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LONG LIFE

Longevity Through Technology

Volume 45 - Number 03

The Immortalist Society 2013 CRYONICS INSTITUTE Technology for Life

Annual Group Meetings SPECIAL COVERAGE

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MANIPULATING MOLECULES

Has science finally cracked the code to assembling matter at the atomic level?

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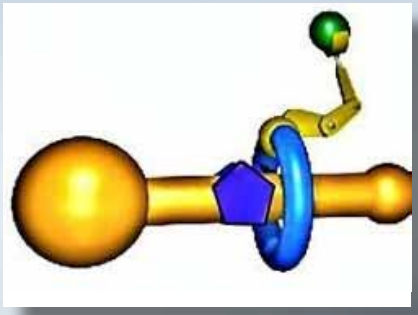


www.immortalistsociety.org www.cryonics.org

www. americancryonics.org

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.

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 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 a free subscription to Long Life Magazine, 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 to fund important cryonics research and public outreach, education and information programs to advance the science of cryonics.

11) Member Ownership and Control

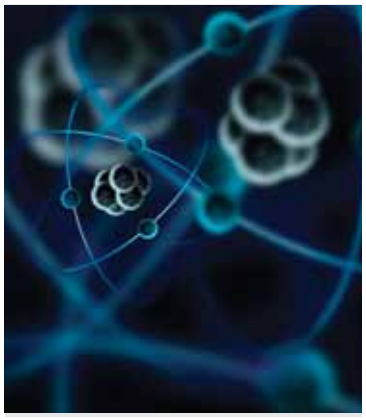
CI Members are the ultimate authority in the organization and own all CI assets. They elect the Board of Directors, from whom are chosen our officers. CI members also can change the Bylaws of the organization (except for corporate purposes).

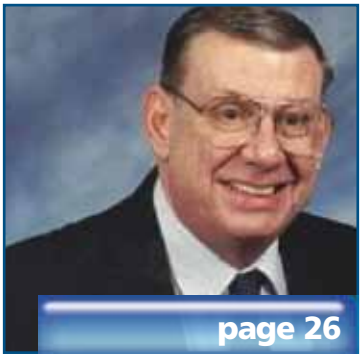
The choice is clear: Irreversible physical death, dissolution and decay, or the possibility of a vibrant and joyful renewed life. Don't you want that chance for yourself, your spouse, parents and children?

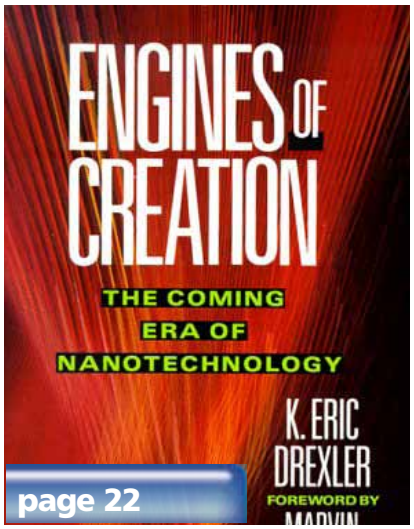
To get started, contact us at:

(586) 791-5961 • email: cihq@aol.com

Visit us online at www.cryonics.org







LONG LIFE MAGAZINE

A PUBLICATION OF THE IMMORTALIST SOCIETY

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Welcome to what we hope is another interesting and thought-provoking edition of ***Long Life.*** Also, welcome to my first guest editorial — I'm Douglas Golner, the Managing Editor here on the magazine. I'm responsible for helping assemble and layout each issue from concept to finished product, particularly in terms of the look and feel of the magazine. That said, I'm very happy to hear that a lot of the new design touches we've introduced over these last three issues seem to be resonating with you, our readers.

As a "creative type," it's always rewarding to hear people like your work, so I sincerely thank everyone who's sent positive feedback on the magazine thus far. By the same token, I also want to just as sincerely thank everyone who sent in suggestions and comments on things they'd like to see done a little differently or a little better. Compliments are a wonderful affirmation of what we're doing right, but just as important, critiques point us to things we could be doing better. So I encourage you to write in with your comments, suggestions and ideas - remember, this is ***your*** magazine. and your feedback is a critical part of making it a success.

This issue features a focus on the upcoming Annual General Meetings and associated elections for officers of The Immortalist Society and the Cryonics Institute. In addition, I personally find it incredibly exciting to be able to report that scientists have *actually created a working **molecular** assembler* - bringing us one critical step closer to the ability to manipulate matter at the fundamental level.

We'll also be taking a step back to revisit some of the seminal musings (and debates) on nanotechnology, which seem particularly relevant (and prescient) on the threshhold of this remarkable breakthrough.

Keep your coments coming in and enjoy the magazine!

Douglas Golner - Managing Editor, Long Life

Correction:

In the second quarter edition of Long Life, Aaron Winborn was misidentified as the founder of Drupal. Proper credit as the founder should have been given to **Dries Buytaert**. Aaron is a contributing developer to Drupal. Long Life magazine regrets the error.

LONG LIFE

A quarterly publication of the

Immortalist Society

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CI EXECUTIVE REPORT

Dennis Kowalski - President, Cryonics Institute

It's that time of year again! CI will be hosting our 36th AGM on Sept 8th at 2pm. This is a good time for CI members to get together with one another to network and socialize. It's also a great time to learn more about CI and to see the progress and upgrades being made to our organization. For those who are interested, we'll be having a casual dinner the night before at the Golden Harvest restaurant. You can check our website for more details on all of this including local lodging and driving directions. It should be a great time and I look forward to seeing everyone there.

It's also time for CI members to elect 1/3 of our directors. CI is unique in that our Board of Directors is made up from and elected by our very own members. Every year CI elects 4 of its 12 directors to represent the membership for a period of 3 years. CI's Board of Directors in turn votes for our officers who manage CI's employees and operations. At CI as a member you really have a say in how things are run. You choose your leaders through the democratic process and if you believe you have what it takes you yourself can run for CI's Board of Directors. One of our greatest strengths is that CI is run by its own. We all have a vested interest in cryonics working and by having a board made up of its own members CI is able to remain affordable and in touch with its members. While no system is perfect, we believe our self-run and directed board is key to keeping CI accountable to all and focused directly on mission.

Thank You! Aaron Winborn has met the majority of his funding goal reported in last issue's magazine

I am pleased to announce that CI member Aaron Winborn has reached most of his suspension goal and is now a fully funded member of CI. He still needs a few thousand to cover funeral director and shipping expenses but I am confident that he will meet his

full goal and get a 2nd chance at life. Special thanks go out to all those who have contributed and worked so hard on Aaron's charity campaign. This is just one more testament to the fact that cryonicists are not simply wealthy egotists out for themselves, but rather real salt of the earth people who care about their fellow people. Aaron's case was especially painful to read in that he is a good family man with young children and his life has been cut short by ALS. Aaron deserves a 2nd chance at life and together hopefully we can give him that chance.

A common theme that I hear from cryonicists who reach out to professionals for assistance is that they are not taken seriously when the subject of cryonics is brought up. Lets face it, the whole idea of cryonics is still to many people an outlandish idea. Many people are completely dismissive of the idea, not giving it the slightest 2nd thought or consideration. While it would be helpful to have professionals like doctors and funeral directors in agreement with us on the value of cryonics, I do not believe it is absolutely necessary they share our ideological commitment. What's important is to set the groundwork for the discussion ***before*** you approach people whose services and cooperation you will eventually need. In other words, if you start by trying to sell someone on the idea of cryonics you may have already lost them from the beginning. Instead, I suggest speaking to both doctors and funeral directors in terms of a *formal business transaction* in which they are performing a service to "honor your last wishes", no matter how unconventional, for a fee. Cryonics is not the easiest subject for anyone to wrap their mind around. It is certainly not a very easy cold sell to anyone and many

of us who have signed up took many years ourselves to realize the logic behind doing so. Is it any wonder why we might face ridicule or down right hostility towards the idea?

Focusing on and starting off with ideas such as "honoring someone's last wishes" or providing "patient advocacy" helps to set the framework that I think allows the professionals we need to work with us. These are fundamental medical and legal concepts that I believe every doctor and funeral director can relate to even if they don't believe in cryonics. If you want help from anyone, you have to give them a starting point that they can understand and relate to. Remember, as with all business transactions, to get everything in writing ahead of time. Last minute funeral or shipping expenses can run substantially higher then verbal estimates so we urge members to protect themselves and their families by establishing formal contracts with back up plans in advance.

When it comes to advocacy, I believe one's immediate family and closest friends are in a very strong position to affect a positive outcome. Professionals assisting you when you can't speak for yourself are much more likely to listen to and help loved ones connected to you then anyone else involved, whether that's a standby team or a cryonics organization. The best approach is really a team effort where these things are talked out between spouses, friends and other key family members. For some of us the approach of getting one's own family and friends on board to help may require similar finessing and diplomacy. The important thing is to hash these things out before there is a crisis and not after. Cryonics is not just a turnkey operation and to be prepared we all need to roll up our sleeves and do what we need to ***ahead of time***. These things require not just hard work, but careful consideration and strategy if we are to have the very best chance at our future survival.

Immortalist INSIDER

What's happening in the worlds of the Immortalist Society with our associates at CI, ACS and elsewhere.

Venturism Society Announces Cryonics Convention

By David Pizer - President, The Society for Venturism

The Society for Venturism, along with the help of Don Laughlin and the Riverside Resort (and perhaps some other organizations to be named later who want to help as sponsors) are planning to host a cryonics convention in October of this year. The following information is tentative and may change, but I wanted to get the word out early so people can start thinking about attending.

