company had the ownership of my invention," explains Swank, "but at least I got the bragging rights."

In a way, Edgar became an "accidental programmer." In college at 18, he studies science and math, subjects he liked a lot but was even

more turned on when he took his first computer programming class. To be able to actually make a good living at something you truly enjoy is every person's dream; except, of course, when you can take the product of your work with you, so it sits on your desk at home, there to use at your convenience. All hail the personal computer!

I found still further proof that my friend's aversion to physical labor does not necessarily extend to mental work when I attended Edgar's 60th birthday party and met his former IBM Supervisor Richard. "We would assign Edgar a programming task that we thought would take several weeks to complete," Richard told me, "then a day or two later Edgar would hand me the finished project.

Besides using his desk-top for a good number of tasks to help ACS or cryonics in general, the Big Blue retiree has found ways he can

Edgar as star at the Big Blue, awarded patent #4641274

use his machine to turn a profit. For several years Edgar was a "bonus player" at online casinos.

I have to admit to being skeptical when Edgar told me of his "hobby". How could anyone actually make money gambling online? "The way I play is not really gambling," he explained. "To lure people in, the casinos offer juicy bonuses. Many will match your original deposit. You can keep the bonus after you have wagered this money some number of times." To convince me, my friend invited me to observe his play. One afternoon, I watched Edgar play Blackjack against an online casino. Playing the Ed Thorp basic strategy with two dollar bets, our boy, ended the session with most of the bonus money intact. "The thing is to have the discipline to only play for the bonuses," explained Edgar. "To do otherwise would be gambling, and gambling is wrong" he added with a smile.

The money Edgar has coxed out of the casinos is no insignificant sum. A few years ago he parted with some of his ill-gotten gains to purchase a new car. Even though the car was, in a sense free, Edgar shopped astutely for the best buy. After deciding on the Toyota Solara, he checked out prices of every dealer in town, both by phone and on-line. I drove him down to the dealership to finalize the transaction and sat with him through a session where the dealer tried to sell expensive add-ons. Edgar had no problem just saying "no"!

Did I mention that Edgar is very frugal? He could have given Jack Benny lessons! "It's not just how much you earn, it is how much you keep of what you earn," Edgar told me once. He has been very good at keeping what he earns. While he seems to come by that tendency naturally, he credits Ayn Rand with the instruction. One of the characters in Atlas Shrugged, while a millionaire, would always count (and pinch) pennies.

Along with The Prospect of Immortality Edgar lists Atlas Shrugged among the books that had the most effect on his life. Edgar is very much a cryonicist, and he is very much a libertarian. It was after he started working for IBM that one of his colleagues at work recommended the Rand book. "My friend told me that Libertarians and Objectivists emphasized self interest," Edgar recalls. "That sounded good to me. I'm all for self interest!"

Edgar and I argue frequently. This is partly because my libertarian friend is very good at keeping his cool. He has mastered the art of disagreeing without being disagreeable. So, we have frequent squabbles on topics that other friends would soon come to blows over, such as religion and politics. In that spirit I often chide him about his stinginess. "With money like you have, you could be living a much more opulent life style," I say. "When are you going to loosen up and spend some of that hoarded loot on living the life of Riley?" His usual answer is to state that his life style suits him just fine. A couple of years ago Edgar surprised me by telling me he had loosed the purse strings enough to buy a penthouse vacation home overlooking the ocean in Venezuela. Not only that, but he was half owner of an ocean-going cabin cruiser. For some time he had been interested in the added purchasing power of Americans living some places overseas, but I didn't think he would actually make such a move. "The cost of labor over there is so cheap you can have servants at your

beck and call," he told me. So the promise of comfort had overcome even Edgar's frugality! But how does one get a decent cryonic suspension in Venezuela? That was a fly in the ointment that bothered Edgar. His intention was to try to arrange to be in the US for that occasion, but to have back-up arrangements in Venezuela just in case.

After spending some time at his South American second home, Edgar has now concluded that the disadvantages of such living outweigh the advantages, and has put the penthouse on the market. Which is another characteristic I admire: he can change his mind and will admit when he is wrong. His decision is fine by me. I dreaded the prospect of getting a call from someone who barely spoke English telling me that the big Gringo was "muerto".

Edgar loves gadgets: most any kind. He was happy as a clam when he got a global positioning satellite receiver for his car, which is detachable so he can take it along to any car he rides in or carry it anywhere. On the occasions when he and his device have ridden with me, he has constantly fiddled with the thing, sometimes to the consternation of his friend Jim! His satellite TV and two Digital Video Recorders give him hours of joy. But most of all, any new addition to his home computer thrills our man no end. The computer is Edgar's connection to the world. He has friends all over the globe that he corresponds with by email, and is a frequent blogger. I honestly think he would be happy on the far side of the moon, as long as he had his computer and satellite TV.

That is not to say he doesn't value human companionship, but friends by phone or email seem pretty satisfactory. That said, and in spite of Edgar's self-centered beliefs and life style, I have been surprised at how tender he can be with his wife of 19 years Uiliana. The pair is in touch by cell phone many times through the day, even while Uiliana is at work, with various tender reassurances of love. I wouldn't think the old materialist would have it in him!

The American Cryonics Society has been fortunate to have Edgar as a member, and officer. He is the only Founder now alive and active. Besides serving as a Governor, he has been Secretary, Treasurer, Vice President, and now President.

He was among the founders of Trans Time, and served as a Director and Vice President. He was a Director of the Immortalist Society. Edgar set up the ACS webpage, where he has been our webmaster. His diligence in working through detail was one of the prime factors in getting ACS a contract with Suspended Animation, Inc. (two years or so before CI had such a contract). So, if the American Cryonics Society ever becomes rich, I'm for awarding Edgar a flying car "as a token of esteem, for past services!" Actually, Edgar has owned a couple of cars that came pretty close to flying. They could fly low. When he was "young and foolish" he owned a Triumph TR-3, to be followed by a Porche 356-C, and then a Datsun (now Nissan) 240-Z. "No more sports cars for me," he says. "My Toyota Solara 'flys' pretty well, and is more comfortable than any of the sport cars I have owned." Did I tell you that Edgar is into comfort?

Options for Safe, Secure and Legal Asset Preservation for Post-Resuscitation Access

The Eighth Annual *Young Cryonicists* Gathering

Teens & Twenties 8 2017: Getting to Know You - You Getting to Know Each Other

Fri-Sun; May 26-28, '17 Deerfield Beach FL Host: *Life Extension Foundation* SCHOLARSHIPS AVAILABLE

★★★

Greetings to *ALL Young Cryonicists*,

You are receiving this invitation because you are among the future leaders in cryonics.

All attention will be focused on:
our getting to know you and
you getting to know each other.
PLUS: an update on the latest emergency response technologies and revival strategies.

Who is Eligible?

Fully signed up young cryonicists from all cryonics organizations in their late teens through age thirty *(18-30) as of May 28, 2017* - may apply to attend.

Younger Cryonicists With Parent(s):

Thirteen through seventeen year olds may attend when accompanied by their parent(s) or guardian(s).

Parents/guardians of attendees aged 18-19 are also encouraged to accompany their child. All attending parents will be put in touch with each other should they choose to have their own "get together" during the "young cryonicists" gathering.

Program

Some individuals are social butterflies. This is not so for everyone. And we want *everyone to meet everyone.* Therefore, I have designed a diverse range of "getting to know you" activities. *IF* you would enjoy participating in these various getting acquainted activities, *THEN* this is for you.

Enjoy this exciting & fulfilling weekend.

SCHOLARSHIPS:

Life Extension Foundation, through a generous education grant, is offering *40 scholarships* that pay for ALL of the following:

- U.S. airfare to/from Fort Lauderdale, FL (up to $1000 for origin outside the U.S.)
- Hotel accommodations for Friday & Saturday nights - plus Thursday & Sunday nights (specifically) for scholarship attendees who room together.
- Meals and beverages on Friday night, all day Saturday, & Sunday breakfast & lunch
- Registration fee - $350 - also covered

Full packet available here:
http://www.cryonics.org/images/uploads/misc/T2_8_2017_details.pdf

Forever,

Cairn Erfreuliche Idun
Founder/Director: T2

PS Come Early. Stay Late.

