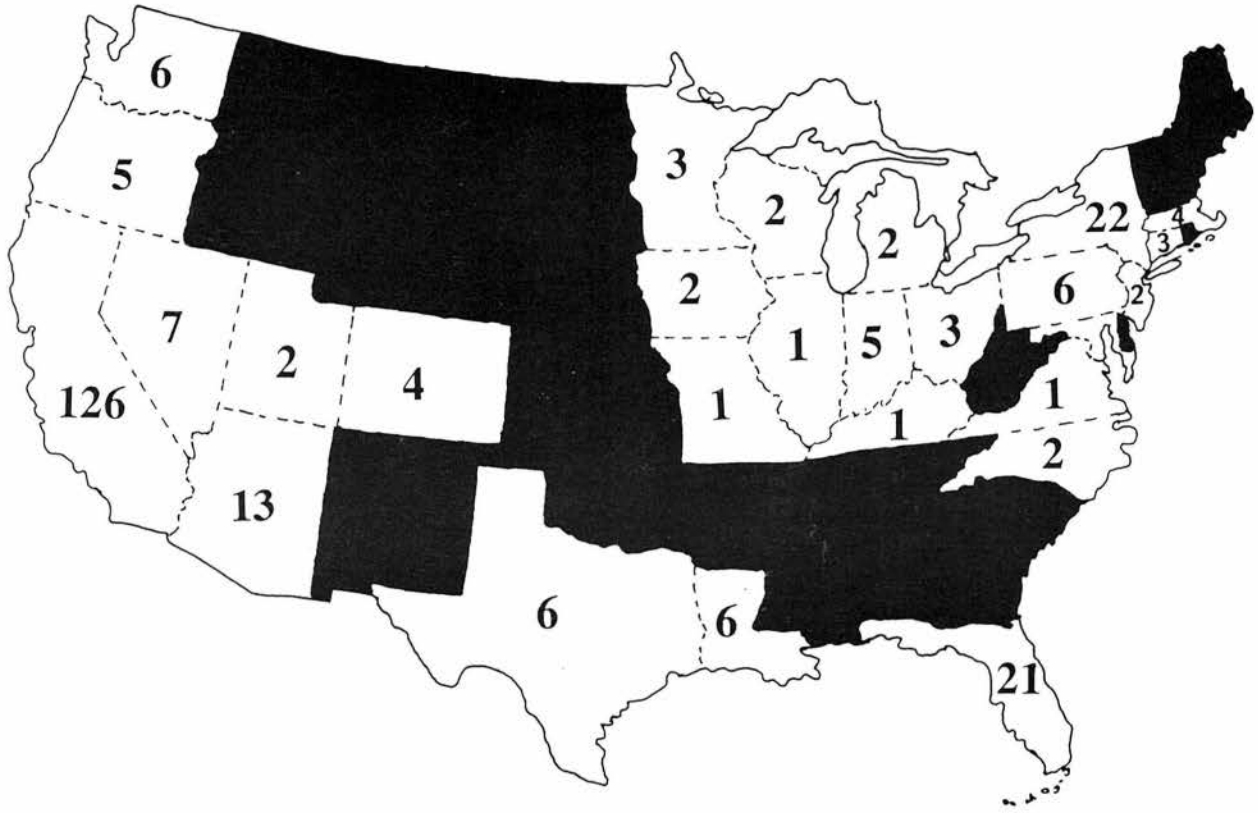
Cryonics

Volume 13(4) • April, 1992
ISSN 1054-4305 • $3.50



An Update on Membership Growth

by Ralph Whelan

Also in this issue:

- The 1991 Financial Statement (Special Insert)
- "A Touch of Human Engineering," by Thomas Donaldson
- "Sparky Enters Suspension," Pet Suspension Report by Tanya Jones

Feature Articles

Columns

Departments

Cover: *Ralph Whelan gives his annual review and predictions for the next year in this month's cover story.*

Cryonics

Volume 13(4)
April, 1992
Issue 141, ISSN 1054-4305

❄

Cryonics is the magazine of the Alcor Life Extension Foundation, Inc.