The Name of the convention will be the FAQ Cryonics Convention. FAQ, as most people know, stands for Frequently Asked Questions.

Our convention is intended for people who are already signed up for cryonics, as well as for prospects for cryonics, as we also expect a good turnout from people who are considering cryonics, or are interested in life extension and/or immortalism.

Story Continues on Page 24

2013 ANNUAL GROUP MEETINGS

Meetings Scheduled for Sunday, Sept 8, 2013

Cryonics Institute AGM

The Annual General Meeting (AGM) of the Cryonics Institute will be held on Sunday, September 8, 2013 at 2 P.M. at the main facility, 24355 Sorrentino Court, Clinton Township, Michigan 48035.

For more information including maps and available hotel accommodations, please visit cryonics.org. To RSVP, please email the CI Facility at CIHQ@aol.com or phone 1-586-791-5961. The meetings are open to the general public, but we do request that we be informed ahead of time if you will be to attending.

Meetings offer a great opportunity to see the facility, to meet other members, to get a sense of the status of the Cryonics Institute in operation and to see Officers, Directors and Staff.

Immortalist Society AGM

The Annual General Meeting of The Immortalist Society immediately follows CI's AGM at the CI facility. IS will be electing the organization's 2014 officers at the meeting.

AGENDA:

- Call to Order
- President's Report
- Secretary's Report
- Treasurer's Report
- Long Life Editor's Report
- Old Business
- New Business
- Nomination and Election of 2014 Officers
- Adjournment

CRYONICS INSTITUTE
Technology for Life

2013 Board of Directors Elections

2013 Board of Director Candidates Announced

The twelve Directors of the Cryonics Institute Board are elected from our membership for three year terms in groups of four every September. The elections are held by proxies with the results announced at the Annual General Meeting hosted at the Cryonics Institute facility in Michigan. This year's meeting is scheduled for Sunday, Sept. 8.

A list of CI's current Board of Directors and their tenure is to the right, with the names of the board members up for re-election in italics.

All four of the current Directors are running for re-election. Two additional cadidates, David Stodolsky and Kevin Doyle are running as well. Statements by all candidates appear in the following pages. (Candidate Statements are listed in alphabetical order.)

Cryonics Institute Board of Directors

Director	Term expires
Debbie Fleming	*2013*
Alan Mole	*2013*
Marta Sandberg	*2013*
John Strickland	*2013*
Ben Best	2014
Dennis Kowalski	2014
S.R. Luyckx	2014
Andy Zawacki	2014
Constance Ettinger	2015
Pat Heller	2015
Paul Hagen	2015
Joseph Kowalsky	2015

Long Life Candidate Statements Disclaimer

In the following pages, candidates for the Board of Directors' seats of the Cryonics Institute present information. Each of these individuals is a bona fide candidate as best as can be known by the Immortalist Society at the time of the publication deadline of Long Life magazine. The information presented here, however, represents solely and entirely the view of the candidates themselves. The Immortalist Society cannot guarantee the validity of any individual's candidacy nor the validity of their statements and/or viewpoint. Other candidates than those who submitted information here may decide to run for a seat on the Board of Directors as well.

Further, in no way should the appearance of the information here be considered an endorsement (or repudiation) of the viewpoint of the candidate or of the information contained in each statement. Each candidate is offered the opportunity to have a maximum of one page in the magazine in the issue closest to the election. Voters should, in this election as in any election, read and consider carefully the information contained in these statements and, where applicable, try to verify, to the best of the voter's ability, statements of fact and the validity of candidate's viewpoints as contained therein. The appearance here does not guarantee the factual or valid nature of statements of the candidates and it is up to each voting member to engage in a reasonable amount of due diligence in evaluating candidate's statements and in voting for candidates in this election.

Kevin Doyle

Kevin Doyle is hopeful that he could help with the challenging work the Cryonics Institute has ahead re growth, stability and changing the public perception of our efforts. Being from Canada he could present a bit of an international perspective. He has run a large scale beef operation all his life and so has some understanding of ground level work and organization, as it were. Kevin has a BSc in Mechanical Engineering from Queen's University and a M.E.Sc from the University of Western Ontario and has worked in nuclear generation for many years. He has a Ph.D.in Operations Research from the University of Toronto and has experience with optimization projects in the health care field, the equipment maintenance field, the area of organizational behaviour, etc. He presently operates his own consulting organization. (However he would not want to displace any of our present capable Directors until such time as they feel ready to step down.)

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Debbie Fleming

It has been my pleasure to serve on this board for the last three years and it would be an honor and a privilege serving three more. During the last three years I have learned so much about how this organization is run and am proud to be a part of it.

I was exposed to Cryonics at a young age while my dad (John Bull) became very involved in the Cryonics movement. Of course, it was not something that I could discuss openly with my friends at the time, but I am pleased to have seen Cryonics come to the mainstream lately and I don't feel as 'strange' anymore when I mention it to people now.

I am not a scientist nor do I have many accolades. My vision for the future of CI is that it becomes more personable. I have spoken to our new President Dennis Kowalski and he shares some of my ideas on how to create a more pleasant environment and experience when visiting your loved ones at the facility.

I am excited to work on this vision and would love to hear your ideas as well.

Thank you and I look forward to representing you on this Board for the next three years.

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Alan Mole

I am a fully funded life member of CI, a director and vice president. I am a retired aerospace engineer with a Master's Degree.

I have an interest in research and have contributed funding to allow Ashwin and Chana DeWolfe to set up a lab and begin their testing.

I'm also interested in ways to invest money to ensure one's own support upon reanimation a century or two in the future. Trusts do not work for small investments because expensive paperwork and tax forms are required annually, but rare coins, stamps and artwork have appreciated well in the past and require no paperwork. It turns out to be possible to store these with the company in Kansas that uses abandoned salt mines to hold corporate records and other valuables for long periods. They will rent a 1 $ft.^3$ box for 500 years for $10,000. This would be affordable provided we can split it among participants and arrange proper rules for access. This plan is ongoing.

Many aspects of cryonics interest me so I expect there will be new things to study in the future.

For CI, getting new members is the most important issue, and getting our speakers in front of clubs – Rotary, Kiwanis etc. -- is a promising way to do this, and I continue to work on it.

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http://www.cryonics.org/bio.html#Marta_Sandberg

Marta Sandberg

Hi everybody,

I was born in Sweden in 1955, in a town that straddled the Polar Circle. As a teenager I immigrated to Australia and went from the freezing north to a hot desert mining town.

It was there I met my husband Helmer and we shared twenty-three wonderful years together until he died of a pituitary brain tumour. I had had a vague curiosity about cryonics before this, but it was my husband's illness that, through desperation, rekindled my interest. After spending several years investigating cryonics I became convinced it made sense. Since then I have become a crusader for cryonics and promote cryonics whenever I have a chance and have managed to get a lot of positive publicity for CI and cryonics.

Part of my deep involvement in the Australian cryonic community has led me to also become a director of Stasis Systems Australia (SSA), a nascent Australian cryonics organisation. I hope that the two organisations can forge solid bonds and help strengthen and protect each other.

Helmer is currently suspended at CI and one day I plan to join him. This gives me a very personal interest in securing the future of cryonics. CI's "slow and steady" approach seems to be the only sensible approach. When dealing with human lives over an indefinite time span, you have to be ultra-cautious.

As I am one of those tragic people who actually enjoy accountancy, I have made CI's financials my special area of interest. My business degree makes me a natural for this task and there always has to be someone who keeps a close eye on income, outgoings and – even more important – the long term fiscal health of the organisation. If you want a copy of my analysis of CI's and Alcor's financial situation, then please email me.

The next project I want to take on is trying to upgrade local arrangements for suspension. I envisage something like an informal partnership between the member, local professionals and CI. This is also something that is close to the heart of Dennis, our president, but I might have to niggle my fellow directors to remind them that these arrangements soemtimes need tweaking so they are applicable for our international members.

Currently I am working through SSA to try to bring Aaron Drake from Alcor to Australia for a suspension training workshop open to all Australians, irrespective what cryonic organisation they have chosen. This will certainly help Austrian cryonicists getting a better suspension and it might also help strengthen relationships between Alcor and other cryonic organisations – and anyone who has lived through the cryo-wars will know how important it is that all cryonicists pull in the same direction. We are only a handful of cryonicists in a sea of indifferent or hostile people.

All in all, I think this has been a great year for CI and I look forward to see what we can accomplish in the future.

If you want to know more about me, please email me at martasandberg99@hotmail.com or look up my director's biography at http://www.cryonics.org/bio.html#Marta_Sandberg

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David Stodolsky, PhD

Candidate Statement of David Stodolsky, PhD for the 2013 Cryonics Institute Election

Please see my 2011 Statement* for my qualifications. I will concentrate here on policy issues, because current policies are endangering the Cryonics Institute (CI). These policies can be characterized by the words: hypocrisy, autocracy, secrecy, amateurism.

Recently, a Member asked on the CI Mailing List, "is there a formal procedure I am unaware of for a CI member to place a matter before the Board for consideration?" If I am elected, Members can send any Matter they would like considered by the Board to me. I will also insist that a clear procedure for Member input be established.