Some attendees to T2 enjoy spending *extra time in Florida* - especially since their flight is already paid for via their scholarship.

This is at their own expense for additional lodging and food.

I look forward to getting to know you.

Looking Back: Dr. Thomas Donaldson Writes About The Technology of Revival

Introduction by York W. Porter, President Immortalist Society

Dr. Thomas Donaldson was a well-known cryonicist who wrote extensively about the subject. He is now under the care of one of the cryonics services providers. In Robert Ettinger's original book on the subject of cryonics, Ettinger made the assumption that future science would advance to the point that revival and repair of individuals undergoing cryonics procedures would be possible. He even wrote in general about the ability to do molecular level repair but he didn't, understandably, have the details about it. Years later, Dr. K. Eric Drexler provided significant and detailed support to Ettinger's assumption in terms of the reasonable capability of nanotechnology to manipulate any structure at the atomic/molecular level, including biological structures, whether those structures were functional or not.

Dr. Donaldson tackles the topic extensively in the writing that appears below. This article was from March of 1981 which is around five years before Dr. Drexler wrote his publicly well received book The Engines of Creation It was also, by coincidence, the same year of the invention of the scanning tunneling microscope which allowed visualization of atoms for the first time and roughly eight years before the point that individual atoms were manipulated in an IBM laboratory.

As a final note, one should keep in mind that putting out the magazine back in the early 1980's wasn't as "high tech" as it is today so, in some cases, Dr. Donaldson used "all caps" to emphasize certain words. In the interests of allowing readers to look at things in their original form, that practice has been followed here, as well as other type setting methods (underlining words but not the spaces between, for example, capitalization choices, etc.) that Dr. Donaldson used in the original article. Some wording has been very, very lightly edited for clarity.

How Will They Bring Us Back, 200 Years From Now?

By Thomas Donaldson, Ph.D.

Even the most imaginative biologists attempting to deal with the problem of revival suffer from a cardinal problem: a pervasive failure of NERVE. We all know that many things will become possible which are not possible today. Indeed, the fundamental

outlines of HOW TO REVIVE frozen people already exists; we can state pretty clearly how we can go about finding an answer to this problem, even if we can't state what the answer is. We can also see equally clearly that finding this answer is going to take HUNDREDS OF YEARS *(Editor's note: He is not around to where he can defend his viewpoint/writing but I feel compelled to point out that* ***no one*** *knows how long this will take. It may be in less than a century. It may indeed be hundreds of years. Stay tuned!)*, but to cryonicists that point is irrelevant. What happens is that few of the biologists who try to deal with this question have given serious thought to exactly what sorts of things are likely to be possible to their own intellectual descendants of the 24th Century, and the barest hint of what is possible seems to them so IMPOSSIBLE that they lose their nerve completely.

I shall point out first of all that most of what we know about biology is quite simply irrelevant to the probability of revival. Most biological knowledge about the state of the cells after ischemia or after freezing is quite phenomenological; biologists can tell us a tiny little bit about WHAT HAS HAPPENED, but they can't come anywhere near giving us a complete picture on a biochemical and fine structural basis, with anywhere near the detail we would need if we were actually to attempt to repair these damaged cells and the people made up of them. Cryobiologists can of course say: well, the cell is damaged in ways A, B, and C. This is only a little bit better than what we know already, which was that it was damaged. The primary point which a detailed study of biology of frozen or ischemic cells WILL tell us is that even despite all this damage AN AWFUL LOT OF STRUCTURE SURVIVES. In fact, even in micrographs of the most severely disrupted cells we can see without difficulty what the cell was once and what it ought to be. The case is very strong that all the information required to rebuild it is STILL PRESENT. This single biological point is about the only one which the reader needs to know for my subsequent discussion.

Beyond this simple question of survival of information, BIOLOGY IS IRRELEVANT to the problem of judging the probability of revival! What we want to know isn't really what has gone wrong. What we want to know is WHAT KINDS OF REPAIR MACHINES ARE POSSIBLE. There really isn't any established scientific discipline which can tell us this. Perhaps the closest thing to it is physics, but that's hardly close. In fact, we are talking about sciences and engineering not yet born, only just conceived, and only attaining their maturity after hundreds of years.

A few numbers will lend concreteness to this discussion. Just HOW SMALL and HOW BIG can we expect to build our repair machines?

The smallest machines now active are on the scale of large molecules, with molecular weights of about 10,000. They are produced by living systems and their common name is enzymes. In essence, enzymes catalyze chemical reactions; but because of their design they are much finer than gross catalysts such as platinum. They operate because they have a particular structure, which will actually grasp a molecule of one reactant and when after thermal motion brings them into contact with the other reactant, will release it. Their analogy to machines goes even further: some enzymes actually are designed so that they will be turned off and not act if too much of the chemical product exists; others will have many complex responses to many different chemicals in their environment. In short, they are machines the size of molecules.

Their existence shows that eventually we will be able to construct machines on the same molecular scale. If it is possible, it will be done, and the existence of large numbers of enzymes constructed by living creatures show that it is possible. Yet we can go even further: in the first place, the processes by which living things construct their enzymes gives us a lot of hints on how we can make our own; in the second place, we are very likely to be able to make our own enzymes bearing little if any relation to those made by living cells. For the idea of a chemical machine is very general, and does not require that the machines so built be composed of the same materials as biological enzymes. They might contain lots of silicon and little or no carbon; they might make essential use of metals. Sufficiently large ones might even contain very simple electric circuits. Biological enzymes must be made of biological materials and satisfy criteria relating to survival of the creature which makes them; if we make our own, we

don't have to limit ourselves in any such way.

Of course, if we can build enzymatic machines, it is only another step of complexity (I'm talking, you understand, about research in chemistry which will take hundreds of years) to build even larger machines, on the scale of living cells. Living cells vary in size: bacteria go from about 0.5 times ten to the minus 6 meters to 1.5 times ten to the minus 6 meters, and larger cells (eucaryotic cells) go from 2.5 times ten to the minus 6 meters up to 25 times six to the minus ten meters; such machines are naturally composed of many of the smaller enzyme machines and other machines too (RNA or DNA machines, which also operate because of their structures). As an interesting sidelight, RIGHT NOW some of the microcircuitry used in computers actually contains electrical circuits the same size as living cells, and bacterial contamination will interfere with their operation. What the existence of machines such as bacteria and eucaryotic cells show us is that machines every bit as tiny are not only possible, but eventually will be built. Just as in the case of enzymes, machines which we build need not work on principles similar to those of living things: the "mechanoenzymes" of which they are made need not be carbon compounds. The major solvents in which their chemistry goes on need not be water: it could be any one of many liquids, from ammonia to petrol. They need not have any mechanisms for reproduction or ingestion of food: we might construct them with their own power supplies, to operate until their power ran out and then stop. They can be designed especially for environments which never occur in nature at all.

From the very small we can now proceed to the very large. A large repair machine of course may be composed of billions of these smaller parts, which would naturally resemble "cells", even though the large machine wouldn't necessarily have to have a cellular structure. Very likely though, the general principles or organization employed by living things and even by computers would be used, so that we would expect some kind of construction out of modular units, and so on. Just how big and how elaborate can we expect such machines to be?

When we begin to talk about physical size, of course, economics comes into the picture. What is "big" for us is not the same as what was "big" in 1800, and the doctors-cryonicists-mechanisms of the year 3000 will deal with, as personal possessions, objects which our whole society could not afford. So I shall estimate the possible sizes of repair machines by using estimates of economic growth.

Right now, a heart lung machine weights about one metric ton (tonne). All of the ancillary support equipment, of course, will add additional weight: for the total amount of equipment involved in freezing someone or in a heart operation, I shall estimate about 10 tonnes. By exponential growth at about 4% per year, the total weight of such equipment may of such equipment may increase by a factor of 10 every 100 years.

The meaning of this is that in proportion to the size of the economy, a medical machine of 10 tonnes in 2080 will be about the same as the heart lung machine today. By 3000, of course, weight would go up by a factor of 10 billion and still bear the same proportional relation to the economy and the same relative amount of resources as a heart operation now.