Published monthly. Individual subscriptions: $35 per year in the U.S.; $40 per year in Canada and Mexico; $45 per year all others. Back issues are $3.50 each in the U.S., Canada, and Mexico; $4.50 each all others.

Please address all editorial correspondence to ALCOR, 12327 Doherty Street, Riverside, CA 92503 or phone (800) 367-2228 or (714) 736- 1703. FAX #: (714) 736-6917. E-mail: alcor@cup.portal.com

❄

❄

Issue to press: March 9, 1992.

Submissions to *Cryonics*

Do you have comments about the articles and columns you read in *Cryonics* each month? Are they exciting? Confusing? Dull? Inspiring? And what about cryonic suspension procedures, emergency response, remote standby, the Patient Care Trust Fund, or local activism possibilities?

If there's anything you think you're unclear about, chances are you're not alone. If you write a Letter to the Editor, it gives you a chance to formalize and immortalize your questions and opinions, and it gives *us* a chance to see what we're doing right and where we need to do better.

And if a letter isn't the right format, or you're particularly motivated to write on some important issue, maybe you can submit your musings as a Feature Article. Many of our members have extensive expertise in relevant fields, and use this experience to broaden the cultural database emerging from *Cryonics* and similar publications. You can be one of them! An aspect of cryonics as exciting as any other is its *accessibility*: the field is large and intriguing enough to receive massive worldwide attention, and yet small enough to feel the impact of individual efforts. Your thoughts and observations make a difference, but only if we know about them!

For one-page submissions, simple hardcopy (printout or printed manuscript) is all you need to send. For two or more pages, a floppy disk is preferred, 5.25-inch, in Wordstar or ASCII (but please include a hardcopy!). If you use e-mail, send your letter or article to alcor@cup.portal.com, ATTN: Ralph Whelan. Be sure to indicate italics, boldface, etc., with characters that will transmit, such as #, @, or %.

For lengthy submissions, it's probably best to call and talk to me before expending any great effort (in the interest of avoiding lengthy revisions). Feel free to include some words about yourself, for inclusion at the end of your article.

Alcor v. Mitchell

Progress in Alcor's litigation against the California Health Department has been slow, but sure. This case originated when the Health Department attempted to ban cryonics in California by administrative decree. Alcor won a sweeping victory at the Superior court level in October of 1990 (see Nov. 1990 *Cryonics*). The Health Department promptly appealed that decision.

As of this writing, all of the appellate briefs have been filed and we are waiting for the appellate court to set a date for oral arguments. We do expect to win again, but unfortunately the Health Department will probably appeal to the State Supreme Court. The cost to Alcor has exceeded $100k so far.

This case is of the utmost importance to cryonicists everywhere. The lower court decision nailed down Alcor's right to contract with our members and our right to use the Anatomical Gift Act. Jack Zinn, of the International Cryonics Federation, and Constance Ettinger, of the Cryonics Institute, filed a friend of the court (amicus) brief in support of Alcor's reply to the State's appeal. The American Cryonics Society lent a hand by raising $1,880 to help pay the legal bills.

Be the First in Your State!

In putting together my article on membership demographics for this issue, I was dismayed to see that there are still 21 states with *no* Alcor Suspension Members. Twenty-one states!

Don't miss an opportunity like this. Is your state just a black blob on the map above? If so, you could be the first on your block, the first in your town, the first far-seeing person *in your entire state* to make cryonic suspension arrangements. Montana, which I now officially dub the Heart of Darkness, doesn't even have any *adjacent* states with Alcor Suspension Members! Who can lift this shroud of darkness? Who can brighten this land of pessimism where cryonicists apparently fear to tread?

Other key states are Nebraska, Kansas, and Oklahoma. An Alcor Suspension member in any one of these states would be the first in his/her state *and* the person responsible for breaking the chain of cryonicist-free states which span our country North to South and divide our East and West members — a Damnation Alley of sorts, ripe for the pickin'.