The Leadership has not responded to repeated warnings about risks to the privacy of Member information. In my draft, "The Customer as Enemy"**, I summarize: "The promise of confidentiality of Member information is shown to be illusory." The only thing that stops Member information from appearing on the front page of a newspaper is the lack of interest by a news organization in CI. I will insist that Member privacy be properly protected.

In response to the arbitrary censorship being exercised by Dennis Kowalski, the new President of CI, even after he presented Rules which aim to "provide open and free communication among all CI members," I requested records that must be transmitted to any Member of CI within 10 days, according to Michigan Law. In response to this request, I received only a mail from Dennis Kowalski asking me to "consider a different course of action." I called for an open discussion*** of corporate governance and the related Membership privacy concerns. However, no action was taken to address these issues, which have been unresolved for almost three years. The refusal to observe Michigan Law is also impeding volunteer organizing on the local level for standbys, emergency response, etc.

According to Michigan Law, CI must make available to Members any records requested, if a Member has a "proper purpose." On June 22, 2011, I requested the Minutes of the Board Meetings. My proper purpose was to determine whether a new Executive Secretary position would improve communication between the Board and the Membership. Since that time, CI has been operating in violation of the Law. I did not receive the Minutes, nor was any explanation given for this failure. The Leadership is also withholding operational information necessary for estimating whether CI will survive and grow. There has been no response to repeated requests for information about the number of post-mortem cases. Without this information, it is impossible to accurately estimate CI's growth rate.

The democracy at the Cryonics Institute is similar to that in Belarus (White Russia), the last dictatorship in Europe. The media is totally controlled by the Dictator during an election. He ensures that only his views are presented. If you communicate to the Membership over channels that the CI Leadership controls, your words can be secretly either deleted or replaced with words the Leadership finds more suitable. You can also be banned from posting to the List arbitrarily. Neither the person banned, nor the Membership, is necessarily notified that such a ban has taken place. Dennis Kowalski has retained the CI List Moderator who has committed copyright violations. The CI List Moderator is also distrusted by many CI Members. There are other Members who are more technically competent and who are not involved in concealing abuses which compromises their impartiality. In addition, the Leadership condones the distribution of false statements which deceive the Membership. I will put an end to these practices.

CI's Leadership has also used its Law Firm to attack its political opposition. For example, it filed a legal action against me, a CI Member, on behalf of another CI Member. The Firm is also making key decisions in the withholding of information mentioned above. While the breakdown of democracy is a key issue, the very survival of CI is threatened by control of CI passing into the hands of a Law Firm.

* http://www.cryonics.org/candidates_2011.html#David_Stodolsky

** http://cosmism.blogspot.dk/2012/06/censored-documents-now-publicly.html

*** https://plus.google.com/102623558643422094970/posts#102623558643422094970/posts

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** Please send questions to:*

cihq@aol.com

John K. Strickland

John K. Strickland, Jr. was born in New York City during the Second World War. He lived for 30 years in western New York state where he received a B.A. in Anthropology with a minor in Biology from S.U.N.Y. at Buffalo in 1967. He moved to a location just outside Austin, Texas in 1976, and earned a second B.A. in Computer Science from St. Edwards University in Austin in 1986. He also earned graduate credits in both Anthropology and Biology. He worked as a professional programmer/analyst starting in 1980, and was employed by the State of Texas in Austin from July, 1989 to June, 2009, when he retired after 20 years of service.

John has been an active member of space and science related organizations from 1961 (when he joined the American Rocket Society as a student member) to the present. He created the Robert A. Heinlein Memorial Award for the National Space Society (NSS) in 1988, (shortly after that author's death.) He is currently the NSS awards committee chairman, and is serving his second term as a member of the NSS Board of Directors.

His work with pro-space organizations brought him into contact in 1976 with Keith Henson, a well-known supporter of Cryonics and space settlement, and later K. Eric Drexler, who coined the word "nanotechnology". John was an early supporter of Drexler's Foresight Institute, and notes that the pro-space, pro-technology and pro-life extension groups all have a compatible and "positivist" philosophy that actively promotes the creation of a hopeful future for mankind.

Since 1976, he has produced articles and op-eds for "*The Humanist*", "*L5 News*", "*Ad Astra*", "*Space News*", "*Solar Power*", "*The Space Review*", "*NASAWatch*", "*Space Daily*" and others. They focus primarily on national space policy, access to space, in-space transport and logistics, and space solar power. He was science/space programming chair at the 1997 LoneStarCon II Worldcon, and is on the committee for the 2013 LoneStarCon III. His chapter on energy systems and space solar power is in the book, "*Solar Power Satellites — a Space Energy System for Earth*", edited by Dr. Peter Glaser et al., published by Wiley-Praxis in 1998. Another chapter "Access to Luna" is in the 2005 book "*Return to the Moon*". He contributed papers and presentations to the Mars Society's 1999, 2008, 2010 and 2011 conventions, the Wireless Power Transmission Conference of 2001, and the World Space Congress in 2002. He has been a track chair and made presentations at many International Space Development Conferences (ISDC). A list of his current technical and popular articles, (most on-line), is available at: http://www.nss.org/about/bios/strickland.html

John's early involvement with (CSICOP), (now CSI), a national group working for better science coverage and less pseudo-science in the mass media, has given him a unique debunker's perspective in dealing with energy vs. environment and other controversial issues. In 1981 he was one of 3 founders of the Protect Lake Travis Association of Austin, Texas, and still serves on its board of directors. He has been a member of the Heart of Texas Orchid Society since 1976 and the National Speleological Society since 1964. He has a greenhouse with 500 orchid plants and enjoys reading History, Science and Science Fiction.

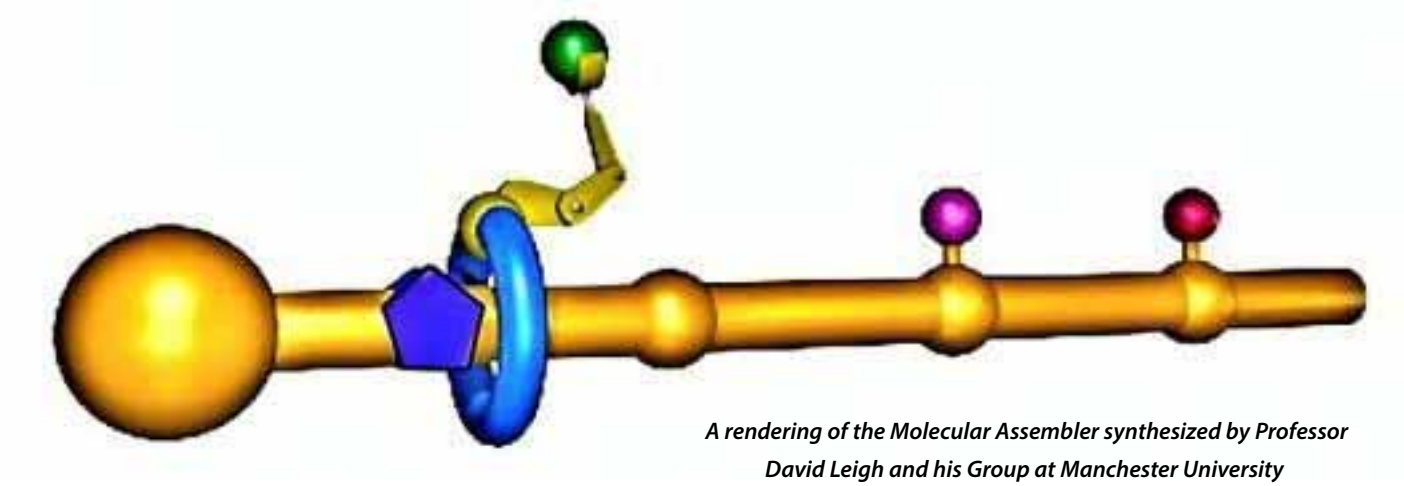
He has a full contract with C.I. and has two close relatives at the facility. His philosophy is one of pragmatism in the service of idealism. In Theodore Roosevelt's words, this means "keeping your eyes on the stars and your feet on the ground". He believes that his abilities as an analyst and generalist can help him assess unique and complex situations, both at the "big picture" level and the detail level. Within CI, he has advocated in diverse areas, such as for more visible ID cards for members, continual work on improving patient cool-down methods, and for more awareness and more active management of the risky mass media environment, that in an instant, can either hurt or help the Cryonics movement.

CRYONICS INSTITUTE MEMBERSHIP STATISTICS:

CI's membership continues to grow, making us cryonics' leading organization in terms of members. As of July 2013 we have 1,100 members (29 new members since our April report) and 117 patients.

Of the 1,100 Members, 530 have funding and contracts in place for human cryopreservation. Of the 530, 146 have arrangements for Suspended Animation Standby and Transport. There are 98 pet patients, up four from our last report. CI continues to be a cryonics industry leader in terms of both membership and practical affordability for all.

Cryonics Institute Membership by Country:



A rendering of the Molecular Assembler synthesized by Professor David Leigh and his Group at Manchester University

Molecular assembler finally created!

By Brian Dodson for Gizmag (www.gizmag.com)

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Ribosomes are the main engines of creation of the proteins on which the body depends. Now, an artificial analog of the biological ribosome has been designed and synthesized by Professor David Leigh FRS and his team in the School of Chemistry at the University of Manchester.

Organic chemists have long had the goal of making chemical-based assembler molecules that can mimic the complex biological machinery of life. In particular, ribosomes are large and complex molecular machines that make proteins (amino acid polymers) from amino acids within all living cells. Ribosomes accomplish their biological task by linking together amino acids in the order specified by messenger RNA (mRNA).

