

CRYONICS

FEBRUARY 1983

ISSUE # 31

Contents:

Editorial Matters	page 1
Reflecting Forward	page 1
Letters to the Editors	page 2
Ev Cooper	page 5
Tahoe Research Proposals	page 6
Public Relations	page 9
The Girl From the St. Croix Valley	page 10
Hypothermic Hamster Revived After Total Body Washout	page 13
Alcor Meeting Calender	page 17
A.I.D.S.; A Dissertation on the Wisdom of Public Health	page 18
Funding Problems for the National Institutes of Health	page 21
Poetry	page 22

CRYONICS is the newsletter of the Alcor Life Extension Foundation, Inc. Michael Darwin (Federowicz) and Stephen Bridge, Editors. Published monthly. Individual subscriptions: \$15.00 per year in the U.S., Canada, and Mexico; \$30.00 per year all others. Group rates available upon request. Please address all editorial correspondence to Alcor, 4030 North Palm #304, Fullerton, CA 92635 or phone (714) 738-5569.

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EDITORIAL MATTERS

Several of our readers commented favorably on the short piece "Why We Are Cryonicists" which appeared in the January issue of CRYONICS and inquired about purchasing additional copies. Copies of WWAC are available from Alcor for 25 cents and are printed on sturdy cardstock.

Alcor is now in the process of reissuing the basic information booklet formerly published by IABS entitled CRYONICS: THRESHOLD TO THE FUTURE. Alcor urgently needs such a comprehensive information booklet to answer requests for information and to solicit new memberships. Unfortunately, such effort doesn't come cheap. We need your contributions and your support to help pay for printing costs, typesetting and layout of the cover. We have already received several generous contributions and large sums of invaluable volunteer labor; but we need more. Please, dig deep and see if you can give us a little financial support. It would be especially nice to see a few new faces in this department.

REFLECTING FORWARD

The past year has been one of excitement, high anxiety and change for Alcor. There have been many occasions when things could have gone wrong and tensions could have gotten in the way. Merging two complex and in some ways very different organizations is never an easy or straightforward task. But, we did it! And what's more, we hit the ground running. Not only did we manage to carry through on the complexities of the merger, we have grown and grown substantially in the months since. We have produced a standard literature pack to answer incoming requests for information, begun a long overdue review of suspension arrangements, developed in-house whole-body and neuropatient storage capability and vigorously pursued a complicated animal research project. We have made outstanding progress in a short period of time. We have been able to do this largely because we have been blessed with so many fine people who are willing to give so freely of their time, intelligence and hard labor. Without these volunteers, Alcor would be a skeleton organization destined for oblivion. Our people, especially that diligent core of volunteer workers are our most valuable asset.

I have been a part of a number of cryonics organizations and have had the opportunity to observe at a distance a number of others. I can honestly say that at no time in the past have I seen the number of people involved, working and contributing, that I have seen in Alcor. There simply is no precedent for the kind of solid organization we have. Betty Leaf has done an outstanding job of handling the mailing lists, assisting with mailings and doing word processing for CRYONICS. Bill Jameson works smoothly and reliably in keeping the books and handling the billing. Paul and Maureen Genteman have kept and issued a fine set of minutes of our meetings and handled the considerable chore of mailing them out to the membership. Hugh Hixon, Jerry Leaf, Anna Schoppenhorst and Arthur McCombs have been good all around general workhorses handling everything from creative writing to creative woodworking. There are others, many others who have also been of great help and assistance. The upshot of all this is that I think our biggest achievement in 1982 was putting such a team together and I am confident that it will be our biggest asset going into 1983.

The coming year will present a number of challenges for us. We need to upgrade our literature and try to be more flexible in our approach. One of the biggest priorities is to attract new people and get them involved. Alcor is in the process of developing a quality presentation which can be used for informing the public about cryonics. We also need to increase our sources of revenue.

Lack of money is, as always, a continued large impediment to our growth. We need to carefully examine the possibilities for raising additional cash through educational seminars and programs. Help is needed in all these departments; we certainly can't do it alone.

We've had a good year. Due to the outstanding generosity of our members we have grown a great deal. Finally, very special thanks must go to Dick Jones for his generous financial support, and to Lawrence Gale for his contributions in the computer department. Stick with us and we'll try to make 1983 even better!

Michael Darwin (Federowicz)
President, Alcor Life Extension
Foundation

LETTERS TO THE EDITORS

To the Editors:

At the 1981 Lake Tahoe Life Extension Conference, I heard several references to "the Alaskan Beetle that was able to survive storage at liquid nitrogen temperature". Being somewhat interested in such things, I taxed several people for more details. What I found out immediately was that: 1) they didn't have any details, 2) they didn't know who did the work, 3) only one person could name the bug, and he couldn't spell the name for me (understandably---it's one of those Latin concoctions), 4) they hadn't looked themselves, but the facts were in the scientific literature, and everybody knew them. Immediate suspicion. If you have never heard how rumors are propagated, allow me to inform you---the above remarks have all the earmarks of a classic case. However, most rumors start with a seed, and it looked like that would be worth knowing about. Off to the library. After an extended Easter egg hunt through the various abstracts and journals, involving several dead ends and a great deal of blundering about (par for the course from where I started) I was able to determine the following:

1) The critter's name is *Pterostichus brevicornis* (Carabidae). More manageably, *P. brevicornis* is found to overwinter at a temperature below -35°C.

2) It is a small carnivorous beetle (average weight 8 mg) in Alaska that overwinters in rotten tree stumps.

3) When subjected to low temperatures, its survival rate is variously quoted as:

o

a) 20% survival at -70°C. (Baust & Miller, 1972)

b) 67% survival after 5 hours at -67°C. (Miller, 1969)

o

NOTE: For reference purposes, dry ice is -78°C and liquid nitrogen temperature is -196°C. The temperatures cited above would indicate the use of one of several brands of two-stage mechanical freezers (often erroneously referred to as "liquid nitrogen freezers").

The source of this variability in survival rates is not mentioned.

4) It is able to survive at these temperatures because after a suitable induction period, it produces glycerol concentrations of up to 24% in its hemolymph.

Having sprung this information on several of my original sources, I was directed to Dr. Corey Noble, IABS Research Director. His reply to me was that:

1) His literature references were about the same as mine, and did not reflect any attempt to check the survival of *P. brevicornis* at liquid nitrogen temperature.