Immortalism in *The Humanist*

An essay entitled "Methuselah's Phone Number," appearing in the July/August 1991 issue of *The Humanist*, showed much of the enthusiasm and dynamically optimistic *verve* so prominent in cryonicists and immortalists in general. Author Shawn Carlson tackled the practicality and even the desirability of life extension and anti-aging, and proceeded to align these with government-funded programs already in existence, such as the genome mapping program.

Hard-core libertarians will probably find some of the article offensively "statist," but it's still an interesting and even inspiring appeal, concentrating heavily on the fundamental importance of *staying alive*, above all other things. I'll leave you with a few of Mr. Carlson's words:

"All of our medical research is aimed at extending or improving the quality of human life. What could be more central to this great goal than arresting and perhaps even reversing the ravages of aging? Our taxes already provide billions to seek ways to help the victims of AIDS and cancer. . . . Is not the possibility of adding decades (or more) of robust health to our own lives worth a similar investment in research?

"All great human achievements happen because of great dreams. We dreamed of flying, and so we conquered the air. We dreamed of traveling to distant worlds, and so we mastered space. In short, what we need is to dare to dream of *immortality* and to let that dream drive the research whose long-term goal is nothing less than conquering death by "natural causes."

Membership Status

Alcor has 307 Suspension Members, 457 Associate Members (includes 164 people in the process of becoming Suspension Members), and 20 members in suspension.

Letters to the Editor

Dear *Cryonics*,

It's quite a shock to hear that Mike Darwin will be leaving Alcor. Still, no one can deny that Mike has done more for the cryonics movement in general, and Alcor in particular, than could reasonably be demanded of any three men. He deserves a chance at a normal life.

Perhaps I can shed some light on a question Mike raised not so long ago: Why have donations to the Jones endowment been so slow in coming? I haven't donated to that fund, though I do make regular donations to Alcor. This isn't because I don't think such a fund is a good idea. It's a great idea. But I'm stuck on the horns of a dilemma: If I direct my donations toward that fund, I'll be cutting into Alcor's cash flow at the very moment when the budget is tightest! Clearly, what you guys intended in setting up that fund was that contributions toward it be in addition to the donations which make up most of Alcor's budget. But with this recession, my income has dropped precipitously. Am I going to boost my donations at a time when I'm having to tighten my own purse strings?

Well, yes, I am. I had to think long and hard about it, and you won't see that money until later in the year, when my bank account is looking healthier. Perhaps part of the problem is that $300k figure. It's very intimidating. At least until you sit down and figure that we can meet the goal if each member donates about $150 a year. I'll brown bag it.

I have a suggestion as to a value added service Alcor could provide fairly easily, to both bring in more money, and to improve conditions for the members. Many magazines do this: Offer *Cryonics* at a higher price, for those who want it sent first class and bagged. I know I'd be willing to pay to get my issue a few days earlier, and not so beat up. Sometimes it looks like they let a dog play with it! And there have been emergency appeals in *Cryonics* which were moot by the time the magazine reached me. I realize that this probably wouldn't bring in more than a few hundred to a thousand dollars a year, but neither would it be difficult to implement.

Brett Paul Bellmore
Capac, MI

I'll look into specific costs and labor associated with offering first class mailings of Cryonics *and report on it next month. Thanks for the suggestion. — Ed.*

Dear Mr. Whelan:

Mike Perry's piece on Nisco, in your March issue, quotes his daughter to the effect that I was an intermediary between her and Nelson, and that I maintained a close business relationship with Nelson, and that, in effect, when she expressed worries to me, I assured her that everything was O.K. None of this is true.

I knew very little about Cryonic Interment's affairs; I certainly never saw the advertising material in which they claimed to have completed construction of a multiple storage facility with fail-safe alarms, and phony photos etc.; in fact, I never knew of it until I read it just now in Mike's article. And I never represented, to Nisco's daughter or anyone else, anything whatever about Cryonic Interment's quality or capabilities.

What I did was two things: I told inquirers what little I did know, and my belief that Bob Nelson was honest. And I gave Cryonic Interment a little assistance on two or three occasions that I recall; I went to California with my brother Alan for the Bedford freezing; once or twice I lent them the Iron Heart, and once I went to Iowa to observe a suspension and offer what little assistance I could.