Ribosomes consist of two major subunits—the small and large ribosomal subunits. In essence, the small ribosomal subunit reads the genetic instructions on the mRNA, and directs the ordering of amino acids that will form the protein assembled by the large ribosomal unit. The power of the ribosome is that, given the raw materials, it can make any protein that can be reduced to a genetic pattern recorded on mRNA.

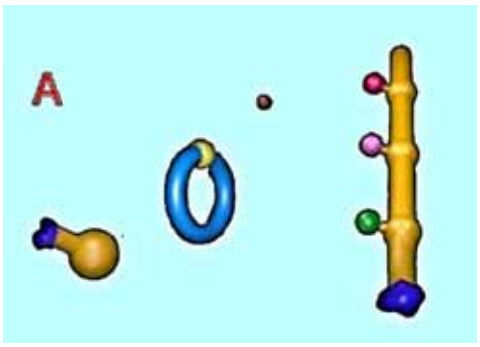
Leigh's group has concentrated on molecular machines that generate mechanical movement that imitates the function of macroscopic machines. A primary goal of such studies is a molecular assembler, a proposed device able to guide chemical reactions by positioning reactive molecules with atomic precision. Such a machine is potentially capable of synthesizing chemical structures that cannot be made by conventional chemical means, as the energy barriers that prevent some molecules from forming can be largely overcome through mechanical manipulation.

A number of artificial molecular machines have been fabricated in recent years. For example, small molecular machines have been used as molecular motors, to store information. Others have been used to aid the synthesis of organic chemicals to switch the action of a catalyst on and off, and to change the "handedness" of a reaction product. Large synthetic DNA molecules have been used to guide the formation of bonds between building blocks that would not normally react, and to assemble gold nanoparticles in particular sequences. However, until now there has been no analog constructed of even a crude molecular assembler.

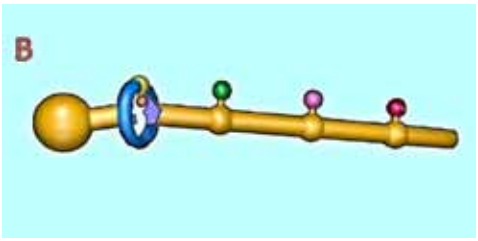
The figure above can be used to give a general notion of how the molecular assembler works. Briefly, you make a polymer backbone (the yellow rod) that has attachment sites (yellow bumps) for three amino acids, and also has a large chemical group at the other end.

A ring molecule (blue ring) is positioned around the polymer backbone. The hole in the ring is large enough that the molecule can move smoothly up and down and rotate around the polymer backbone, but the ring cannot pass the large chemical group or any of the attachment sites while they are occupied by an amino acid.

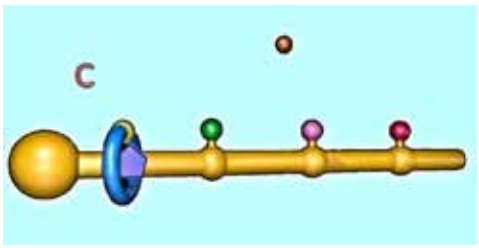
The following figures and their captions describe the mechanism of operation of the artificial molecular machine.



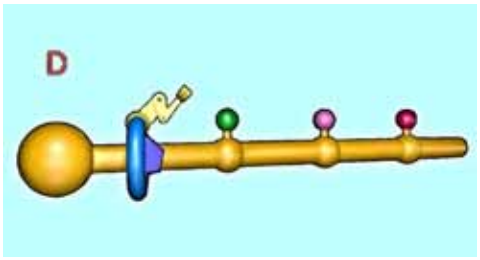
We start with the initial building blocks: a molecular ring, a polymer backbone with attached amino acids (green = phenylalanine, violet = leucine, red = valine), a stopper group, and a copper ion



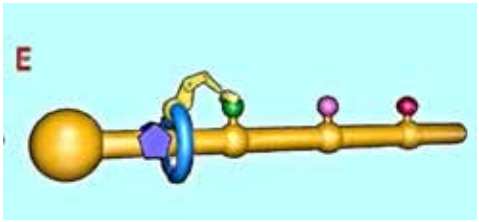
The copper ion is attached to the inside of the ring, from which point it attracts the blue end of the polymer backbone and the blue end of the stopper group, bringing them into proximity



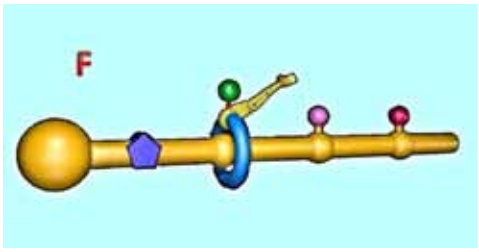
The polymer backbone and the stopper group bind together so that the molecular ring is trapped to move only along the polymer backbone (this type of structure is called a rotaxane) – the copper ion is freed in this step



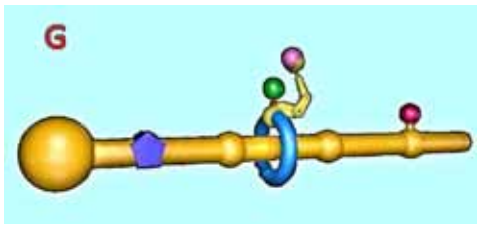
The assembly arm (yellow arm) is attached to the molecular ring, rendering the molecular assembler ready for operation



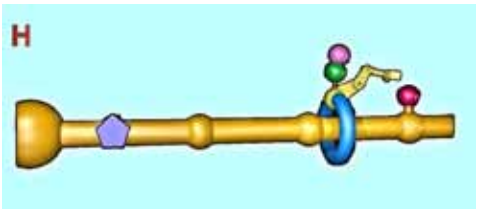
Now the process of protein synthesis begins – eventually, through the random thermal motions of the assembly arm, the phenylalanine molecule becomes bonded to the arm, and at the same time breaks free of the polymer backbone



Here the assembly arm has moved the phenylalanine molecule back to a position on the molecular ring where it can bond to the end of a growing protein chain – the arm is initially made with a three-member protein chain (not shown), so that the arm is sufficiently flexible to make the necessary motions for operation



Next, the molecular ring at some point moves into the vicinity of the second attachment site, and attains the necessary configuration to react with and pluck the leucine molecule from the second attachment site – the leucine molecule is then added to the end of the protein chain



The same process is then carried out for the third amino acid, the valine molecule

Once the valine molecule is plucked from the polymer backbone, the molecular ring is free to slide off and float, together with the desired protein – a simple chemical reaction then frees the protein from the assembler arm and the ring

A short polymer chain serves as an assembly arm (yellow "arm") that can react with an amino acid, detach it from the attachment site, and put it on the end of a protein chain. The protein chain already has three amino acids to give the arm enough flexibility to carry out this reaction in a reasonable amount of time.

In operation the ring moves up and down the polymer backbone between the large molecular group at the right and the first occupied attachment site. This motion is powered by Brownian motion, as is the assembly arm, which takes on all possible configurations on a statistical basis. Eventually, the ring is near enough to the attachment site at the same time as the assembly arm is in the right configuration to pluck the first amino acid. It does so, and the amino acid is moved by the assembly arm to the end of the growing protein chain.

The same mechanics power additional stages of polymer growth. However, the region over which the ring moves is now larger, as it its mass, and both of these factors slow down the process of adding the second amino acid to the polymer chain. Leigh finds that it takes an average of 12 hours to add each of the amino acids (there is as yet no data on how long each assembly step takes). To put this into perspective, a ribosome can add 15 to 20 amino acids to a polymer chain every second.

Prof Leigh's molecular assembler is clearly no competition for a biological ribosome. Not only is the speed roughly a million times slower, but Leigh's assembler has a hard-wired program, in contrast to the ribosome, which is programmed by the messenger RNA encoding the desired protein sequence.