2) He and a number of other people had heard from Dr. John Baust, informally, that after the proper glycerol induction sequence, the beetles will survive dropping into liquid nitrogen. Dr. Baust's Ph.D. thesis was on the mechanism of freezing tolerance.

3) I should check with Dr. Baust, or with Dr. L. K. Miller, his thesis adviser and an insect physiologist, concerning their work with the beetle.

Mike Darwin then talked with Dr. Baust and at my request asked him about his work with *P. brevicornis*. His reply was that after proper glycerol induction, immersion in liquid nitrogen, and thawing, they stagger around a bit. Then they die. No survivors. Admittedly, this is an impressive performance, but they still all die.

It is obvious that a number of people in cryonics have exaggerated the cold tolerance of *P. brevicornis*. They should stop this. Because, if they should spout off to someone who does know about the work on *P. brevicornis*, they risk being dismissed as some sort of idiot, a problem that cryonicists have enough of already.

I would like to thank Jerry Leaf, Mike Darwin, and Dr. Corey Noble for pointing in various directions, mostly correctly. A short list of references is attached.

Hugh Hixon

Baust, J.G., Influences of low temperature on cold hardiness and neural adaptation in the Alaskan beetle *Pterostichus brevicornis* (Carabidae), University of Alaska. (1971)

Baust, J.G., Insect freezing protection: *Pterostichus brevicornis* (Carabidae), Nature (London), 236, 219 (1971)

Baust, J.G., and Miller, L. K., Variation in glycerol content and its influence on cold hardiness in the Alaskan carabid beetle *Pterostichus brevicornis*, J. Insect Physiology, 16, 979 (1972)

Baust, J.G., and Miller, L. K., Influence of low temperature acclimation on cold hardiness in the beetle *Pterostichus brevicornis*, J. Insect Physiology, 18, 1935 (1972)

Miller, L. K., Freezing tolerance in an adult insect, Science, 166, 105 (1969)

Dear Editors:

I have some comments and a request to make concerning the publication of the "Tahoe Research Proposals", that appeared in the January, 1983 issue of CRYONICS.

First, I think you should have written a brief paragraph, in that issue, to introduce the reasons why these research proposals were being published in CRYONICS, explaining that they are competitive proposals whose authors, representing different organizations, hope to acquire research money from the Tahoe Life Extension Festival, etc.

While I can appreciate the fact that CRYONICS is the publication of the Alcor Life Extension Foundation and, therefore, can be expected to subscribe to the theory that "Alcor is wonderful", it should guard against the illusion that it operates without bias, and take proper precautions.

Shades of this illusion manifest themselves in the fact that the three research proposals are not prefaced with an explanation, yet the Alcor proposal alone contains a direct pitch for funds, complete with an appeal to the Tahoe Life Extension Festival. I can't speak for Biophysical Research and Development, but as for I.C.E., I was asked to submit a research project to be considered for funding. Since only the Alcor proposal contains these elements, the other proposals seem not to have a reason for their appearance at all.

In addition, originally IABS, then Alcor, was engaged in the Alcor project. but not without cooperation from supporting organizations. Since the entire period of Alcor's project is discussed, credit should be given to those who provided significant contributions for the last 18 months. A mere footnote would have sufficed. Cryovita Laboratories provided the facilities and equipment and I.C.E. donated hundreds of dollars in support of this valuable research.

Further, I request that my original I.C.E. proposal be printed exactly as submitted. It was a mistake on my part to allow alterations of the text, by phone conversation, without seeing the final draft. I find its final form to be less compelling than I would have imagined. I offer my apologies to the I.C.E. board of directors for this lapse of prudence.

Cryovita Laboratories has also submitted a research proposal that is to appear in this issue of CRYONICS, because "there wasn't enough space" for it to be published in the January issue. I hope this editorial will provide some explanation for its appearance and the reprinted I.C.E. proposal.

Lastly, I would not like to leave the impression that I am without appreciation of CRYONICS and its editors, especially Mike Darwin, who is a fountainhead of all things cryonic. The editors do have the impossible task of pleasing everyone. In fact, they have done a remarkable job, and are easily producing the most important cryonics publication in print today. I also subscribe to the theory that "Alcor is wonderful", even if, sometimes it isn't "finger licking good".

Jerry D. Leaf, President
Institute for Cryobiological Extension

Dear Jerry,

Please accept my sincere apologies and the apologies of the Alcor board of directors for the oversights you have pointed out. It was not my intention to slight anyone or any organization in the publication of the Tahoe abstracts. As you have pointed out there is an understandable prejudice on the part of the Editors of CRYONICS toward Alcor. This is particularly true of me, since it was

my research proposal and I deeply believe both in the work and in the goodness of Alcor. There was no intention to slight others; that such insult was offered was simply a consequence of many small decisions, each of which standing alone seemed innocent enough.

Now I am faced with the issue of what to do about this situation. After much thought and careful consideration I have decided that the simplest and fairest course to take is to withdraw Alcor's research project from consideration for funding by the attendees of the Tahoe Life Extension Festival. It is my hope that the members of Alcor will forgive my poor performance and the resulting loss of important research dollars.

As you have requested, your original I.C.E. proposal appears as it was submitted minus the editing.

Out of fairness to Dr. Segall of Biophysical Research and Development I am rerunning his abstract as well.

Sincerely,
Mike Darwin (Federowicz), President
Alcor Life Extension Foundation

EV COOPER LOST AT SEA

We are deeply saddened to inform you that Ev Cooper, one of the two fathers of the cryonics concept, is reported lost at sea. Ev is reported several months overdue for his arrival at Beaufort, S.C. and neither he, nor his sailboat PELICAN, have been sighted since shortly after they left Martha's Vineyard on December 21st. There is still some slight hope that he might yet be found disabled out at sea, or that he put out to sea on a sailing expedition without informing friends or relatives.

The loss of Ev Cooper would be a profound loss to both the life extension community and the world. Ev was a gentle, decent man who contributed much to the early days of the life extension/cryonics movement. We hope to have more details available on Ev's status for the next issue of CRYONICS. In the meantime we sincerely hope we will have recieved word that Ev has returned safely.