We can take note that these machines would be far more sophisticated than any present heart-lung machine. Their individual parts might be composed of billions of the tiny cellular machines I have discussed already: a heart lung machine, made of brutish lumps of metal, would compare to a Neanderthal implement hacked out of trees. In physical size, by 3000 we would expect normal medical machinery to be as much as 2000 meters on a side, solid.

This is only a rough statement of a very crude measure, the physical size of a repair machine. We can now discuss what such machines should be able to do.

First, we don't really have to worry about the whole body, but only about the brain. This is of course not because we want to dispense with bodies, but because few real problems are likely (on a scale of HUNDREDS OF YEARS) to arise in replacing them. The body might be cloned and grown specially without

any brain, or with only lower brain centers; the repaired brain, still unconscious, might be placed in a special nutrient bath and caused, by the right biological manipulations, to grow an entire new body. I see now difficulties in principle with such achievements (although many difficulties in execution: that's why I say this will take hundreds of years). Complete control over growth and development will allow us to manipulate growth of a body, or the joining together of a repaired brain and a cloned body, with ease. We are therefore to consider the problem of repairing a frozen, possibly severely ischemic, human brain.

Several different problems are likely to arise. First, we must repair a high proportion of the individual cells. Second, we must introduce our repair machinery into a brain whose vascular system may not work well enough to allow normal circulation. Third, some of the chemical reactions occurring after thawing but before repair may take place awkwardly fast, so that repair itself might have to take place very swiftly.

The first problem, that the individual cells must all or nearly all be repaired, really should present few problems with microminiature-biological-mechanical machines the size of viruses, bacteria, and the cells themselves, to do the repair. If we consider the problem of repairing a single isolated cell, in fact, microscopic implements complete with their own repair programs are likely to be able to take the cell by the scruff of the neck and REPAIR IT, casually mopping up any damaging lyzosomal enzymes or other impedimenta while they do so. We can ask some quantitative questions here: just how many and how many <u>different kinds</u> of repair machines would it be possible to use for each cell of the brain? We note that a human brain is about 2000 cc's (usually smaller, in fact); if we had to introduce 1 repair cell for every 1 cell in the brain, we would have a volume 2 X that of the normal brain. If we introduced 10 cells, we would have a volume 10 X that of the normal brain. I have established (so far as a rough estimate can be established) that by 2200 we can expect repair machines of 100 tonnes. This is about 100 cubic meters (with density that of water) and that is 10 to the eighth power cc. It therefore follows that we might have by 2200 as many as 50,000 cellular repair machines cooperating to repair each individual brain cell. This is the size of a small organism and it seems unlikely that (to repair a single cell) there would be any difficulty at all in principle to carrying out any imaginable repair.

The second problem which concerns us is the problem of introducing our repair machine into the brain. I shall divide this question into two cases, the easy and the hard. Let's suppose first for the sake of argument that the vascular system of the brain still contains enough function to allow some sort of perfusion. We can notice then that repair machines could certainly be introduced through the vascular system; since brain tissue, and other tissue, contains a large amount of intercellular space it may help to estimate just how many repair organisms we might introduce into the brain without causing significant mechanical disruption. If the repair machines are the size of bacteria about 1/50th the size of normal cells we might easily have as many as 10 per cell without causing too much mechanical disruption. All of these could act, of course, at the same time (in a microscope, a brain under repair would appear to swam with repair bacteria!).

At some stage, if needed repairs become too elaborate, it will become physically impossible to crowd enough repair machinery into the brain to carry out the repair. Even this, however, is not a difficult problem to solve in principle. What we have to do is to take apart the brain cell by cell and then put it back together again; the main thing we'll have to keep track of is where all the cells were before and what were their interconnections. I can think of several different ways to solve the problem of storing this information during disassembly. What I will do here is to describe ONE such way.

Recalling first that even by 2200 we can expect up to 40, 000 repair machines per brain cell, we can imagine a process of disassembly which would go like this. Repair machines would first grow into the intercellular spaces. As more and more of them arrived, the brain cells would be slowly teased apart and repair machinery introduced into the space between. In effect, each

cell will become surrounded by increasing numbers of repair machines, as if its volume were to increased by fifty times, while at the same time the geometrical relations of all the brain cells would remain the same.

At the end of this process we would then have a large structure, of about the same shape as the brain under repair, but magnified by about 30 to 40 times. Repair would then go on, after which all the repair cells would LEAVE the intercellular spaces in the same way as they arrived, and as they left, they would put the brain back together again. From the outside it would seem that the brain had swollen to about 3 to 4 meters on a side, and then shrunk again to normal size.

One final problem remains to be solved: what about the deterioration of a thawed but not yet repaired brain while under repair? Wouldn't repair have to take place very quickly?

In short, my answer is No. The most powerful technique, although also the most advanced, is simply to carry out all these repairs at subzero temperatures. To do this, we will have to develop repair machinery which can function at such temperatures; for the chemistry involved this is primarily a problem of finding suitable solvents in which enzyme systems can act. A very large number of substances remain liquid at subzero temperatures; for some of them, such as ammonia, a little bio chemistry has even been done; enzyme reactions which can take place in ammonia solution. Since in making our repair machines we aren't even limited to the biochemistry of present living cells, it seems hard to believe that repair machinery cannot be developed to function even as low as minus 60 degrees C.

Furthermore, we don't have to solve the problem in this particular way. Another method of solution is to identify the enzymes and reactions which cause the deterioration of the thawed, frozen cell, and send into the brain, before we do anything else, repair machines (including our own specially designed enzyme systems) which prevent these deteriorations from happening. Then at our leisure we commence repair. Right now we have some drugs such as methylprednisone which will inhibit some of the destructive enzymes; but I want to make clear that this argument does not depend on any specific properties of specific present drugs, which compared to a microscopic repair machine, with all the arsenal of analysis and synthesis it would have in place on board, are pathetically crude.

Finally, a word to biologists and physicians is appropriate, because this point has made a lot of physicians lose their nerve entirely. I have just explained how if necessary we will disassemble the brain and repair it, cell by cell. Please notice that I am supposing capabilities; it is quite true that nerve cells do not mend themselves and do not grow together again under present circumstances. All of these properties, which are quite valid as they stand, are not more than trivial aspects of the design of neurons. A sufficiently advanced medicine, exactly of the sort I am describing, would be able to control all of these properties and cause the neurons to do exactly those things they cannot do now.

Biologists generally and cryobiologists in particular already know a good deal about what can go wrong with cells after freezing. We possess, in fact, a knowledge of cell structure and physiology which would have been thought overwhelmingly bizarre to anyone of the 18th Century; to the doctor of 1790 whose answer to most diseases was bleeding, tetraparental mice and recombinant DNA would have seemed fantastic, unbelievable achievements.

Doctors and biologists of today know a great many FACTS, many details about how cells function. But even if doctors know a great many little things, cryoncisits know ONE BIG THING, which is that even the most advanced medicine and biology of today comes NOWHERE NEAR the limits of what is physically possible, and it is the limits of what is possible, and not the limits of what we can do now, which tell us whether or not we can be revived and what the probability of revival will be.

My own opinion of the question of revival would go as follows. It is nearly certain that all of the damage occurring, even to the most severely damaged person yet frozen will be repairable within the next 1000

years. The main source of uncertainty is not the scientific and medical issue at all: it is the question of exactly how long we must be stored before we can be repaired. For the longer we must be stored, the greater is the chance that something: political events, economic troubles, revolutions, rebellions, riots, interplanetary wars, will force our cryonics society to thaw us out. It is for this reason, and not because of any limitations in what is possible to repair, that we want to work as hard as possible to perfect freezing now. The less damage done to us in freezing, the shorter will be the time we must wait for repair, and therefore the less likely that failure of storage will occur.

Nor for that matter do I think that these disruptions will necessarily occur. If in Westminster we can see the tomb of Chaucer, buried in the 15th Century, we must conclude that a quite high proportion of those frozen are likely to remain so for long enough to be repaired. But every advance we can make now in techniques of freezing will increase our chances that much more, by shortening the time in which we must wait, frozen, for our revival.

Looking Back: Dr. Mike Perry Comments on Robert Ettinger's Article "It's Peachy Keen To Be A Machine"

Machinery Vs. the Supernatural

By Mike Perry

Introduction by York W. Porter, President Immortalist Society

Dr. Michael Perry is a long-time cryonicist who works at the Alcor Life Extension Foundation. Receiving a B.S. in Mathematics from the University of Chicago back in 1969, he later received an M.S. in Computer Science in 1979 and a Ph.D. in that same subject in 1984 from Colorado University.