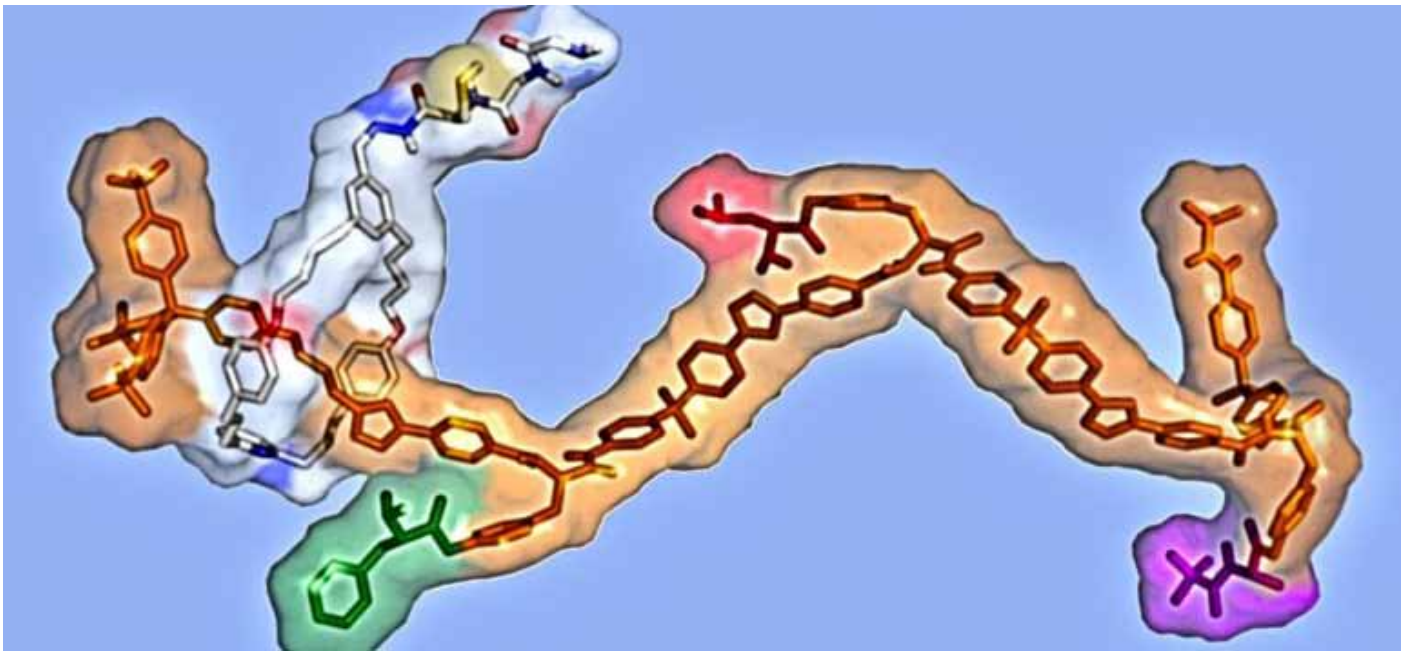
Despite its limitations, however, Leigh's is not only a large step in the right direction, but is also a tour-de-force of synthetic organic chemistry.

(Source: Univeristy of Manchester)

About the Author

From an early age Brian wanted to become a scientist. He did , earning a Ph.D. in physics and embarking on an R&D career which has recently broken the 40th anniversary. What he didn't expect was that along the way he would become a patent agent, a rocket scientist, a gourmet cook, a biotech entrepreneur, an opera tenor and a science writer.

Long Life Editor's Note: While Dr. Dodson is certainly quite correct in his comparison of this "artificial ribosome" to those working in biological systems, he is also quite correct in referring to this development as a "tour de force" in synthetic organic chemistry. In this well written article, the very fact that an assembler of any kind has been constructed is what jumps out at this reader. Crude and slow though this assembler may be, I couldn't help but think of my trips to Dayton, Ohio to the Air Force Museum. Early in the self-guided tour, one sees a full size exhibit of the "Wright Flyer", which first took to the skies back in 1903. One then works through the museum and finally, at the annex, you can even walk through the "Air Force One" Boeing 707 that was used from 1962 through 1972. When one mentally compares the fabric covered, wood framed, "wires, chains, and sprockets" design of Orville and Wilbur Wright to the high tech device that appeared just a few decades later, one can't help be reminded that any initial step in any field is just that, "the beginning" and not necessarily "the end". Stayed tuned!!



Nanotechnology and Cryonics: The Connection Remains

by York W. Porter
Medical Laboratory Scientist (cm), (ASCP)
President of the Immortalist Society

One of the most exciting developments in cryonics occurred in the 1980's when a scientist by the name of K. Eric Drexler published a book entitled *Engines of Creation*. Dr. Drexler talked, among other things in this readable and intriguing volume, about the possibility of humankind being able to control matter on the atomic scale. Science had, down through the years, produced a large number of useful and varied substances, ranging from the wonders of penicillin and other lifesaving medicines to the interesting and useful plastics and other materials that pervade our modern life.

Dr. K. Eric Drexler
Source: e-drexler.com

The substances just mentioned and others, however, were brought forth in more or less traditional fashion by the time honored method of "mix and stir" as Dr. Ralph Merkle, in a talk I heard him give on nanotechnology many years ago, quite correctly explained. For centuries, chemists had worked in their normal way by putting together various amounts of compound A with compound B, mixing them thoroughly together, adding, in many/most cases, various amounts of heat, and utilizing the resulting molecules in various and sundry fashions.

This general process had been done in everything from chemical laboratories at universities and research agencies, to large and complex industrial plants that turned out chemicals by the pound or by the gallon. Still, in some ways, with all the blessings and the numerous various chemical compounds of many types that it provided the human race, it all still basically tied back to the origins of chemistry and, in some fundamental ways, didn't differ a great deal from the "mix and stir" method that chemists down through the ages had carried out.

What Dr. Eric Drexler proposed was something entirely different indeed. His efforts, as outlined both in the *Engines of Creation* volume written for the public at large, and in his more in-depth and technical science publications, dealt with a basically entirely new concept. It would be the ability of the human race to take individual atoms and molecules and to combine them in any order and in any arrangement that the laws of science indicated were possible, and to do so with a precision that, to date, no chemical process had allowed to be done.

Dr. Drexler proposed that this could be carried out through devices that were generally called "assemblers". Assemblers were going to be infinitesimally sized devices that would enable one to take Atom A and place it, assuming the laws of chemistry and physics weren't

violated, with Atom B, add Atoms C, D, and E, etc. in whatever order, placement, and orientation one wished to achieve consistent with chemical and physical laws. The result would be a structure that, in a similar way to living organisms, was built "from the ground up", atom-by-atom and molecule-by-molecule. If it could be done, the resulting structures could be quite complex indeed.

Dr. Richard P. Feynman

And, although some in referring to Dr. Drexler apply the phrase "the founding father of nanotechnology", he wasn't entirely the first to think of the concept of manipulating things at the atomic level, at least in a general sense. In late December of the year 1959, Dr. Richard Feynman, a man who would go on to win the 1965 Nobel prize in physics, gave a talk entitled *"There's Plenty of Room at the Bottom".*

In a play on words of the saying "There's Plenty of Room at the Top", Dr. Feynman pointed out that in spite of the progress that had already been made in technological realms in terms of making devices and processes already developed by the time of his talk , much, much more remained to be done. He referred to the then existing technologies of "electric motors that are the size of the nail on your small finger" and "a device on the market ... by which you can write the Lord's Prayer on the head of a pin" as "the most primitive, halting step in the direction I intend to discuss". Progress, as his remarks clearly showed, was just beginning in the miniaturization realm.

Robert Ettinger Several Years Ago at the Cryonics Institute Facility in Michigan

Dr. Feynman made several interesting and bold statements during his talk. The well-known reference set of the *Encyclopedia Britannica* was quite physically extensive, consisting of 24 large volumes of books crammed full of various information. Dr. Feynman speculated about whether it, as opposed to just the Lord's Prayer, could literally be written on the head of a pin. He talked about whether computers which were, at the time of his talk, taking up entire rooms of space in order to operate, could be greatly reduced in size. He spoke of robotic surgery in terms of independent units that would work inside the body itself.

One of his statements that stands out is as follows: "But I am not afraid to consider the final question as to whether, ultimately---in the great future---we can arrange the atoms the way we want: The very atoms, all the way down! What would happen if we could arrange the atoms one by one the way we want them (within reason, of course; you can't put them so that they are chemically unstable, for example)?" Buttressing his case, Dr. Feynman went on to state "The principles of physics, as far as I can see, do not speak against the possibility of maneuvering things atom by atom. It is not an attempt to violate any laws; it is something, in principle, that can be done; but in practice, it has not been done because we are too big."

There has been some discussion about whether Dr. Richard Feynman started the field of nanotechnology or whether others deserve more of the credit. In any event, Dr. Feynman's talk has generated, at least retrospectively, a lot of interest among those now working in the field. Given in a casual setting, as an after dinner talk, Dr. Feynman's remarks still stand out in both their basic points and in demonstrating the creative thinking of Dr. Feynman himself. Like a later genius by the name of Robert Ettinger, Dr. Feynman simply spoke out where logic and reason led him, irrespective of whether that position made everyone feel at ease or not.

Not too awfully long after Richard Feynman's interesting after dinner talk, another man of science came out publicly with a different, but ultimately

interrelated idea. In the early to mid 1960's, Robert Ettinger, who attained in his lifetime Master's Degrees in both mathematics and physics, proposed the concept of "cryonics", where persons who were terminally ill and/or had been mortally injured, could be offered hope that, after storage in liquid nitrogen, with its ultracold temperature allowing one to "suspend time", future science and technology could offer revival, repair, and rejuvenation.

Mr. Ettinger's concept appeared, at first, as though it would immediately take root and readily become a part of normal societal activity. Alas, this wasn't the case and cryonics organizations today, although continuing to gain members and continuing to place people in what has been termed, among other things, "cryonic suspension", still struggle to gain acceptance in the public arena.

Even Dr. Drexler struggled with cryonics when he first heard about it. In the publication *Cryonics*, which is put out by the Alcor Life Extension Foundation, in the January 1986 edition, Eric Drexler himself stated at one point that he had previously been acquainted with cryonics and didn't get very interested in it. In fact, he thought that "...It's a nice idea, but it probably won't work. They're probably a bunch of crazies." Years later, after his thinking in nanotechnology developed, he began to see the logic of Mr. Ettinger's approach. In that same edition of *Cryonics* magazine, Eric Drexler stated the following:

> *"So then I went and dug out a copy of Ettinger's The Prospect of Immortality from the MIT library, and there, lo and behold, I found out that these crazy cryonics people not only were right, but they even knew why they were right, that in the future we're going to have molecular repair technology. Ettinger wrote of repairing cells molecule-by-molecule if need be. Of course, he didn't have the numbers to demonstrate this, and there was still the question of how we would get there. But he had the basic physical perception that we'd develop molecular-level repair machines, and that doing this doesn't conflict with any physical law."*

Dr. Drexler, having the courage of his convictions, mentions cryonics in *Engines of Creation*. The ninth chapter has as its title *"A Door to the Future"*. Dr. Drexler used the more general term "biostasis" to refer to any reasonable attempt to preserve the structure of the human body after clinical death but, in one interesting and memorable sentence, he states: "... Robert Ettinger has apparently identified a workable approach to biostasis."