"We will not be driven by fear into an age of unreason if we remember that we are not descended from fearful men, not from men who feared to write, to speak, to associate and to defend causes which were, for the moment, unpopular."

--Edward R. Murrow

RESEARCH PROPOSAL



REVERSIBLE CRYOPROTECTIVE PERFUSION OF THE HYPOTHERMIC HAMSTER

Bio Physical Research and Development, Berkeley, California
Paul E. Segall, Ph.D., and Harold D. Waitz, Ph.D.

We are developing techniques for the total body washout of hypothermic hamsters using an asanguinous perfusate to replace the blood volume. We then replace the blood substitute with whole blood, and revive the animal. We intend to use this system, once it's reliability is increased, to examine the effects of cryoprotective additives on hamsters lowered to temperatures below the ice-point. Since hamsters have been known to survive extensive body water freezing, and since glycerolated frogs can over-winter for months partially frozen, we feel glycerol perfusion of blood substituted hamsters is presently the best approach to cryonics experimentation.

RESEARCH PROPOSAL



PULSATILE OR NONPULSATILE PERFUSION?

Cryovita Laboratories, Fullerton, California
Jerry D. Leaf

Pulsatile perfusion is a modality that may provide several benefits for the suspension patient. Clinical perfusion studies have shown physiologic pulsed perfusion, as compared to non-pulsed roller pumps, provides decreased peripheral vascular resistance (PVR), increased capillary flow, increased lymph flow and improved brain, kidney and pancreas metabolism.

These same parameters need to be quantified in the context of cryoprotective perfusion. These kinds of improvements in perfusion could provide the following benefits to suspension patients:

- 1) Improved or completely adequate distribution of cryoprotective agents (CPA) in peripheral areas, including skin, due to decreased PVR.
- 2) Decreased perfusion time required for equilibration, due to increased capillary and lymphatic flow.
- 3) Increased brain metabolism from more physiologic distribution of flow and decreased toxicity by reduced time of exposure to high CPA concentration.
- 4) Reduced metabolic requirements by improved perfusion cooling, allowing the elimination of surface cooling techniques.

CPA distribution will be determined by the isotope microsphere technique, comparing pulsed and roller pump perfusion. Optimum perfusion pressure and CPA ramp slope will be determined by equilibration of central venous versus arterial osmometry and tissue glycerol analysis. Total body and regional brain oxygen consumption and lactate production will be measured to determine differences in metabolism during pulsatile versus non-pulsatile flow.

RESEARCH PROPOSAL



BRAIN PERFUSION STUDIES

Institute for Cryobiological Extension, Downey, California
Jerry D. Leaf

Current technology indicates that brain viability studies should be pursued. Research at Cryovita and other laboratories, especially G. Fahy at Red Cross, have shown that current base and cryoprotective perfusate designs provide adequate perfusion media for the central nervous system, in terms of washout and cryoprotective equilibration. Further studies to test brain function, after blood reperfusion at normothermia, will provide necessary control data and model development to test viability after freezing. Such a model will provide a necessary step toward the goal of demonstrating memory viability after freezing or vitrification at cryogenic temperatures.

Control EEG recordings will be made of rabbit brains, in vivo, at normothermia. The brain circulation will be isolated, the head perfused with cryoprotective agents (CPA's) to terminal concentrations necessary for vitrification and the head surgically excised. CPA's will be washed out and the head circulation connected to a support animal in the manner of R. L. Swank, et al, (Archives of Neurology, vol. 13, p. 93-100, July, 1965). EEG recording will be made and compared to controls. Visual and auditory stimuli will be applied to elicit specific EEG responses. AV-O2 consumption and lactate production will be monitored to determine metabolism of the head during blood reperfusion.

Recently the Alcor phone rang at just the wrong time. I was busy troubleshooting a new monitoring system on a patient dewar, being harassed about problems with our computer printer and was just generally at wits end. It had been one of those days when you just want to walk away from it all and call it quits. Hugh Hixon, the volunteer who answered the phone, said there was a young man on the line doing a school project about cryonics. He needed some information; would I be willing to talk to him? As I was contorted into a small and uncomfortable space in the Cryovita loft my first instinct was NOT a charitable one. But I stifled a grumble, crawled down from the loft and took the call. I gave the 15-year-old caller the information he needed and told him he would get a packet from us in the mail in a few days. As I prepared to conclude the call the young man said that he would really like to thank me for taking the time to talk to him. He said he had called a number of other cryonics groups both in California and in two other states. It seems that no one was willing to be anything but abrupt with him. After all, a 15-year old isn't anything more than a waste of time anyway, right? I accepted his thanks feeling a little bit better about the time I had spent with him. Then he caught me completely off-guard with his final remarks: "You know," he said, "I'm really excited by this idea. In fact, soon after I started researching cryonics as my biology project I realized that nothing I had ever heard of made so much sense. But, I was almost ready to give up on the idea in disgust because of all the "down" messages I'd been getting. With the exception of you, all of the people I talked to in cryonics gave me the impression that getting involved was the worst thing that could happen to you."

There is a message here. It is a message that many of us have either apparently forgotten or never learned: cryonics is GOOD news. Cryonics is something that IS making our lives more livable and IS worth being enthusiastic about. Perhaps the day to day grind of problems has worn away the smoothness of an easy smile or upbeat conversation. We are all a little shellshocked by the past few years of bad press and slow progress. But we must not lose sight of the fact that others see us as we see ourselves. If we do not bring optimism to our contacts with "outsiders" we will lose the battle. We cannot neglect the realities of the hard road we have to travel, but neither can we afford to be overwhelmed and overwrought by our difficulties.

In the days that followed my conversation with that enthusiastic 15-year old, another idea, one which I have held for a long time began to crystalize in my mind. While almost all cryonicists regard inquiries from young people as tedious chores and a waste of time, we should not. In fact, if we are given the choice between spending time with a teenager excited about cryonics, or a 50 year old businessman who is "really interested in an exposition of risks and benefits" we should pick the youngster every time. Why? Because young people are more flexible, they are in the process of searching for answers and life philosophies. They are also more directable. A young person in high school has yet to decide on a career and still is open to learning complex technical or administrative skills. Adults aren't nearly so malleable. Adults, particularly motivated and successful ones bring their own set of goals, priorities and ego trips with them. Adults are also almost invariably committed: they have careers, spouses, children, and/or status to protect. A high school student has none of that.