This informative and interesting article is a "reply", so to speak, to Robert Ettinger's earlier writing of "It's Peachy Keen To Be A Machine". Ettinger's article first appeared back in September 1986 and was reprinted in this magazine within the recent past as part of "The Legacy Continues" series of Robert Ettinger's writings. Dr. Perry takes a page, so to speak, from the area of his formal training and writes about a concept derived by Alan M. Turing, a noted mathematician, computer scientist, and cryptologist of his day.

While my friend Mike's general philosophy may differ somewhat from mine, the great thing about cryonics is that cryonics is compatible with a whole host of world-views. (Normally the only worldview that would be incompatible would be if you think there should be no use of medical technology at all. As I like to say, "If you would accept a pacemaker, then cryonics is for you!"). The one thing that binds Mike Perry and myself, plus numerous other cryonicists together is a common-belief in the value of human life and the value of cryonics in providing a mechanism to allow present day humans to reach their full potential.

Machinery vs. the Supernatural

By: Mike Perry
November, 1986

I like Bob Ettinger's article, It's Peachy Keen to be a Machine (The Immortalist, Sept. '85). I am an unbeliever in the supernatural myself, and sometimes, when I've expressed this position, I've been asked, 'What do you mean by the supernatural?'. Generally I've replied 'a process that in some way is inherently unknowable or incomprehensive'. But this sort of answer is unsatisfying to those who like to ask, 'What do you mean by comprehensible?' So, with more thought on the subject, I've come up with what might be a reasonable, simple definition of a 'supernatural' process, and by implication, its alternative, a world where everything in some sense is a 'machine'.

It's clear, I think, that a process, to be accepted as 'supernatural', would have to violate a known scientific law. (This would include 'coincidences' such as rainmaking through prayer that technically do not violate scientific laws but are claimed to require more than natural forces). Nobody ascribes events that fit accepted physical theories to any supernatural agent. It's worth pointing out, though, that ascription to the supernatural was common in former times, for phenomena such as wind, rain and lightning, that were not understood then but now are. By the same token, a phenomenon that may violate known scientific laws today should not be considered supernatural if new theories could be derived that explained it. In some sense, then a supernatural process would not merely have to violate known scientific theories but all those that were both 'reasonable' (as approximations to reality) and 'knowable'. But it is difficult to arrive at a notion of what would be a 'reasonable and knowable' theory. So here is a simple alternative:

A supernatural process would have to violate Turing's thesis.

Turing's thesis (named after mathematician Alan M. Turing), for those who are wondering, basically states that any process that is 'effectively doable' can be done by a computer. In its original form it was restricted to computations performed by reading and writing symbols on paper tape divided into squares. A 'Turing machine' is a kind of simplified, theoretical computer for performing such operations. It is very restricted in what it can do and how it 'decides' what to do next. It contains a reading and writing 'head' that is positioned over a square of tape. The head can replace the symbol it is sitting on with another symbol, in all cases choosing from a finite alphabet. It also has the power to move right or left, one square at a time, or to halt, in which case its action stops. It can be in one of a finite number of 'states', and the state it is in may change. Its action, at a given instant, that is, what symbol it writes, whether it moves right or left, or halts, and what state it changes to, all depend only on the symbol it is reading and what state it is in now. A complete description of its actions under all possible circumstances can be written down in a table, which is called the 'state transition table'. Thus there is nothing 'magical' about it. A Turing machine is not 'supernatural'.

Although the Turing machine is very simple, it can perform any computation possible to any modern digital computer, however sophisticated, although probably not very efficiently. We would need to use a suitable alphabet of symbols to represent our 'instructions' on the tape and the resulting 'output', and to be sure that an adequate amount of tape and time are available. In particular, a 'universal' Turing machine can be defined that can do what any other machine can do, provided it is given a description of the machine in question, encoded as symbols on a tape. A 'general-purpose' computer (as most computers are), in fact is nothing but a glorified universal Turing machine.

Although the notion of 'effective doability' or Turing computability, as its often called, was originally restricted to computations such as a person might perform on paper, it's easy to generalize it. Scientific theories, for example, deal with descriptions of reality, or in effect, with known strings of symbols. A theory will start with a given description and attempt

to predict a future state of affairs, or in other words another description. The prediction must be something that can actually be carried out (in principle at least), thus it must be 'effectively doable'. In effect there must exist a Turing machine able to make predictions according to the theory, or in other words it must not violate Turing's thesis!

Another kind of generalization is the non-deterministic Turing machine. Basically the machine is allowed to simultaneously go into several states at once and to perform many different computations, in parallel-universe fashion. One machine thus is allowed to have many behavioral 'histories'. Although this may seem to confer extra computing power, it does not. A single, deterministic machine, by painstakingly exploring all the possible alternatives, could reproduce every computation of a nondeterministic machine, though far more slowly. But a nondeterministic machine makes a useful tool for modeling 'random' processes such as are observed in the universe on the quantum level. Our history, in effect, resembles one of the possible histories of just such a machine. (And the Wheeler universe concept, named after physicist John Wheeler who originated it, boldly asserts that our history is only one of many that are going on in parallel, which further fits the Turing model). Thus it is not necessary to assume a 'supernatural' basis even for random or 'unpredictable' processes. It seems possible that a Turing machine, though restricted to a finite initial inscription of symbols on its tape, could model an infinite universe, provided its time is unlimited. It would simply construct descriptions of larger and larger volumes of space-time, approaching an infinite volume in the limit of infinite time. It could also construct multiple histories to model parallel universes, and could calculate probabilities of different possible occurrences to put allowable but unlikely events in proper perspective.

The Turing model provides for processes that violate known scientific laws, but which may eventually be 'understood' as non-supernatural. If, for example, my apartment building in Boulder, Colorado suddenly disappeared and reappeared in Calcutta, India, it would not necessarily violate Turing's thesis. Perhaps instead there was intervention by advanced extraterrestrials using science beyond our present knowledge but still consistent with Turing computability.

At this point the reader may be wondering if there is any process that would not fit the Turing mode. One example, well-known to computer scientists, concerns the 'halting problem'. An all-too-frequent occurrence in computer programming is a program with an 'infinite loop' that causes the computer to go into an endless cycle, so that it can never finish its computation. Although many times it is easy to detect such glitches, there are more difficult cases too. In general, we would like to know in advance whether a given program will eventually halt its execution like a good program should, or whether it has a 'bug' that needs fixing. Since a program is basically just a sequence of symbols which could be looked at by another program, it ought to be possible to write a program that would look at other programs and decide whether they would halt. But this can be shown to be impossible. The halting problem is unsolvable, even in some of its simpler forms. In particular there is no effective way to tell if a given Turing machine, if started on a blank tape, will ever halt or will simply run forever. An 'oracle' able to tell this would, according to our ideas, be supernatural.

But there is no such oracle that we know of, and more generally, no known process that violates Turing's thesis. To all appearances we live in a Turing-compatible universe. It's peachy keen to be a machine, and to have confidence that everything around you is one too. At least you don't have to wonder why a benevolent, omnipotent Power has allowed cats to eat mice, children to die of rabies or nations to war with one another in the name of the 'Prince of Peace'. And if there is no supernatural, there is also no known obstacle to man-made immortality. As far as we know, immortality 'computes'!

Looking Back: Eric Drexler on "Sloppy Thinking" In Nanotechnology

Introduction by York W. Porter, President Immortalist Society

Cryonics has been plagued (although less so now than in early years) with the thinking that somehow it is nonsensical. The main problem has been, sadly, that the overwhelming amount of nonsense has come from its critics who either don't know what they are talking about because of lack of any real knowledge about cryonics or the old standby of "They'll never be able to do ***that!****". This type of problem isn't limited to cryonics. In the field of nanotechnology, Dr. K. Eric Drexler also notes the problems that he perceived, back in December of 1986, in this type of problem in the field of nanotechnology. The concept of nanotechnology has been the field of technology/mode of thinking that has come along that greatly bolsters Robert Ettinger's espousal of the worth of cryonics. It took the assumption that was inherent in Ettinger's writings back in the 1960's of future science being able to repair, revive, and rejuvenate people who are currently beyond help from that of an "educated assumption" to that of a likely probability. As I have written before, CI President Dennis Kowalski has said about nanotechnology "It took cryonics from being something that might work, to something that probably will work". That difference is, of course, all the difference in the world.*

Still, as Dr. Drexler points out, even in the field involving more "hard science", nonsense is difficult to avoid. In this article from the IS magazine from December of 1986, he discusses the problem of sloppy thinking which occurs in every field, especially when it first begins to become prominent.