Dr. Drexler's statement was, of course, heartening to cryonicists everywhere. His writings, coupled with his known expertise in the field of nanotechnology, gave persons interested in cryonics a useful tool in their discussions about the subject. In particular they added to the discussion about whether the field of cryonics could be viewed as a reasonable thing to do. In spite of Robert Ettinger's intelligent insight into the fact, in general, that molecular repair would one day be feasible, the lack of his (or anyone else's for that matter) ability to give the specific details continued to give skeptics of cryonics ammunition in the debate over the subject.

With Dr. Drexler's highly qualified backing, it was now much more clear that cryonics was not only a reasonable thing to do, it was an ***extremely*** reasonable thing to do. Further, the work showed that cryonics wasn't, as its critics were sometimes wont to say, "an act of faith", as though it was some sort of "wishful thinking" type of endeavor. Instead, it made things abundantly and crystal clear that cryonics is based on reasonable premises that are, at bottom, grounded in scientific fact.

Controversy in Nanotechnology

No field of scientific endeavor is without its share of controversy and the field of nanotechnology has been the same. In a 2001 article in the well known and widely read and respected publication *Scientific American*, Dr. Richard Smalley, who had won a Nobel Prize in chemistry in 1996, argued that the development of assemblers as proposed by Dr. Drexler, was simply not feasible.

Dr. Richard Smalley

The position of Dr. Smalley seems strange indeed since he wrote in his career that "nanotechnology holds the answer, to the extent there are answers, to most of our pressing material needs in energy, health, communications, transportation, food, water".

Further, in August of 2000, Dr. Smalley had stated in a National

Public Radio interview: "It is true that it seems as though almost anything can be done if one can position atoms in the right place, but it's not going to be simple and overnight." Dr. Drexler had never maintained, of course, that the development of assemblers would be "simple" or "overnight".

Nevertheless, for some time a debate raged between Dr. Drexler and Dr. Smalley as to the basic feasibility of Dr. Drexler's concept. Other individuals weighed in on the discussion, among them Ray Kurzweil, noted inventor and futurologist. In his book *The Singularity Is Near* Kurzweil, in a succinct summation of a major point against Dr. Smalley's argument, wrote "... if Smalley's critique were valid, none of us would be here to discuss it, because life itself would be impossible, given that biology's assembler does exactly what Smalley says is impossible".

Kurzweil's written statement reminded this author of something once talked about by Curtis Henderson, a well-known cryonics pioneer. Curtis, although never seeing actual combat, trained as a fighter pilot near the end of World War II. He said it was always amazing to him how reputable scientific figures in the centuries before the Wright Brothers flew, could maintain that a heavier than air flying machine was impossible "with birds flying around their heads every day". Similarly, Dr. Smalley seemed to be arguing from the standpoint of being a living example of what he said couldn't be done.

In 2003, the Center for Responsible Nanotechnology also added their voice to the discussion in the subject by printing the following:

"Smalley's strategy, both in the 2001 *Scientific American* article and in the current debate, has been to equate Drexler's proposals with something unworkable and then explain why the latter can't work. Thus Smalley's comments do not directly address Drexler's proposals, but attempt by example to show fundamental problems with his underlying theory. However, both of Smalley's attempts have failed, and the second failure is noteworthy for what it reveals about the weakness of Smalley's position."

(The entire paper can be read at http://crnano.org/Debate.htm)

Further, Dr. Drexler had, during the controversy, published a point-by-point rebuttal to Dr. Smalley's position, to which Dr. Smalley never replied.

Regrettably, Dr. Smalley succumbed to cancer at the age of 62 in the year 2005. He wasn't, to this author's knowledge, interested in cryonics at all.

Whatever one's viewpoint, the fundamental standard in any dispute of the kind that Dr. Drexler and Dr. Smalley had is meeting the basic test of science that has been long held. Dr. Carl Sagan very well explained that basic test in his book *Broca's Brain*. Paraphrasing, Dr. Sagan pointed out that there was no difference between believing in DNA and UFO's, in believing in sorcery or nuclear physics, in believing or not believing in a lot of things ***except for the evidence***. That standard is the one which both cryonics and Dr. Drexler's concept of assemblers or Dr. Smalley's critique of it has to be ultimately held.

And there has been progress in the factual basis of nanotechnology, both in general and, recently, in the very specific area that Dr. Drexler originally referred to, now frequently known as Molecular Nanotechnology, abbreviated as MNT.

In Feynman's talk back in 1959, Richard Feynman gave the resolution of electron microscopes, useful in determining an atom's actual position, as about ten angstroms. Today, electron microscopes of the same general type (there are different "families" of electron microscopes), are able to resolve around a half an angstrom. So an instrument that Dr. Feynman said needed to be improved and which might be quite instrumental in the quest for nanotechnology, was improved several fold.

In the case of a special type of microscope known as a "Scanning Tunneling Microscope", scientists are able to manipulate individual atoms themselves and were able to do so even at the time of Dr. Smalley's objections. The image just below was demonstrated at IBM's Almaden Research Center in San Jose, Calif. This was done back in 1990 and each of the "dots" in the letters IBM represent single atoms that have been manipulated into forming the pattern one sees here.

Over the years, numerous reports of various applications of the general concept of nanotechnological thinking have been given. Each advance, however small (no pun intended) adds credence to this dynamic and interesting field of human endeavor.

If nanotechnology, as it appears it will, ultimately attains the dream of Dr. Drexler of MNT, the following point from Michael Rieth's book *Nano-Engineering in Science and Technology* becomes quite relevant:

> *"And if we can build anything in any quantity, the practical question of 'What can we build?' becomes a philosophical one: 'What do we choose to build?'..."*

One thing we, as human beings, will no

DavVinci Surgical System--Surgeon Is At Left Pt. Can be In/Out of the Operating Suite Where the Surgeon Is Located.

doubt surely build, are devices to aid those among us that are sick and injured. That means, ultimately, nanotechnology that works at the sub-cellular level and which will enable physicians to do things absolutely undreamed of in previous times.

Dr. Sam Bhayani, a surgeon who works with the revolutionary DaVinci robotic surgery system, is already able to operate in a manner which he has described as making him feel like "the Six Million Dollar Man...it makes me faster, better, stronger...".

The DaVinci surgery system allows the surgeon to be in any location in the world as long as the unit is hooked up via a telecommunications link to the mechanical end that would be with the patient themself, ***whether the patient is in the room or in another location***.

Dr. Bhayani goes on to say "I imagine a future where robots don't only go into the body and take out tumors but also can go into our genes and alter how we produce tumors, alter our longevity ... that nanotechnology is going to happen in the next hundred years, it's just on the cusp of today..."

While Dr. Bhayani's prediction is of medical nanotechnology being fully developed and finally happening "in the next hundred years", the more important point, from the standpoint of cryonicists, is that the more or less identical technology will be useful in the revival, repair, and rejuvenation of those individuals who have undergone the procedures associated with cryonics. The ability to work with sub-cellular structures, to repair those structures, to replace molecules where they need replacing, and to move molecules from their incorrect position to their correct position, will all be procedures that will certainly be developed in nanomedicine and which will also certainly be useful for persons who have chosen cryonics.

Further, some very recent evidence indicates that Dr. Bhayani may be way too conservative in his viewpoint of the length of time before this will happen. It also seems to be a quite damaging piece of evidence to the argument that Dr. Smalley made against the concept of assemblers.

In an exciting and relatively recent development strongly backing up Dr. Eric Drexler's side of the "assembler" argument, Professor David Leigh and his team working in the School of Chemistry at the University of Manchester ***have actually developed the first molecular assembler***. (See the separate story about this in this issue of Long Life).

While the device developed by Dr. Leigh and his group is primitive compared to, for instance, the "natural assembler" which is called a "ribosome" that works inside living cells, and while it is also primitive compared to Dr. Drexler's idealized concept of an assembler, nevertheless, it is a big, big step in the right direction. The magnificent aircraft that we see routinely plying the skies today, for example, are a long, long

Continues on Page 24

Keeping the Legacy Alive

Thoughts from Robert Ettinger, the Father of Cryonics

Robert Ettinger in his days as a World War II soldier

Robert Ettinger's Initial Review of Eric Drexler's book *Engines of Creation*

As indicated in the previous issue of Long Life Magazine, we will feature Robert Ettinger's writings from years past as they seem relevant to a particular topic. This particular submission was in the August 1986 issue of The Immortalist (which was the former name of Long Life Magazine).

Everyone who can read should have this book, just for the fun of reading it.

Immortalists should not only read it, but promote it, because of its potential importance in converting the infidels--in particular, those scientists (so far a large majority) who consider cryonics a long-shot based only on vague optimism.