To the skeptics who question if there is really any evidence that this approach will work, the answer is a resounding yes. Thanks to Curtis Henderson and Saul Kent I am involved in cryonics. I now well understand why Curtis used to say to me so often "It's really good to see you young people involved; you're

the hope of this thing." As each year flies by I begin to understand that remark more and more. I was 13 years old when I first wrote to the Cryonics Society of New York. Thanks to the patience of Curtis Henderson and Saul Kent I have had the opportunity to practically grow up a cryonicist. Jerry Leaf and Corey Noble first heard of cryonics from Robert Nelson (then president of the Cryonics Society of California) when he spoke at their respective high schools. Anna Schoppenhorst, Alcor board member and one of our more dedicated volunteers was drafted into cryonics by this author at the tender age of 14.

We should think twice about how we handle young people. If they are genuinely interested we should invite them to visit us, see our facilities and talk about cryonics. Above all, when we deal with interested people, be they young or old we should reach into our hearts and give quite honestly of the joy cryonics has put there. Such joy is the one commodity we can give which will return itself endlessly. In the long run, sharing our passion for life and making others believe the good news is the only thing that will save us. Believe me, I know this can work because each time I pour liquid nitrogen on a few of the Alcor patients who touched me in this way I have all the certainty of soul I need. □

THE GIRL FROM THE ST. CROIX VALLEY

by Bob brakeman

Prolog: The author wishes to acknowledge the role of Shelley pickard in the preparation of this article.

It began as a failure, but grew into a success.

It began, and is continuing, in a location which is arguably the most beautiful non-famous place in America: The border-country where the exquisitely pretty St. Croix River flows and twists through Wisconsin and Minnesota.

"It" is the story of my relationship with a young woman (23 at the time, a bit older now) whose own beauty was sufficiently overpowering that it made me ignore the scenic grandeur of the green and dramatic valley which contains the twin-river-towns of St. Croix Falls (Wisconsin) and Taylors Falls (Minnesota). Although as a good-citizen-and-right-thinking-human-being I've memorized all the standard cliches about inner beauty being more important than outer beauty and it's what you are that counts not what you look like, we might as well get it on the record right now that it was nothing but that crass/superficial old thing pure-physical-beauty that attracted me to her in the first place (no one ever said I had any depth.....).

"The first place" was a drugstore, one in which I saw her having a soda at the counter. She was seated alone, and so of course after I noticed what she looked like I made sure that she would be alone no longer. Certain kinds of physical appeal taper-off when viewed at closer range, but hers was the type that grew in power: To a perfectly-crafted face (molecules-in-motion sometimes do nice work) she added cascading hair favored with a dozen shades of gold---and to all of that she added the kind of figure that I think a Catholic priest I once knew had in mind when he warned me against various things.

She was so friendly that it proved to be very easy to start a conversation with her, one which went on for nearly half an hour. She talked in a way which was as animated and musical as it was friendly, and about the only flaw one could find in her way-of talking- to-strange-men was that she wasn't much on eye-contact: Although she talked well and listened well she didn't seem to really look directly at me much--instead she concentrated her vision on her soda almost the whole time. I think I was about to comment on that, when suddenly my attention was diverted when she accidentally knocked over the glass of whatever it was that I was drinking. From where she was sitting it took an excess of clumsiness and not watching what you're doing to accomplish that, so I joked aloud that "The vision is always the first to go.....". She laughed, and after a few more minutes she had to leave--but not before we'd arranged for me to come up to her house that night to meet her mother. (Actually it could have been anyone from her great-uncle to her dog; I wasn't paying too much attention because the only person I wanted to meet was her-again).

After she left I got into a conversation with the guy behind the counter at the soda-fountain (they don't like to be called "soda jerks", so watch it). Almost the first thing he said to me was: "Ya know, I could make you blush right now". That line naturally made me wonder if perhaps some part of my attire which should have been closed was in fact open---but before I could wonder very long he immediately explained what he meant:

"Ya know that girl? Ya know what you said about the-vision is always the first thing ta go? Yeah, well, she's been blind since birth".

Staggered. That's the only adjective for what I was, and not just because I was terminally embarrassed about my vision-crack: The other reason was that I just couldn't believe it. She'd seemed so totally "normal" in every way that I couldn't understand how she could have been blind without my noticing it. In retrospect I realized that her almost never looking directly at me was part of it, and that another part must have been that her lack-of-sight must be of the type which doesn't make the eyes themselves look at all unusual: They look perfectly fine when seen from the outside--they just don't function. She had no cane or seeing-eye dog, but someone had come to get her, and the fact that they had walked out in a way which was semi-arm-in-arm now made sense.

Saddled, as we all are, with unforgiveable prejudices against people with any kind of physiological handicap, I slightly-and-subconsciously "revised" my general-image of her after hearing the blindness-announcement----not in any way which I could easily explain, but certainly the general drift was that she was now "different" to me. Still, my anti-handicapped prejudices must have been less intense than those of some other "normal" people, for it didn't take me long to get to the stage of saying who-cares-and-how-do-I-find-her-house?

After finding it, after mumbling an apology about the "vision" crack, and after having her make light of it by saying she thought it so funny that she'd been telling people about it

all day---it was then that I had The Idea. Because of a background in entertainment-generally and in what one might call the pretty-girl-sector in particular, I had a professional-level appreciation of her looks and decided that her type of blindness wouldn't stand in the way of her making a good deal of money through a certain type of commercial modeling (any kind of shot where the very slightly unfocused look that her eyes had wouldn't show up---basically anything but a close-up would be all right). Although she was first amazed at the suggestion and then intrigued by it---she finally decided against it, even after we brought in a photographer who produced some stunning test-shots of her. Her reason seemed to be that she only felt at home and comfortable in St. Croix Falls/Taylors Falls, and since doing anything in the modeling world would require a move to a big city---she wasn't interested. And so, in that area I failed.