The Problem Of Nonsense in Nanotechnology

By: K. Eric Drexler
MIT Artificial Intelligence Laboratory
(Visiting Scholar, Stanford University)

Bogosity A false idea or concept; misconception. 2. Inaccuracy; opposite of veracity. (colloquial use in the artificial intelligence community; from *bogus)*.

Flake –ky,-kiness. One who habitually generates, spreads, or believes flagrant bogosities.

Nanotechnology—the field embracing mechanical and electronic systems built to atomic specifications—seems certain to suffer from an impressive infestation of nonsense. There is nothing novel about a technological field suffering from nonsense, but a variety of factors suggest that nanotechnology will be hit hard.

The health of a field depends on the quality of judgments made within it, both of technical concepts and of individual competence. If concepts are sound and credibility requires competence, the field will be healthy; if bogus concepts prosper and credibility and competence come unhitched, the field will suffer. Maintaining the health of a field requires concern with the quality of these judgments.

Trends in academic interest and media coverage suggest that nanotechnology will receive growing attention. This field subsumes several others, including much of molecular electronics and advanced biotechnology. Flakiness in this broad field will tend to reduce funding and to reduce the number and quality of workers. Similar (but lesser) effects seem likely to spill over into all fields that appear similar in the eyes of reporters, managers, and politicians. A consensus on sound ideas, however, will tend to have positive effects.

If bogosities thrive, they will also tend to obscure facts, hampering foresight and---as I argue in *Engines of Creation*, foresight in this field may be of extraordinary importance.

Our Problem: bogosity equals…

Experience already suggests the problems we will face in the quality of the technical literature, of media coverage, and of word-of-mouth. In estimating the future magnitude of this problem, a simple model may be of use: In this model, the bogosity in a field equals the bogosity imported from related areas, plus the bogosity generated internally, minus the bogosity expelled or otherwise dispose of.

Bogosity imported…

Nanotechnology is related to several other areas. For example, the scale of nanotechnology makes quantum effects important---sometimes. But quantum mechanics is a peculiar and often misunderstood subject; popularizations of it shade off into brands of mysticism distant from anything a physicist would recognize. The quantum domain thus holds ample bogosities waiting to be imported. Further, misunderstandings of quantum uncertainty can be used to make molecular machines seem either mysterious or unworkable.

Nanomachines may be developed through protein engineering, and some nanomachines will resemble biological mechanisms. Thus, nanotechnology borders on biology, a field rich in emotional issues and misconceptions, some shading off into mystical views far from anything a biologist would recognize. Genetic engineering (an enabling technology for nanotechnology) has been the center of a remarkably confused debate. Misconceptions about evolution have already led a *New York Times* writer (in a review of *Engines of Creation*, 10 August 1986) to suggest that developing molecular circuits and the like may take billions of years—on grounds implicitly suggesting that human designers will be no more intelligent than cosmic rays.

Some applications of nanotechnology border on brain science and artificial intelligence—and quite aside from real applications, many people think of brains when they hear of molecular computation, and some people (for some reason) think that molecular computers will lead automatically to

machine intelligence. Nanotechnology seems ripe for invasion by ideas linked to bogus "explanations" of consciousness, rooted in bizarre physical phenomena rather than complex information processing.

Finally, nanotechnology has many dramatic uses that border on science fiction: the ability to build things atom by atom leads naturally to strong materials, to self-replicating machines, and to a wide variety of systems with impressive performance, including spacecraft. The vast literature of science fiction holds a wealth of appealing, plausible ideas that are often inconsistent with physics and sense. It., too, will provide ready-made bogosities to import. *(Editor's note: Dr. Drexler's writing here reminds me of my own experience watching good movies. I can "suspend my disbelief", necessary for any movie watcher, but only so far. When I see something involving medical work and I realize that Hollywood has used a "script device" (basically "fibbed" about something) in order to make the story work, it hurts my enjoyment of the film. Patients I run into who have seen the same film, however, will sometimes remark about the "made up" stuff as though it is a fact. My lawyer friends say that they frequently have the same experience watching a "lawyer show" on television. They say they can't enjoy the drama because thoughts pop in their head of "The judge would never let you ask things like that!" or "Why doesn't the opposing counsel object?". Very easy for "urban legends", if you will, to get started).*

…plus bogosity generated…

Nanotechnology will offer fertile ground for the generation of new bogosities. It includes ideas that sound wild, and these will suggest ideas that genuinely are wild. The wild-sounding ideas will attract flaky thinkers, drawn by whatever seems dramatic or unconventional.

Further, imported bogosities will interbreed, yielding novel hybrids. Inspirations and nonsense imported from quantum mechanics, biology, brain science, and science fiction may lead to suggestions for creating quantum biomolecular consciousness for space robots, or bioevolutionary nanomachines for giant brains. We can expect to hear of a host of vague devices and implausible concepts.

In the policy domain, misunderstandings of opportunities and dangers will be translated into misconceived policy prescriptions. Researchers can expect to face both irresponsible advocacy and irresponsible opposition, both eroding support for the field.

…minus bogosity expelled

All this would be little problem if normal mechanisms would maintain the quality of ideas. But will they? Consider some of the problems:

People distinguish fact from fiction best when the subjects are visible and familiar—but this domain deals with unfamiliar, invisible entities. Few know enough about quantum mechanics, chemistry or molecular biology to reject bogosities in these fields. Even those with knowledge in one field may fall victim to nonsense in another. *(Editor's note: This prescient statement reminds one of physicist Michio Kaku who has pontificated about cryonics not being feasible. Dr. Kaku is undoubtedly a very intelligent person. Is obviously well educated in his field. Is probably also a very nice guy. But when he strayed out of his particular field of expertise, he fell into the "pitfall" that Dr. Drexler just mentioned of making very intelligent sounding statements that, at bottom, weren't so intelligent after all.*

It should be noted that both cryonics and nanotechnology both were formulated only after two very intelligent people (Ettinger, in one case, Drexler in the other) spent a ton of time exercising their minds and collecting data and solid facts about their proposed field of endeavor. This doesn't, of course, provide them with "infallibility" and make them absolutely right and Dr. Kaku automatically wrong. It should provide, though, anyone with a guide to evaluating evidence. When one is hearing someone who is "out of his or her territory" pontificate with certainty on something, the listener should proceed with great caution. (And sometimes this applies to someone who is "in their territory"—expertise doesn't, sadly, equate to infallibility). The best analogy I can think of is to act

as though you are on a jury in a court of law, where someone's freedom/life/financial well-being may be at stake. Try to discern fact from opinion and make sure that the opinions expressed follow from the facts and are consistent with the facts, no matter who is talking and no matter what position they are taking)

People think more clearly when they have no emotional stake in the subject—but nanotechnology raises issues of life-and-death consequence, issues that will likely become clouded by emotion.

People reject bogosities more rapidly when these can be subjected to practical tests—but in nanotechnology, many ideas can only be tested with tools that won't be developed for years.

Refereed journals operating in an established field can help communities maintain the quality of information—but this field is new and interdisciplinary; it lacks both a refereed journal and an established critical community.

In short, nanotechnology is a fertile field for nonsense, and is presently short of effective quality-control mechanisms

What Can Be Done?

What can we do to reduce damage caused by nonsense?

When asked to judge a surprising idea that cuts across disciplinary boundaries, one may be forced to say, "I don't know." This does little good, but does no harm. *(Editor's note: I benefited from this with a slight twist when I was a teenager. Understandably concerned, as parents need to be, that their son had stumbled onto some nefarious idea---remember, cryonics was in its relatively infancy when I came across it around the mid 1960's, they asked our family doctor if it would work. Not knowing very much about the subject, he did say "I don't know, but it might". That one word "might" made all the difference and my parents left me alone to pursue this, to their everlasting credit)*

To declare "No one can know" would often be to discard the distinction between what is *unachievable* using present tools for design and fabrication and what is *impossible* under known physical law. This position is often false. Likewise, to declare that all wild-sounding ideas are false would itself be false, if history is any guide.