Reviews in *Booklist* and *Virginia Kirkus* might suggest that the book is just another won't-it-be-wonderful listing of distant promises in future technology. Still worse, the editors have excised some of the most impressive material in the original draft (called *The Future by Design*) because it might intimidate the lay reader. The book jacket manages to be both dull and illiterate, speaking of "... discoveries that are literally just around the corner."). But the work itself rises above these handicaps, and may become one of the keenest blades in the immortalist armamentarium. It isn't only about immortalism, by any means; one could call the assortment of topics either versatility or dilution, since it cuts both ways. But I'll concentrate on the immortalist/cryonics aspects--partly because that is our main interest, and also to save some of the delights as surprises for the reader.

The main theme is molecular technology or nanotechnology (**nano**- being a thousand times as fine as **micro**-). This refers to manipulation of individual atoms and molecules; and construction of molecules atom-by-atom; and, in consequence, building of tiny yet intricate machines that can replicate themselves, live off the environment, observe, compute, assess, build, and repair. Thus we have the implication of exploding wealth, since machines like these need only a source of energy and raw materials to provide, djinn-fashion, almost anything we want and a great many things we didn't even know we wanted.

For the layman, the immortalist implications can perhaps best be imagined by thinking back to an old movie, *Fantastic Voyage*. Remember? A vehicle, with doctors/scientists, was reduced in size until it could navigate a medical patient's blood vessels, allowing the experts aboard to visit diseased or damaged parts of the body and make repairs, kill parasites, etc. In the nanotech scenario there are no tiny humans, but there are (will be) machines small enough and versatile enough and clever enough (or programmed in sufficient detail) to do the job a tiny surgeon might do, and more.

To reverse virtually all the effects of aging, the machines (and their operators) needn't even understand the cause(s) of senescence! They need only to recognize abnormal tissue, and restore to normal structure whatever has deteriorated.

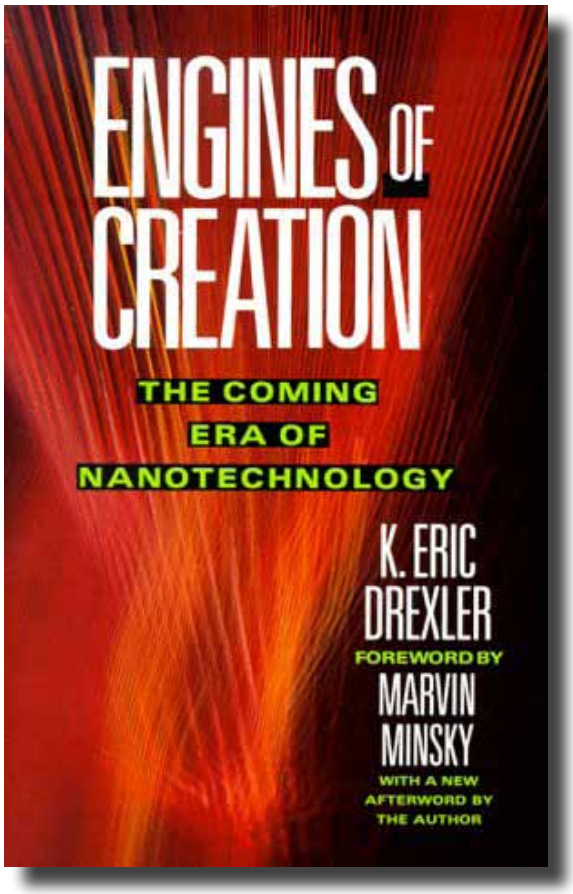
To repair damage done by freezing (or any other form of "biostasis" including vitrification, chemical fixation, or combination) the machines again need only recognize small-to-moderate deviations from normal structure, and make repairs, including the removal of cryoprotectants, etc.

The great point---so easy to understand, yet so hard really to appreciate--is that these capabilities and possibilities represent ***merely engineering problems***. There is no problem with the

fundamental science--after all, many similar tasks have been done for eons via the evolved machinery of our bodies, and inorganic machines will be able to do much more.

O.K., time for the devil's advocate. "Only" engineering problems? In World War I, Will Rogers had a simple solution to the problem of German U-boats: boil the Atlantic Ocean. When asked how that could be done, he said he was the idea man; he left the little details to others.

Of course Mr. Drexler can't give us precise blueprints for complex nanomachines; he says they are ten to fifty years in the future. But he does investigate in quantitative detail several of the underlying questions of feasibility, and it is these discussions that hold the most promise for persuading scientists.



Because of the editorial compromises made for the lay reader, some of the argument is relegated to the notes and references at the end. Early drafts had more detailed discussions in the crucial area of "design space"--how much elbowroom is allowed engineers by the laws of nature. From our point of view, this is Mr. Drexler's splendid contribution: building a conceptual bridge between the "vague" optimism of some cryonicists, based on broad evidence and the sweep of history, and the specific techniques available only in the future.

It is also difficult to sort out Mr. Drexler's other personal contributions, aside from integration and interpretation. But some of the most important people will (we hope) either be already familiar with the references or dig them out, including Mr. Drexler's 1981 paper listed on p. 26 of this newsletter*.

Eric Drexler is currently a Research Affiliate of the Space Systems Laboratory, MIT (where he was formerly based). He has or had the ears of some important people, including several gray eminences and department heads at MIT. His book includes, by permission, several (indirectly) favorable quotations by some of them. Yet even Dr. Minsky, who wrote a warm foreword, mentions rejuvenation only in passing, and biostasis or cryonics not at all. That's a fairly grim fact.

Part of the problem is motivation and time horizons. It's hard to get people seriously working when the putative payoff--both monetarily and otherwise--may be distant and uncertain. And outstandingly successful people, for complex psychological reasons, are exceptionally poor material for immortalist recruitment. Even so, Mr. Drexler's book just might ignite a spark in the right place, and there are things we can do to help.

Ask your local library to buy the book; many libraries in small cities or suburbs will respond to requests. Send review to newspapers, including small ones. Call radio talk shows to raise the subject.

The immortalist Society will send a copy *gratis* to Any Nobel laureate or any other person we consider a V.I.P., if that person makes the request (until we run out of money, which we're afraid won't happen). So if you, the reader, will write to some Very Important Person and say how wonderful (s)he is and won't (s)he please write the Immortalist Society for a free copy of *Engines of Creation*--well, like chicken soup, it might not help, but it couldn't hurt.

This month the Immortalist Society will also give a copy to any new full member, or to any associate member who upgrades to full member. How about it?

Addendum: We had urged the *New York Times* to publish a review, and offered our own. On Aug. 10 they finally did run a review, by science writer Terence Monmaney.

The mere appearance of a review in the Times may help book sales, but unfortunately the review itself was perfunctory, superficial, and tepid. To get an idea how dense Mr. Monmaney is, savor his last sentence: "(Previous) splendid achievements (in technology) haven't made any utopian dreams come true, though, and it's hard to believe nanotechnology could do that, ***no matter how wonderful it turns out to be.***" (Emphasis added).

***(Long Life Editor's Note:** The article that Bob Ettinger referred to above is "Molecular Engineering: An Approach to the Development of General Capabilities for Molecular Manipulation", K. Eric Drexler, Proceedings of the National Academy of Sciences, USA, vol 78, No. 9, pp. 5275-5278, September 1981.)

FAQ Convention *Continued from page 6*

Details of the convention include:

1. There will be speakers on the leading ideas in cryonics and life extension in formal presentations.

2. There will be an adjoining exhibition room with information tables and/or booths where attendees can pick up literature from leading cryonics and life extension organizations, and perhaps talk with some of their representatives in person.

3. There will be at least two buffet dinners, combined with informal parties similar to the old Lake Tahoe Life Extension Festivals, in a third adjoining room. This is where you can meet with other cryonicists and make new contacts.

4. We are inviting media and reporters.

Besides the speakers and programs on subjects of interest to cryonicists and immortalists, we plan to have a "Meet Don Laughlin" presentation where those people who want to meet Don Laughlin and ask him questions and give him suggestions can participate.

The Riverside Resort and Laughlin Nevada are great places to have conventions and have some fun at the same time. Besides the casino with gambling, bowling alley, several movie theaters, and conventional game rooms, there is swimming in the Colorado River and places for a beach picnic. Or you can rent a ski-doo for river fun. Additionally, there is the whole rest of the town of Laughlin with several more casinos to explore that feature Las Vegas type shows.

The rates for the convention, meals, and the rooms will be at extremely reduced rates for us as Mr. Laughlin is a long-time cryonicist and wants to help make this an annual and affordable event. You will want to be a "charter attendee" to these conferences!

Some of the tentative confirmed speakers are: Max More PhD from Alcor, Catherine Baldwin from Suspended Animation, Stephen Valentine from the Time Ship Project, Cairn Idun from the Asset Preservation Group, Mike Perry PhD and cryonics historian, Ben Best on cryonics in Wikipedia, Don Laughlin, David Pizer on the benefits of being a Venturist Member, Mark Plus with a presentation of our current appeal to help Aaron Winborn.

Invited and Waiting for confirmation are: A representative from the Cryonics Institute; a representative from the Immortalist Society; a representative from the new life-extension religious organization, The Church of Perpetual Life; a presentation on what happened in the unfortunate Chatsworth incident by Bob Nelson; and a representative from the Teens and Twenties Group – a new cryonics group for young folks.

We are preparing several more invitations to the leading experts in the cryonics, nanotechnology, neuroanatomy, and long term life extension movements.

So this convention will have everything, speakers, info booths, parties, relaxation and fun in the sun AND IT WILL BE VERY AFFORDABLE.