But largely by accident I had a much more significant success with her, in another area (all right, you people, get your minds up out of the gutter.....). Through braille and cassette tapes and having people read aloud to her, she was an omnivorous "reader", and because of her handicap she was very interested in physiology and biology and medicine. One day she asked me if I knew several (related) things: That many experts now believed that the aging process was just another "disease" that would eventually be conquered; that therefore what we misname "natural death" would one day disappear; and that therefore lots of people were now arranging to have themselves frozen at "death" so that their physical selves would be around-and-well-preserved whenever the day of the conquering of aging-and-death arrived. After I stopped laughing I told her that since I was a long-time cryonicist (she hadn't known that), asking me if I'd heard about all that stuff was the greatest straight-line since Costello asked Abbott "who's on first?"

After we both stopped laughing, we entered into a month-long dialogue on the subject, one which ended up with her deciding to (A) make provision for her own cryonic suspension and (B) become the leading proselytizer for immortalism in her part of the country. Her family's assets were such that the former would be no problem, and she had so many friends/acquaintances throughout the St. Croix borderland that the latter seemed to be a job made explicitly for her (her success as a maker-of-converts would be aided by two of her qualities---high intelligence and impressive articulateness---which people with better values than me would have ranked as even more appealing than her beauty).

Although it was as a result of her own thinking and "reading" and analysis that she made her pro-immortalism decision, I was able to help her in several ways. One was by just being there: It's one thing to "read" about cryonics in a book, but it's much more impressive to have someone in front of you who's prepared to read to you his entire contract providing for his own cryonic suspension. A second way in which---according to her---I was able to help her was by talking her out of a tendency toward what one might call excessive abstractionism: She had a tremendous interest in any number of abstract intellectual issues---but it never occurred to her that they had much meaning for her own personal life-and-being; on the issue of cryonics and

HYPOTHERMIC HAMSTER REVIVED AFTER TOTAL BODY WASHOUT

Paul E. Segall, Ph.D., Judith M. Murrell and Harold D. Waitz, Ph.D.
Biophysical Research and Development, Berkeley, California

Introduction

We wish to report a technique for the recovery of hypothermic golden Syrian hamsters (Mesocricetus auratus) following total body washout. Previous experimentation has allowed us to recover heartbeat and respiration in hamsters re-perfused with blood after asanguinous hypothermic periods. The present report extends these findings to the recovery of consciousness in which the animal opened its eyes, was clearly able to respond to stimuli, was able to right itself after being placed on its side, and showed other forms of sentient behavior.

Methods and Materials

Four retired breeder hamsters of mixed sexes obtained from Simonson Laboratories, Gilroy, California, weighing between 148 and 178 g. were placed each in separate air-tight 1.5 l. jars immersed in ice water and allowed to become severely hypoxic (oxygen deficient), hypercapnic (high in CO₂) and hypothermic. When they showed torpor and dyspnea (irregular breathing), they were removed (after 46-67 minutes) from the airtight jars and covered with crushed ice. After 15-25 minutes when rectal temperatures, as measured by a YSI telethermometer, reached approximately 12°C, each hamster was removed from the ice bed. At this time, the animals showed a very limited response to surgical trauma. An incision was made in the abdomen, and the abdominal and then the thoracic cavity were exposed. An 18 gauge hypodermic needle attached to a 10 ml. syringe was inserted in the left ventricle of the beating heart and 1-5 ml. of blood was withdrawn. The blood from each hamster was pooled in a glass jar which had earlier received 20 drops of a 1000 units/ml. heparin solution. Approximately 14 ml. of blood was collected from all 4 hamsters.

One hundred ml. of a 6% Dextran 40 solution in Ringers Lactate (Ringers-Dextran) was prepared, pre-filtered through a 1.2 micron Millipore filter and then filtered through an 0.2 micron Nucleopore filter, adjusted to pH 8.45 with 0.6N NaOH, heparinized with 30 drops of heparin (1000 units/ml.) and stored at 4°C. This solution was pH readjusted to 8.45 and re-filtered through an 0.2 micron Nucleopore filter immediately prior to use.

A micro-cannula was prepared from Voltrex fluorocarbon tubing (0.010 in. ID x 0.030 in. OD) obtained from SPC Technology, Chicago, Illinois. A small length was warmed with a hot air gun, narrowed by pulling from both ends, and then the narrow portion was cut. This cannula, about an inch long, was mounted on a 30 gauge hypodermic needle, which was attached by a small adaptor to a roller pump. The roller pump was set to deliver perfusate

through the cannula at a rate of approximately 1 ml./min. . The roller pump tubing was flushed with about 80 ml. of Ringers Lactate, and then flushed again briefly with Ringers-Dextran solution.

A 101 g. female hamster 8-10 weeks of age was made hypothermic by the same method described above for the blood donor hamsters. When this animal had reached a body temperature of 9°C, it was removed from the ice bed and placed on a wooden surgical platform, ventral side up. Using a jeweler's magnifying lamp, an incision was made in the right side of the ventral surface of the neck, at about the level of the salivary gland (about 0.5 cm. from the midline of the neck). The incision was widened by blunt dissection with forceps and non-pointed probes, and the jugular vein and carotid artery were exposed. A small piece of thread was placed around the jugular vein for use in locating and moving it.

The animal's temperature was lowered to 6°C by placing it on a small plastic "ziplocked baggie" filled with crushed ice. Another "baggie" was used periodically to chill the animal by placing it on the abdomen when needed. The right carotid artery was cannulated, the cannula being inserted approximately 1 cm. toward the heart. Perfusion with 45 ml. of Ringers-Dextran solution followed, and immediately after the onset of perfusion, the jugular vein was sliced with iridectomy scissors. The resulting effluent was removed by syringes from the region in and around the neck incision, and also from the wooden surgical platform. The effluent was expelled into centrifuge tubes for hematocrit measurement and for calculation of washed out blood volume. During the 45 minute perfusion, body temperature fell to 3°C and the heart rate ranged between 20-30 beats per minute. Perfusion was then ended, the animal was allowed to cool further until its temperature fell to 0.5°C and its heart rate slowed to 7, and then 3 beats per minute.