These blanket declarations of ignorance or rejection would do actual harm. By being false, they would add to the bogosity problem. By failing to distinguish among ideas, they would blur the very distinctions that need to be made.

These distinctions often can be made, even in an interdisciplinary context. In judging people and bodies of work, one can use stylistic consistency as a rule of thumb, and start by checking the statements in one's field. The mere presence of correct material means little: it proves only that the author can read and paraphrase standard works. In contrast, a pattern of clear-cut, major errors is important evidence: it shows a sloppy thinking style which may well flow through the author's work in many fields, from physics, to biology, to computation, to policy. A body of surprising but sound results may mean something, but in a new field lacking standard journals, it could merely represent plagiarism. More generally, one can watch for signs of intellectual care, such as the qualification of conclusions, the noting of open questions, the clear demarcation of speculation, and the presence of prior review. In judging wild-sounding theoretical work standards should be strict, not loose: to develop a discipline, we need discipline.

Over time, these problems will lessen. Community judgment will play a growing role as the community itself grows and matures. Eventually, the field of nanotechnology will be like any other, full of controversy and disputes, but built on a broad base of shared judgements.

Looking Back: Dr. "Corey Noble" Looks At Cryonics

Introduction by York W. Porter, President, Immortalist Society

"Corey Noble" is the pen name of a cryobiologist who felt compelled to write under a pseudonym. Back in my younger days, I thought that "logic and reason" would automatically win out in life. As I began going through adulthood, it became evident that the specter of "office politics" is a major (and harmful) factor in many areas of human endeavors, including those of immense importance to the human race, and is just a sad and negative reality of life. Hopefully those days will eventually come to an end but, for the foreseeable future, it is just a reality that all humans have to deal with.

In this article from October of 1984, an obviously well informed look is taken at cryonics with the state of knowledge of the day.

The Scientific Case for Cryonics

By: Dr. "Corey Noble"

(Dr. "Corey Noble" is a well-known cryobiologist with many research papers to his credit, but he writes about cryonics under a pen name because of coercion by his employer. When he comes "out of the closet"—perhaps in a year or two—it will be recognized that no one in the world is better qualified to judge the scientific merits of cryonics. The following piece is a letter to the British cryobiology publication Cryo-Letters abridged from our issue of October, 1980.)

The cryonics thesis is that present technology can sufficiently limit the amount of damage sustained during the freezing of an individual to provide a non-zero chance of restoring that individual's conscious identity, given hundreds or thousands of years of continued scientific advances made during the period of storage.

The first preliminary issue is that cryonics involves freezing the "dead". This is a red herring, because in most places "death" consists of cessation of heartbeat and breathing, not brain death. In at least two cases, external cardiac compression and artificial respiration have been initiated in preparation for cryonics procedures immediately upon cessation of spontaneous respiration and heartbeat, guaranteeing excellent pre-freezing viability of the brain with little or no ischemic injury. The objective is to catch the individual at the moment of clinical death, so that postmortal pathology is prevented.

The second issue is that success in no way depends on resuscitating the entire body. If only the brain can be successfully frozen, then it takes very little credulity to accept the possibility that the brain could be transplanted into an appropriate host given unlimited time for continued medical and scientific advances. There is already much evidence that it will eventually be possible to do such transplantation and, in particular, to reconnect the severed spinal cord and the severed cranial nerves. (1, Marx) (It has even been shown that specific lesions in adult brains can be repaired by neural tissue transplants. (2. Perlow)) The one issue then, from a strictly scientific point of view, is the prospect of reviving and repairing, if necessary, a frozen human brain preserved with no antecedent ischemic pathology. The evidence I will cite, therefore, will concern primarily the cryobiology of nervous tissue.

The earliest and still the best evidence on this score is the fascinating work of Dr. A.U. Smith et al (3, Smith), who made the highly significant observation that up to 60% of the water in the brain of a golden hamster can be converted into ice with no subsequent neurological (behavioral) deficits. Actually, this limit is artificial, since it was imposed by death of the hamster from other causes. Presumably, then, this figure of 60% is the lower limit of tolerance of the brain to freezing. This observation demonstrates the compatability of normal conscious behavior with previous gross mechanical distortion of the brain and brain vascular system by ice crystals, and must rank as one of the most fascinating observations ever made in biology.

Smith's results suggest that mechanical injury to human brains may be avoidable by preventing at least 40% of the brains' liquid volume from freezing. A 25% v/v (*Editor's note: v/v means "volume to volume")* solution of glycerol frozen until 40% of its volume remained liquid would become a 62% v/v solution. But a 62% solution, which is the "eutectic" concentration, will tend not to freeze but to vitrify due to the difficulty of forming crystalline glycerol. (4, Miner; 5, Meryman) 25% glycerol is approximately 3.4 molar. Pegg et all have shown that rabbit kidneys tolerate perfusion with this concentration (6, Pegg) and there is no reason to belive the same could not be true of brains.

Evidence that the brain can tolerate exposure to high concentrations of glycerol has been provided by Suda et al (7,8 Suda), who froze cat brains permeated with 15% glycerol to –20 degrees C and stored them at that temperature for up to 7 years.

They found that brains thawed after five days at –20 C had electrical activity virtually indistinguishable from that of the same brains before freezing, and that the histology of the brains was well preserved even after prolonged storage at this very unfavorable temperature. Significantly, about 60% of the fluid content of the brain was converted into ice in these experiments, and the glycerol concentration at –20 C was in the vicinity of 5.5 molar, yet these brains "survived". They also perfused well with cat blood at 37 C, in striking contrast to the dismal perfusion of transplanted thawed kidneys.

A further, extremely powerful piece of evidence has just been published in Brain Research (9, Houle). This report demonstrated that fetal rat cerebral cortex enjoys complete survival after freezing to –95 C and storage for up to 130 days, when 10% dimethyl sulfoxide is used as a cryoprotective agent. The survival was clearly demonstrated by transplanting the cerebral cortex to the cerebellum, where it could be unequivocally demonstrated histologically. The transplant formed synaptic connections with the neighboring cerebellum and there was no evidence of necrosis and no scar formation around the transplant. The grafts were, in fact, indistinguishable from control grafts of fresh, non-frozen cerebral cortex. All cellular elements, both neuronal and non-neuronal, appeared to survive.

Another extremely significant observation was that of Pascoe (10, Pascoe), who demonstrated clearly the extreme freezing resistance of the rat superior cervical ganglion, which showed partial recovery after freezing to –10 C and below without a cryoprotective agent. With the aid of 15% glycerol, these ganglia showed total recovery after freezing to –79 degrees C. Both axonal conduction and synaptic transmission were perfectly preserved, demonstrating again that synapses are not disrupted by freezing.

I could go on, but to my mind the above data already provide clear evidence that the chances of reviving a frozen human brain are non-zero.