— David Pizer, President, The Society for Venturism

PS: Without making a commitment, we would appreciate a reply as to whether or not you find this desirable, would like more information, and may possibly attend. This would be extremely helpful in our planning phase. To let us know if you are thinking of attending, want to have a booth, want to recommend a speaker or presentation, please contact Venturist Secretary, Mark Plus at: mark.plus@rocketmal.com or call Mark at 928 273-8451.

Nanotechnology & Cryonics *Continued from page 17*

way from the machine made of fabric, wood, wire, and chains which Orville and Wilbur Wright developed. One can see retrospectively, however, their antecedents in that now, to us at least, flimsy looking "Wright Flyer" of lo so long, long ago.

Similarly, being a primitive example of an "assembler" in what will ultimately develop into a very high tech endeavor, lets those of us observing the efforts know that, as in the first brief flight of the Wright Brothers, high intelligent scientific minds are on the right track.

Perhaps Dr. Leigh's assembler will be viewed, looking back in later years, as the fundamental basis on which the promise of man-made nanotechnology finally fully went from theoretical concept to actual reality. Perhaps a combination of Dr. Leigh's work and someone else's, or even another route entirely, will ultimately prove to be more fruitful. Whatever the case, this primitive assembler's very existence and other work in the area that Richard Feynman, Eric Drexler, Robert Ettinger and others had the insight to see in various depths of detail, will continue, irrespective of what anyone may say or think. Dr. Drexler, Dr. Ralph Merkle, Dr. Leigh and others, continue to determinedly and doggedly follow the trail wherever the facts and

evidence lead them. They continue, and will continue, to engage in work that will fully complement the equally important work of another man of science who was also the "father of cryonics", our founder, Robert C.W. Ettinger, himself.

The development of this field of study, not even known as nanotechnology when Robert Ettinger wrote his seminal work back in the early 1960's, offers a solid basis upon which those of us who are active cryonicists throughout the world today can use as a reasonable explanation of how cryonics can ultimately succeed in its life saving mission.

Robert Ettinger stated in *The Prospect of Immortality*:

"Most of us now living have a chance for personal, physical immortality.

This remarkable proposition--which may soon become a pivot of personal and national life--is easily understood by joining one established fact to one reasonable assumption.

***The fact:** At very low temperatures it is possible, **right now**, to preserve dead people with essentially no deterioration, indefinitely. (Details and references will be supplied).*

***The assumption:** If civilization endures, medical science should **eventually** be able to repair almost any damage to the human body, including freezing damage and senile debility or other cause of death. (Definite reasons for such optimism will be given)."*

The fact that Robert Ettinger mentions in this world-changing book was already well established in the 1960's at the time of his writings. The assumption he makes, with the continuing work of Dr. Drexler, Dr. Merkle, Dr. Leigh and others, comes closer and closer and closer to fact each and every day and the connection between cryonics and nanotechnology gets stronger and stronger and stronger with every passing year.

Wanted!! Contributors!

It's no big secret that Long Life magazine, like all magazines, has at its core the folks that write for it. Dedicated and working for no pay, the folks that write here are folks that truly believe in the dream that Robert Ettinger founded. They continue, issue after issue, to try to expound on the topic of cryonics in ways that are hopefully informing, interesting, and entertaining. I know that each of them works hard in order to try to reach that goal.

What about you? Do you have an idea floating around that you think should be covered in the pages of Long Life? Thought up a new way to express the ideas that are put forward here? Had a new thought entirely as to what the world changing and life saving concept of cryonics could mean to your fellow humans? Got a new approach to either how this idea should be carried out or how we might be better able to convince others of its usefulness and truthfulness?

Friends, we're looking for you then. Though we can't automatically guarantee you space just because you send something in, we would love to hear your ideas. so feel free to drop us an e-mail today at immsoc@aol.com]

General Guidelines for Writing for Long Life

Sometimes people ask what are the guidelines or requirements for writing for Long Life. The main answer that is given is, of course, that the topic has to be relevant to the subject of cryonics. It can be anything from the latest relevant developments in nanotechnology to research in cryobiology in general. One can write, for example, about specific information concerning cryobiological research into organ and tissue storage and revival. Reasonable conjectures about what future societies and governments may look like and how cryonics might have an impact on how mankind governs itself are also fair game. Just basically let your imagination be your guide. Again, though, the topic needs to be related, as closely as you can, to the subject of cryonics and the closer to that subject, the better.

Things we don't want to see are, however, articles with profanity/pornography, articles that are filled with tirades of a personal nature against an individual or group, or subjects that are so far a field from the topic of cryonics that one has a hard time making a connection between them and the main reason for the existence of this magazine. Our purpose is, of course, to inform and educate about Robert Ettinger's world changing concept.

We have to admit that the above guidelines (and others not listed here) aren't always "black and white". If you have any questions about whether something is useful to appear in Long Life, don't hesitate to get in touch with us. We're always looking for new talent!

Final Thoughts

York W. Porter - Executive Editor

Integrity...

As everyone involved in trying to push the world-changing concept of cryonics forward knows, it is a tougher job than it appears at first glance. As I've written before, when I first came across the general concept, way back in the 1960's when I was a teenager, I figured that by the time I got grown, it would be just a routine part of every day life. Alas, that hasn't been the case and the efforts of the Immortalist Society, the Cryonics Institute, the folks at Alcor, ACS, Suspended Animation, and all the other organizations that are working in the field, continue to this day to be partly centered around making what should be a self-evident concept into a more accepted one. There are lots of strategies in dealing with this problem but the most important one in all of our efforts has to be summed up in one word and that is the word "integrity". Everything else is going to be for naught if all of us trying to push cryonics forward fail to do so in a fair and honest way. Nothing but our ultimate failure will follow if we don't keep that one word primary in our thinking and our efforts.

Recently, in a development that saddened those of us who knew him, the long time Immortalist Society Treasurer, John Besancon, was placed under the care of the Cryonics Institute at their facility in Clinton Township. John had been suffering from several severe health problems for quite some time and they finally overwhelmed him.

John was an interesting and intelligent person. He started out going to college with the intent of becoming an engineer. He later changed his course and wound up with a degree in Business Administration. He worked for a while with GM and then with EDS when the data processing of GM was transferred. He retired in 1992 after thirty years of service.

In 1995, John suffered a cardiac arrest while in a Meijer's store parking lot. He was very, very fortunate to have survived this episode and later on, an automatic defibrillator was implanted which went off a few times during the remainder of his life. John referred to himself, from time to time, as our "miracle man". Originally given a life expectancy of around five additional years, he lived sixteen additional ones instead.

Cryonicists, as everyone who has been involved in the field for very long knows, are a pretty contentious lot, generally speaking. I am, in some ways, probably the chief of sinners in this. John Besancon, however, was always unfailingly polite, simply sitting in his chair and raising his hand for recognition while debate that didn't exactly follow Robert's Rules of Order raged around him. When he spoke, it was unfailingly in a polite and non-personal manner that stuck to the subject at hand without any of the harsh vitriol that will, regrettably, occasionally accompany a discussion in which folks have strong views. In the midst of chairing the meetings of the Immortalist Society, I always admired his demeanor and his honest approach to things.

John Besancon

That demeanor and honesty also accompanied his work as the IS Treasurer. Of all the things that went through my mind during our years of working together, financial scandal wasn't one of them. John was unfailingly scrupulously honest. The concern expressed by some folks who are newly introduced to the concept of cryonics that it is some sort of a scam was something I knew would never have to be dealt with when it came to IS finances. With John Besancon's intelligent and honest hand helping to guide IS financially and, as an IS Board of Directors member, in several other ways as well, I knew we were well served in the integrity department. John was, in short, a good and decent man and the world is greatly better off with men like him in its midst. The word "integrity" described him through and through.

He was also an example to follow for those of us that continue our work in cryonics. We have to strive to continue to be, and to continue to make, our organizations and efforts the type of decent and moral and upstanding organizations and efforts that men like John Besancon would approve of. The basic premise of cryonics is indeed decent and moral and John Besancon recognized that. We have to continue to assure that our actions in carrying it out are the same. We owe him no less.

Long Life is a publication of the Immortalist Society
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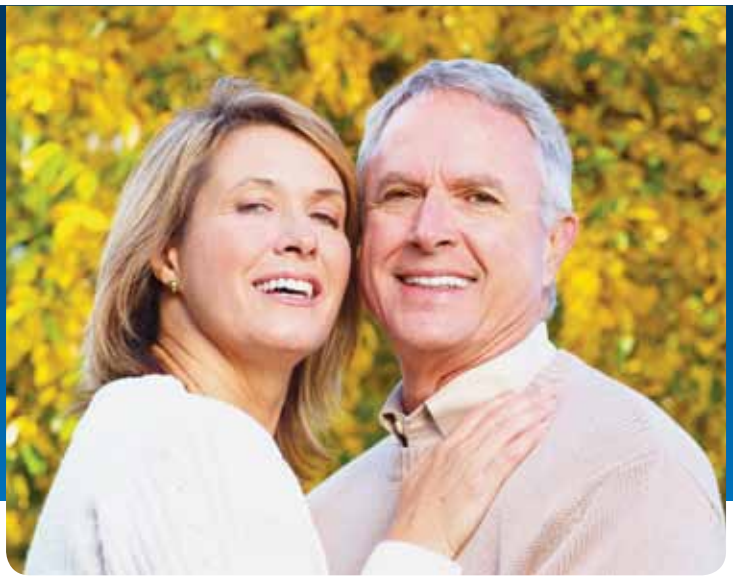

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