The animal was 3°C or less and essentially asanguinous for 70 minutes, with approximately 40 minutes of this time spent at a temperature below 1°C. The animal was then rewarmed using a 60 W light bulb suspended a few inches from its chest. Four minutes later, when the temperature had climbed to 7°C and the heart rate began to increase, perfusion with 8 ml. of a 1:1 mixture of the previously harvested whole blood with Ringers-Dextran was begun, using a hypodermic syringe. Movement of limbs and breathing appeared 35 minutes later when the heart rate and temperature had increased even further. At this time, 5 ml. of whole blood was perfused. During this perfusion, the cannula became dislodged and the hamster lost several ml. of blood volume due to hemorrhage from the carotid. However, the carotid was elevated with a probe and quickly ligated, permitting survival (at least temporarily). During the following 90 minutes, the animal breathed on its own, opened its eyes, righted itself after being rolled over, responded to the pain of surgery when its neck was being stitched closed, responded to the rectal insertion of the telethermometer lead, and showed every sign of being conscious. After approximately 90 minutes, its breathing slowed and stopped, as did its

movement. The animal was respired artificially for an additional 30 minutes, after which time it experienced cardiac arrest and was autopsied.

Results and Observations

The final effluent following perfusion showed a packed cell volume of 0.25 ml. as compared to a total volume of 5.1 ml., which therefore represented a packed cell volume percentage, or hematocrit, of about 4.9%. This is to be compared to a packed cell volume to total volume percentage of 57.2% for whole blood withdrawn under hypothermic conditions. Thus the hematocrit had been reduced to 8.6% of normal in the final stages of perfusion. However, since the effluent in this sample was collected over a period of about 5 minutes, and was mixed with some more concentrated effluent from earlier perfusion stages which remained on the surgical platform, it is probably an overly high value, possibly more than twice as high a value as the actual final hematocrit.

Calculated another way, a 101 g. hamster can be expected to contain approximately 1/13 of its body mass as blood, or approximately 7.8 ml. At a hematocrit of 57.2%, 4.4 ml. of packed cells would be expected. We collected about 3.75 ml. of packed cells, representing 85% of the predicted total packed cell volume. At least one-half to two-thirds of the remainder was mopped up from the surgical platform using paper tissues. Therefore, at least 90% and most likely 95-98% of the blood volume had been removed by the perfusion.

The hamster survived approximately 2 hours after its first movements. Of this time approximately 90 minutes were spent in a "conscious" state. Autopsy showed a "pallid" condition within the animal, although no obvious damage was observed to any organ. This is consistent with the concept of death due to hypovolemic shock subsequent to loss of blood following hemorrhagic discannulation. Perhaps the emergency physiological responses allowing the brief survival of the animal eventually culminated in loss of vasoconstriction in the peripheral areas, possibly due to prolonged relative ischemia, with resulting central hypotension, cerebral ischemia and finally respiratory and cardiac arrest.

Discussion

The above experiment conclusively proves that the recovery of the hypothermic golden hamster after extended asanguinous perfusion is possible. Given recent observations regarding the survival of partially frozen frogs in Minnesota (*Science*, Feb. 5, 1982) during sub-zero periods in which 35% of their blood volume is ice and during which time endogenous glycerol is found within their vital organs, the addition of glycerol to our asanguinous perfusate, and its perfusion into the hypothermic hamster may produce similar results.

This project was largely sponsored by the Bay Area Cryonics

Society, with Trans Time and several individual donors also making substantial contributions. These parties, as well as most other Immortalists, are anxious to see a reversible technique developed for sub-zero suspended animation in the mammal. These results allow for the immediate initiation of hypothermic whole mammal cryoprotection studies. They furthermore allow for comprehensive analysis of the global impact of total body washout using cryonic suspension perfusates, such as used in Trans Time Phases I and II. It is with extreme pleasure that we report these results, and also strongly urge that all possible means be explored for increased fund raising. It is of paramount importance that the the present momentum of our and other research in this most critical area continue and increase.

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(Continued from page 12)

other issues as well, I was able to document for her the way in which people all over the world were acting on their intellectual views (which in this case of course meant providing for their own cryonic suspension). A third way in which I was able to be of use to her was in that battle which is well-known to a lot of immortalists: Fighting Off The Relatives. A couple of members of her family were pretty well-indoctrinated with the death-is-swell ethics which dominate all cultures, and I was able to carry a good portion of the burden of arguing with them on her behalf--not because I was more intelligent/articulate than she, but simply because I'd been through it all so many times before.

The events recounted above are still too recent to know how many converts she might add to the cryonics/immortalist cause, but as you might infer from her not letting even so severe a handicap as total blindness cripple her life or spirit, she's a very powerful personality--so she's likely to be very effective. And at the very least she herself is beginning arrangements to provide for her own cryonic suspension--and a couple of sane members of her family have now decided to do so too. Also, she's already persuaded various editors of her acquaintance to run some favorable-to-cryonics articles for their readers in the St. Croix Valley. Now if I could just get her to let us start putting her face on coast-to-coast billboards.....

"Definition of the word philosophical: a cheerful attitude assumed by everybody not directly involved in the problem."

-- BITS & PIECES

(17)

8 Jan 1983

MAR - MAY 1983 MEETING CALENDAR

ALCOR

ALCOR LIFE EXTENSION FOUNDATION

4030 NORTH PALM #304
FULLERTON, CALIFORNIA 92635
(714) 738-5569

ALCOR meetings are usually held on the first Sunday of the month. Guests are welcome. Unless otherwise noted, the time of day for the meeting is 1:00 PM.

The March meeting will be at the home of:

(SUN, 6 MAR 1983)

Marce Johnson
8081 Yorktown Ave.
Huntington Beach, CA
Tel: (714) 962-7898

DIRECTIONS: Take Interstate 405 (San Diego Fwy) to Beach Blvd. (Hwy 39) in Huntington Beach. Go South on Beach Blvd. approx. 4-5 miles to Yorktown Ave. Turn left (East) on Yorktown. 8081 is less than 1 block on the North side of the street.

The April meeting will be at the home of:

(SUN 10 APR 1983)

Paul and Maureen Genteman
535 S. Alexandria #325
Los Angeles, CA 90020
Tel: (213) 386-2265

DIRECTIONS: Depending on the direction from which you are coming, take either Interstate 10 (Santa Monica Fwy) or Hwy 101 (Hollywood Fwy) and exit at Vermont Ave. From the Santa Monica Fwy: Go North on Vermont approx. 2 miles to 6th St. From the Hollywood Fwy: Go South approx. 1 mile to 6th St. Go West on 6th 4 blocks to Alexandria. Turn right on Alexandria. 535 is the first apartment building on the West side of the street.