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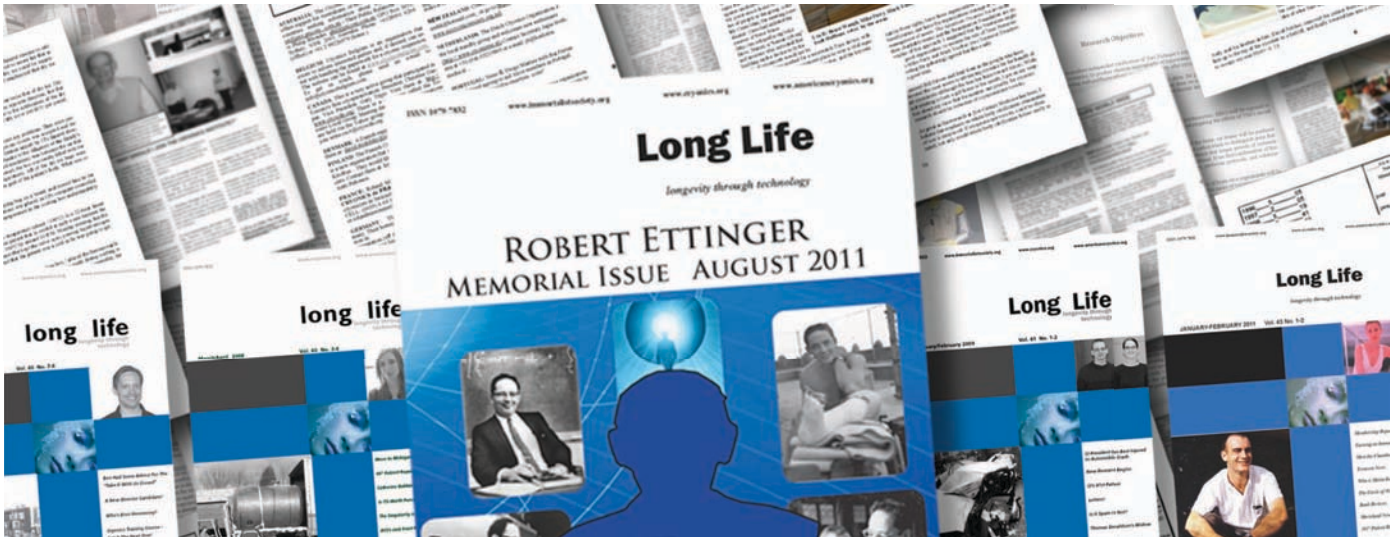

Robert Ettinger: *The Legacy Continues*

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

Looking Back: Robert Ettinger on Community Ethics in Cryonics

Introduction by York W. Porter, President Immortalist Society

Cryonics, if successful, has not only an effect on technological problems of resources needed to succeed and resources needed to support "cryonauts" after their successful revival, repair, and rejuvenation. There are also implications for social interactions. It is one thing, as in a staple topic of comedy shows, to tolerate your cousin and his family for a couple of weeks when they pay a long-anticipated visit but it's another thing if you wind up living with them on a day to day basis for an indefinite time period. The reality of a situation in which members live for time spans that dwarf those of present day life, will present some "living arrangement" issues that will be different from those in today's society. In the first article, "Nice Immortals Finish First", Robert Ettinger deals with some aspects of this problem. This article is from of 1984.

The second article continues Mr. Ettinger's attempts to deal with how individual and collective morality may work in a "longevity" oriented society by talking about the "Problem of the Commons". This is what we face to some degree today as well and forms part of what our politics is all about. The whole thing revolves around how much does one think of "self" and how much does one think about "the group".

Nice Immortals Finish First

By: Robert Ettinger
November, 1984

Although the prime motive for cryonic suspension is simple self-preservation, we have always rejected the contention that immortalist philosophy, because it is selfish, is antisocial. It seems obvious that people who expect to be around a long time will make better neighbors than those who think they face early doom.

A striking new validation of this principle has recently been found in a computer tournament conducted by University of Michigan professor of political science Robert Axelrod involving the "Prisoner's Dilemma"—an old problem in a game theory. (Detroit News, Oct. 18)

It might better be called the "Competitor's Dilemma". To take a specific example, suppose you have a store, and a competitor with a similar store. If you cut prices a little but he does not, you gain. If you cut prices and he responds with a similar or greater cut, you both lose. If you co-operate, both gain (leaving aside the ethics and legality of a price-fixing conspiracy).

In the computer game, scoring reflects those outcomes: if both sides cooperate, each gets 3 points, if both defect, each loses a point; if one defects, it gets 5 points while the cooperating "sucker" gets 0. Rough parallels can be found in business, war, politics, etc. Prof. Axelrod's tournament involved psychologists, poltical scientists, mathematicians, etc. With the condition that the game would go on for about 200 moves (repetitions of the dilemma with the same competitor, and with knowledge of the previous responses), the winning program was one of the simplest, called Tit for Tat: its first move is to cooperate; then it does whatever the partner (competitor) did in the previous move.

In other words, you start out being nice. If the other guy is nasty, you don't turn the other cheek, but respond in kind, to let him know he can't get away with it. As soon as he relents, you back off too.

The interesting feature is that this strategy *only* works reliably when both players know the game will continue. In real life, also, "Once a manufacturer begins to go under, even his best customers begin refusing payment for merchandise, claiming defects in quality, tardy delivery, etc. The great enforcer of morality in commerce, is the continuing relationship."

Prof Axelrod thinks the lesson can be applied to relations between the U.S.A. and the U.S.S.R. (But successful application requires that neither harbor a belief it can "bury" the other.)

From our point of view, the outstanding lesson is that individuals will take the Golden Rule seriously when life becomes open-ended. A great many people would trade places with Hitler, who went down to defeat and relatively early death only after a decade or more of enormous power and glory; he was one of the most successful men in history…But if he had known he was giving up thousands of years of transhuman development, the risks and rewards would have been altogether different.

Potential immortals do not want to be martyrs in anybody's army. Neither will they take cheap shots at their neighbors for temporary advantage. They play the game to win, and in this game nice guys finish first…or in a tie for first, which is even better.

The Problem of the Commons

By: Robert Ettinger
March 1985

It may sometimes be useful to consider all problems subsumed under a single title: The Problem.

The Problem can be stated in various ways:

"How can I get the current situation to develop to my best advantage?"

"Where do I go from here?"

"What is the next step in furtherance of my goals?"

And so on. I don't claim that one should, or even could, take such a consciously programmed approach to life every moment or even every day; but such an approach may often be helpful in orientation, and will sometimes help avoid major errors and illuminate major opportunities; more on this another time.

I also claim that all decisions can, in principle, be based on maximization of expected utility—a concept that will have to be explained to non-mathematicians, and defended against mathematicians. This also is a project primarily for the future.

Today's little exercise, however, will be restricted to just one aspect of The Problem—the apparent paradox involving the conflict between individual and community interests. This has been called "The Problem of the Commons", and it is of particular interest to immortalists.

The word "commons" refers to anything owned by the community, or by the people collectively. In the simplest and most literal case, it might be a town square; or it might be a global ecology, perhaps with respect to air pollution, etc.

The "paradox" can be illustrated by a simple example—walking on the grass in the town square. If you walk on the grass, you save yourself some inconvenience, and contribute only a trifle, that may not be noticeable, to the deterioration of the lawn. Yet if we all make the same decision, the grass will soon look shabby, making us all feel worse.

The "paradox" is said to arise because the effort to maximize our individual benefit does not produce the intended result.

We cannot just decide on forbearance out of community spirit, the argument goes, because we cannot be sure others will follow suit, and if they do not we will be left holding the bag, saving neither convenience nor the lawn.

As usual in cases of "paradox", the fallacy is in the implicit premises—false assumptions or omissions.

One of the omissions is the internal effect of the antisocial behavior. If you do this kind of thing habitually, you won't like yourself so well; the whole structure of your personality may tend to be undermined.

Another possibly false assumption is that your behavior will have neglible effect on that of others. On some occasions, you may be in a group of two or more, multiplying your influence; some situations may be repetitive, with a cumulative effect. In addition, there is the aspect of public and private coercion and censure—anything from statutes to glares of disapproval. Feedbacks are involved; it is not just a matter of evaluating a static situation, but of trying to locate leverage points in the system where your actions can have the maximum effect, and then estimating the result after all the ripples and feedbacks (A changes B changes C…changes Z changes A.)

Then there is the multiplier-of-multipliers. If your own narrowly selfish, short-sighted decisions contribute to a general collapse of morale regarding the lawn, there tends to be a domino effect on other matters of public (and ultimately private) interest, and eventually civilization itself may be at risk. (In reality, things are unlikely to go so far, because negative feedbacks are created at some point in the spiral; the pendulum swings.)

The above discussion should make it abundantly clear that the commons problem, as usually stated, is so simplistic as to be totally misleading and unrealistic.

What is not clear, even to those with mathematical backgrounds, is how to enter all these considerations into an explicit calculation of maximization of expected utility—especially in view of the fact that there is no agreement on how to define and quantify the concept of utility, even if we could agree on individual values and community values.

Well, nobody said it would be easy, and I can't provide detailed answers to all these questions today. But at least two comments are appropriate.