The May meeting will be at the home of:

(SUN, 1 MAY 1983)

Eugene Hartnell
7801 Slater Ave. Apt. #1
Huntington Beach, CA 92647
Tel: (714) 847-0936

DIRECTIONS: Take Interstate 405 (San Diego Fwy) to Beach Blvd. (Hwy 39) in Huntington Beach. Go South on Beach Blvd. approx. 2 miles to Slater Ave. Turn right (West) on Slater. 7801 is about 2 blocks on the North side of the street.



A.I.D.S.; A DISSERTATION ON THE WISDOM OF PUBLIC HEALTH

by Michael Darwin

"And now was acknowledged the presence of the Red Death.
He had come like a thief in the night. And one by one
dropped the revellers in the blood-bedewed halls of their
revel, and died each in the despairing posture of his fall.
And the life of the ebony clock went out with that of the
last of the gay. And the flames of the tripods expired.
And Darkness and Decay and the Red Death held illimitable
dominion over all."

--The Masque of the Red Death
by Edgar Allen Poe

They had warned us that the young man being transferred from the Definitive Care Unit was desperately sick, but nothing that we had been told could have prepared us for the reality we were to confront. Rick, as I'll call him here, was a 28-year old caucasian male who had been sick for approximately six months. The last three weeks of that period had been spent in the hospital where I work. When I first saw Rick, he was on a respirator, floating on a bed of air-suspended glass beads. There was almost no part of his skin or mucous membranes that looked normal. Almost every available inch of skin was covered by raised, nodular, purplish-red lesions. His groin and perineum were nothing but raw, bright red ulcers. Looking into his mouth past the endotracheal tube which coupled him to the respirator, all one could see was a white, cotton wool tufting of fungus--oral candida. In short, Rick was at death's door. Within a few hours of his arrival in the Intensive Care Unit--indeed, even before we could connect him to a dialysis machine to treat his latest complication, kidney failure--Rick passed through that door and ceased to exist.

Rick's story is rapidly becoming a common one. I have worked in health care in a variety of settings for about seven years. I have never seen anything quite as grotesque as Rick's case. Perhaps Rick's illness seems particularly horrible because it was not the result of some long, wearying battle with malignancies and chemotherapy. Six months prior to his death in the Intensive Care Unit Rick had been a healthy, muscular young man with not a care in the world. Friends and family attested that Rick had been an outgoing, healthy young man who was scarcely ever ill with anything more serious than a cold. At first glance, Rick's life and his death might seem to have little relevance to us. Unfortunately, a closer examination may convince us otherwise.

Rick died of a brand new disease called Acquired Immune Deficiency Syndrome, or AIDS for short. It is a disease which affects primarily Haitians, homosexuals, intravenous drug abusers, and hemophiliacs at this time, but which threatens to spread throughout society. AIDS is a new kind of illness, one which kills by destroying the victim's immune system thus leaving the individual prey to a wide range of infectious and malignant diseases. At first the compromise of the immune system inflicted by AIDS was attributed to factors other than infectious disease. Homosexuals, the group in which cases were first documented in mainstream medical literature, frequently use nitrate based inhalants to intensify sexual pleasure. Nitrates are known carcinogens and some studies have documented a transient depression in immune function as a result of nitrate exposure. Homosexuals are also frequent victims of venereal diseases and parasitic intestinal illnesses such as amebiasis, both of which often require the administration of drugs which might be compromising to the immune

system. In the early days of the AIDS epidemic it was hypothesized that the illness resulted from a combined assault on the immune system by a number of individually mildly compromising factors. Unfortunately, the continued exponential increase in the number of cases reported (a classic "signature" of a truly infectious illness) and recent documentation of the illness in nonhomosexuals who share no common risk factors (such as nitrate use) suggests that this society may be in the process of being invaded by new infectious illness. A paper by Kornfeld and Stouwe, et al, in the September 16, 1982 issue of The New England Journal of Medicine documented the "finding of a detectable abnormality of T-cell subsets in over 80% of the male homosexuals tested" at random. The widespread presence of this immune abnormality--a hallmark of AIDS--suggests in the authors' opinion "a greater public health problem than has generally appreciated." The 716 cases which had been reported to the Center for Disease Control (CDC) in Atlanta by November of 1982 may be but the beginning of a massive epidemic of immune suppression.

It is important to understand that AIDS is a disease of the immune system; not a cancer or a particular kind or combination of infections which ultimately cause the victims's death. In its earliest stages it appears to be characterized by depressed white blood cell counts--in particular the reversal of the ratio of two important immune system defense cells. In a normal person the ratio between AKOT4 (helper white cells) and AKOT8 (killer white cells) should be about 1.4 to 2.8. In patients with AIDS this ratio is reversed. Early symptoms of the disease often include enlarged lymph glands in the neck, groin, and armpits; a dry, nonproductive cough; persistent low-grade fever; heavy sweating at night; and unexplained loss of weight. In the absence of a competent immune system the individual is open to a wide variety of infectious and malignant disease. Some men have developed an opportunistic cancer called Kaposi's Sarcoma (KS), which prior to its appearance in AIDS victims was seen only in the Bantu of Africa, elderly Jewish men of Eastern European extraction and in transplant patients undergoing immunosuppression to preserve their grafts. In the elderly Jewish men the disease is slowly progressive and responds well to radiation therapy. However, when KS occurs in the Bantu, or in gay men, it is an aggressive illness which metastasizes early and can kill in as little as six months from the time it is first detected. It does not respond well to conventional cancer treatments and indeed appears to be accelerated by them. Others AIDS victims develop explosive infections such as milliary or disseminated tuberculosis, herpes meningitis, fungus and parasite infections of lung, brain, mucous membranes and blood, or a combination of many of these illnesses.

Vigorous treatment with antibiotics, reverse isolation procedures, and intensive intravenous nutritional support have all been ineffective in treating AIDS. The most frightening fact of all is that no one who has contracted AIDS has recovered. Joel Weissman, a Southern California physician who was one of the first to recognize AIDS, has stated that of the 25 or so patients he is currently treating for the illness, he expects all will have succumbed within a few years at most. None of Dr. Weissman's patients have shown improvement in immune function and those who have not quickly deteriorated and died have shown a gradual worsening of health.

At the time of this writing the CDC is reporting about 3 to 4 new cases of AIDS each day. During late 1982 the number of cases doubled every month. Two thirds of the cases reported so far have been in homosexual men. It seems clear that AIDS is well on its way to becoming present in epidemic proportions in the homosexual community.

The National Institutes of Health and the CDC have been discussing radical control measures to prevent the spread of AIDS such as banning gay men from

blood donation and possibly undertaking quarantine measures to prevent further spread of the illness in the community at large by those already known to be afflicted. Unfortunately, it is probably far too late for these halfhearted and impossible measures to be of much worth. AIDS has already gone beyond the bounds of a homosexual problem. Because it is an infectious illness, it has begun to penetrate the nonhomosexual community as well. While AIDS does not appear to be a highly contagious disease, it does appear to be spread the same way in which hepatitis B is spread--through an exchange of body fluids via needles, sexual contact, and blood products. Many gay men occasionally have sex with women, and many married men occasionally have sex with homosexuals. AIDS can quickly get into the heterosexual community in that way. The recent report in the December, 1982 issue of Medical World News of a female prostitute who contracted AIDS indicates that it is in the process of doing just that. But even people who have no sexual contacts are in danger; AIDS is now the second leading cause of death among hemophiliacs (second only to bleeding from hemophilia itself). In a recent New England Journal of Medicine study, 56% of the hemophiliacs tested appeared to have immunologic abnormalities associated with AIDS.

The ability of AIDS to spread through blood components and needle sticks suggests that it ultimately may become as well distributed in the population as hepatitis B currently is. This would be a major catastrophe for civilization. Consider that 28% of all surgeons contract hepatitis B in the course of their careers. Rates of infection for blood bank workers, pathologists, lab technicians, and dialysis patients and technicians are similarly high.

The cost of treating an AIDS patient from start to finish is currently about \$65,000. It is hard to imagine the impact of the greater spread of such a devastating and costly fatal illness. Whether or not this kind of spread will occur and indeed whether or not AIDS has the potential for a major infectious illness of the stature of Hepatitis B remains unknown. But we should be mindful of its potential for this kind of spread and we should be prepared to take action to protect ourselves and those we care about from contracting it.

There is a lesson for all of us, homosexuals and heterosexuals alike, in this outbreak of AIDS. It is an old lesson and one that most of us apparently forgot in our headlong rush into the "sexual revolution." That lesson is the basic one upon which all of public health and sanitation are founded. Infectious illnesses which claimed large numbers of lives have largely disappeared from the western world because we are willing to pay the costs of ISOLATING OURSELVES FROM INTIMATE PERSONAL CONTACT WITH EACH OTHER. Public drinking cups were eliminated, fecal and urinary contamination of water supplies was prevented by chlorination of drinking and pool water. Ill people were isolated and quarantined to prevent transmission of infectious agents. In short, a lot of things were done to stop infectious disease from gaining a foothold and having available the number of hosts required to set up a self propagating epidemic. It is no accident that we wash our hands after using the toilet. We don't do this to protect ourselves from our own germs but to protect other people from them. If you take for granted the effectiveness of this kind of simple isolation measure, go to Mexico where toilet paper is scarce and routine handwashing non-existent and have a few meals.

We have forgotten that sexual contact is personal contact and that we can get germs from someone's penis just as easily as we can from a public drinking cup. Whatever our sexual orientation, we will all have to relearn an old and painful lesson: promiscuity, as good as it may feel, is an unacceptable and antisocial behavior. It is unfortunate that gonorrhea, syphilis, and chlamidia were not sufficient to teach us this lesson. It will be more unfortunate still if we do not become apt pupils in our tutelage by AIDS, for it appears that AIDS is a very unforgiving teacher.

FUNDING PROBLEMS FOR THE NATIONAL INSTITUTES OF HEALTH

by Alvin Steinberg

The National Institutes of Health (NIH) funds about 2/3rds of all Federal Government expenditures for biomedical research. In 1982 alone \$1,897,526,000 was requested by scientists submitting proposals to the NIH under the Competing Research Projects Program. Of this amount, \$663,721,000 was rejected because NIH judged the proposals to be without sufficient merit. Of the proposals found eligible for funding \$695,939,000 was rejected only because of lack of money.

The approved application rejection rate under this program averaged 60.8%. Due to recent extensive cutbacks in federal funding of biomedical research it is likely that this total is even higher now. Some of these unfunded research projects are of prime interest to cryonicists and are concerned with cryobiology, gerontology, brain biology and the subcellular and molecular aspects of the dying process.

As the reader may see from the breakdown of rejection percentages given below, projects concerned with aging (NIH/Aging) and cryobiology (NIH/Diabetes, Digestive and Kidney Diseases) did not fare well.

<u>NIH INSTITUTE</u>	<u>% REJECTED DUE TO LACK OF FUNDS</u>
Aging-----	76.4%
Allergy and Infectious Disease-----	65.1%
Arthritis, Diabetes, Digestive and Kidney Diseases-----	59.0%
Cancer Institute-----	64.8%
Childhood and Human Development-----	60.8%
Dental Research-----	54.9%
Environmental and Health Sciences-----	52.5%
Eye Institute-----	47.6%
General Medical Sciences-----	59.9%
Heart, Lung and Blood-----	59.3%
Neurological, Communicative Disorders and Stroke-----	59.4%

In addition to the lack of adequate funding for the Institutes, other branches of NIH such as the Research Resources Division which make research technology available to scientists are very poorly funded and thus delivering inadequate service. Addressing this problem, the former President of New York University (who was also President Carter's Energy Secretary), Dr. Sawhill, has commented that the government "expects to find tomorrow's cures with yesterday's equipment."

To those critics who would question the worth of NIH supported projects it should be pointed out that NIH support is most frequently mentioned by American Nobel Prize Winners as having allowed them to do their Prize winning research.

We urge you to write to your two senators and your congressman asking them to fund biomedical research more adequately. You may wish to use some of the figures in this article to back up your request. We would also like to point out that it is advisable that you write several letters over a period of a few weeks or months. Many legislators don't feel that a one-time letter counts for much.

The Way Not Taken

by Robert Frost

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps a better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same.

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads onto way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I--
I took the one less traveled by,
And that has made all the difference.

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