Even though the guiding rule, in principle, is maximization of expected utility, it is often useful in practice, when the MEU calculation is complex, to adopt a rule of thumb based on the "minimax" criterion—minimization of the maximum loss.

An example would be crossing the street. One could make complex calculations involving running speeds and angles and the developing traffic pattern—but one seldom does. Instead, one waits until the crossing is obviously safe. You may lose a little time, but you almost always avoid death or dismemberment; i.e., you minimize the chance of maximum disaster.

The second comment is that commons calculations are much easier for immortalists. Part of the commons calculation involves estimating how often you are likely to encounter your neighbors. Among immortalists, there are no isolated encounters: the person you offend will turn up again and again. Hence, while you retain your me-first orientation in principle, in practice you recognize the feedbacks and long-term effects.

We have already discussed the "Competitor's Dilemma," which might be considered a variant of the problem of the commons (See *The Immortalist*, November, 1984: "Nice Immortals Finish First"). The University of Michigan's Robert Axelrod conducted a computer contest and showed once more that "The great enforcer of morality in commerce is the continuing relationship".

Have we merely gone the long way round to demonstrate what some think obvious anyway, that it's better to be nice than naughty?

No: some new truths emerge. First, we have resolved the "paradox" of the commons, especially for immortalists (even though we haven't displayed the calculations). Second, while reinforcing some traditional values, we have laid the groundwork for rejection of others. Individual and community values may truly differ: more on this another time.

Final Thoughts

York W. Porter - Executive Editor

"Shoeless" Joe Jackson- Source: Wikimedia Commons

Say It Ain't So, Joe...

In the early 1900's, the sport of baseball was "King" in the United States. The National Football League, and the also prominent in these days National Basketball Association, are entities destined to not come to any sort of prominence until the middle of the 20th century. The exploits of the "heroes" of the baseball field occupied the primary focus of those sports fanatics such as existed back in the day.

Beginning as an amateur sport in the mid 1800's (my grandfather is in a late 1800's photo as a player for the "Stratton Amateurs"), real and lasting professionalism slowly and gradually came into play, and by the turn of the century, baseball was poised to have a spurt of growth in public interest that led to the building of large ball parks in major cities. One of these was the baseball stadium in Chicago used by the Chicago White Sox.

In 1919, the White Sox had an excellent season and were thought by many to be the "sure-fire" winners of the upcoming World Series contest between themselves and the Cincinnati Reds. When the White Sox fell short and didn't win the world championship, a cloud of suspicion came over the whole operation. When the truth came out that the White Sox had thrown the series due to their low pay and many of the players' intense dislike for their owner, Charles Comiskey, a giant uproar ensued. In a headline in a newspaper, player "Shoeless" Joe Jackson was taken to task by the media. Jackson was a "four star" professional player of his day. He had acquired his nickname by playing a game in his

socks early in his amateur playing days due to blisters brought on by the cleats he was wearing at the time. There is a dispute that rages to this day with baseball aficionados as to whether Jackson was involved at all in the World Series scandal. Whatever the level of his guilt or innocence, the headline still appeared in the days after the details of the scandal broke that simply said "Say It Ain't So, Joe!"

It was, sadly, definitely so and eight of the players thought to be involved were banned from being involved in professional baseball for the rest of their lives. Jackson, as one of the eight, spent thirty years proclaiming for all to hear his innocence. He died still proclaiming this back in 1951.

Whatever the truth, baseball isn't the only area of life in which shenanigans occur. In politics, skullduggery is known to be rampant and we don't have enough space in order to go through all of it, even if we were writing an encyclopedia. But even in what would seem like areas of life that should be relatively scandal free, the specter of dishonesty still rears it's ugly head from time to time.

Michelangelo is well known to all as an artist of great skill and repute. Born in March of 1475, he lived a life in which he worked as an artist whose works include the painting on the ceiling of the Sistine Chapel, as well as his portrayal of The Last Judgement, which is on the altar wall. He was a sculptor as well, with his well-known and renowned figure of David being completed before Michelangelo was thirty years old. When he was seventy-four, he was placed in the position of the architect of St. Peter's Basilica.

For a non-artistic type like myself, these accomplishments are incredible. I am barely able to draw the "stick-man" of childhood days. My skills in sculpture amounted, in my youth, to the mangling of sticks of modeling clay to a state of being basically unrecognizable. To see the wonderful art work and sculpture done by this great and undoubted genius is an inspiring thing for myself. How one person could be so talented is something that comes immediately to mind.

But, as in any person, there are numerous aspects to any life. In Michelangelo's day, of course, nothing like Social Security as exists in the United States or the "social safety net" programs of other nations, existed or were likely to come into being. Whatever funds you and your family and friends had to live on was pretty much it. If you grew old and had no family and were penniless, it was a very bad and stressful situation to find yourself in.

In those days, as now, the value of present things is, puzzling to some degree to me at least, considered to be in some circumstances less than those of older ones. A copy of one of Mark Twain's books, for instance, which would cost you a few dollars at a local bookstore, could be worth quite a bit more if it was one of the original copies from back in the 1800's and especially if it was in good but aged condition. A friend of mine has made a thriving business out of this surprising but general phenomenon of "older is better". Paraphrasing his words, "When I'm buying, it's junk but when I'm selling, it's an antique!"

In Michelangelo's day, this general principle worked as well. New art wasn't considered to be worth as much money as "old art". This led to a plot allegedly involving Michelangelo and his skill at sculpture. After completing a sculpture of Cupid, he was asked to bury it for a while in what was acidic soil to make it seem to be an ancient work so it could be sold for more money. Though no doubt originally being done to Michelangelo's always demanding first-class sculpting standards and not "junk" at all, it could still make more

as an "antique", even in those days, than it could as a new piece of work. It ultimately was sold to a Cardinal by the name of Raffaello Riario, who somehow discovered the fraud and demanded his money back from the dealer. He was, however, so impressed by the work that he didn't press charges against the sculptor but instead readily invited Michelangelo to Rome. One never knows how the tapestry of history will interweave.

But there are contrary stories as well. Sometimes things are even better than what they appear at first glance.

For centuries, surgery was coupled, inexorably, with pain and suffering. Mankind's old standby, ethanol, was an early way to try to avoid the pain of "the knife". I don't even drink and never have but I think I could down a gallon or two if facing surgery without any other anesthesia There are some ancient accounts of opium bearing poppy seeds being grown as well and used for pain relief in sick humans. The reality was, however, for most people that needed to undergo a surgical procedure, the prospect was of excruciating pain for which there was no easy way of dealing with.

This led to the belief by some that pain and surgery were inexorably intertwined and that it was just "the natural order" of things for which absolutely nothing could be done. Surgeons had to become hardened to the fact that their attempts to help their fellow humans would be automatically combined with severe agony as well. One doctor said that anesthesia was a chimera, never to be achieved by mankind. In October of 1846, he was definitively shown to be wrong. After the completion of a surgery on a patient, a different surgeon allegedly raised up from the short operation (all of them at that time had to be due to the agony of patients). With tears in his eyes, he is reported to have said to the audience, "Gentlemen, this is no humbug!"

While not totally without risk, modern anesthesia can safely be described, as I heard one anesthesiologist say, as "long periods of boredom interrupted by moments of stark terror". Fortunately, the "stark terror" moments of a, generally speaking, very sick patient becoming unstable in surgery are relatively rare, and most routine surgical procedures are carried out without incident. Anesthesia is now extremely safe and the horrible days for most folks of deeply painful and agonizing surgical procedures are gone. Sometimes there are indeed events in the history of mankind that don't involve fraud at all.

The same thing occurred in the early 1960's when an intelligent and persistent individual by the name of Robert Ettinger proposed that patients who were at the point of clinical death were not beyond help. Perhaps they could be placed at ultra low temperatures and kept safe until future medical science could help them. Fighting courageously and determinedly down through the decades. Ettinger stayed with it until this concept continued to gain adherents and support down through the years. In the intervening years, the field of nanotechnology has begun to be developed which has only strengthened the initial argument that Mr. Ettinger made. As in the case of anesthesia in surgery "…this is no humbug" and as far as it being a fraud, we can assuredly say "It ain't so, Joe!".

If you're new to cryonics, continue to read vigorously here and elsewhere. If you're a long time reader about the subject, don't hesitate a moment. Join us today!

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