Certainly I could be faulted for not keeping a stricter watch, for not pressing Bob about his procedures and standards, and perhaps for allowing newcomers the impression that the Cryonic Interment operation was all right when there were danger signals. However, as I have said before, I had not set myself up as Big Daddy of the cryonics movement, with a right to dictate everyone's business. I had a strong impression that Bob was honest and energetic, and did not see my role as overseer or arbiter.

As I have said before, without approving the corner-cutting or misrepresentation, I still think Nelson had good intentions. He did accomplish the Bedford suspension, and if the astronaut fire had not ruined the impact of the *LIFE* article, the Cryonic Interment gamble might even have succeeded.

All this is ancient history, with virtually no current relevance to anything — except that putting me in an unnecessarily bad light could still have effects. I have made my share of mistakes, no question, but those attributed in the article were not among them.

Robert Ettinger

Thank you, Mr. Ettinger, for your clarifications in this letter. Please accept my apologies for any erroneous statements or assumptions.

I asked Mike Perry, a year and a half ago, to begin an historical column for Cryonics *that would present a more formal documentation of matters and events existing now only in the letters, file, and wetware of various cryonics pioneers. I'm both proud and enamored of the work he's done, and I'm glad to see it evoking further refinement from "first- handers" such as yourself. Mike speaks for himself on this issue below. — Ed.*

Mike Perry replies:

It is good to get this reply from Bob Ettinger, which presents his accounting of the actions attributed to him by Mrs. Bowers (Louis Nisco's daughter) in my column in last month's *Cryonics*. I see now it would have been advisable to check with Bob on the the actions attributed to him, although the quotes in question come from documents on public record, which I generally feel free to quote at will. The thought also occurred during the writing of that piece that everything Mrs. Bowers said *could* have been true (allowing for a little exaggeration perhaps, in keeping with her adversarial position toward Nelson and, secondarily, Ettinger), without imputing blame to Mr. Ettinger. If Nelson was appropriately deceptive, as the evidence shows him to have been in other ways, a lot of people could have been fooled, even close associates, and apparently many were. So I let it go at that. My apologies for any misrepresentation that may have occurred. I have no evidence that Mr. Ettinger was guilty of willful misconduct over the Nelson affair. The general tone I adopted in the article was not to treat either Nelson's or Bowers' testimony as "fact" but to let the evidence speak for itself where possible.

It is possible too that Nelson, despite his demonstrated dishonesty, did have good intentions — at any rate he seems to

have started with good intentions; however, his methods in the end proved disastrous to cryonics as well as to many people individually.

The thought also occurs that I may have unintentionally slighted some others in the article, in the brief listing of what I said were the positive contributions of CSC and its leader, Nelson. There were some useful contributions in the CSC newsletters, for instance, despite the misrepresentation of CSC's capabilities. I think it would be good to hear from others who would have additional information, comments and/or criticism. That way we will arrive at a clearer understanding of what really happened.

Letter to the Editor:

One of our major goals this year, this decade, should be, I propose, to find some way to pay those who provide capital (especially capital, but also work, land, management, etc.) in the form of tradeable "shares" in our enterprise. If we were allowed to be a for-profit corporation, we could do it. We aren't, so what similar things can we do?

Life,
Charlie Hartman

Some time ago, Fred and Linda Chamberlain devised a system for volunteers to keep track of their contributed efforts. Ultimately, this system could be used to proportionally compensate volunteers with some kind of non-monetary rewards (such as credit toward remote standby time). Up to now, none of our regular volunteers have elected to use this system, but it is available.

As for direct cryonics investment opportunities, Alcor cannot offer any stock or any other kind of equity participation. These opportunities do sometimes exist through other entities. For more information about these enterprises, contact Saul Kent at (714) 780-3252. — Carlos Mondragón

Dear *Cryonics*,

I am fully in support of Charles Platt's program for the growth of cryonics ("Selling Cryonics," Jan., 1992). I agree also that the "One-by- one" method recruitment will successfully burn out everyone currently involved in cryonics and not succeed in growing the movement. I hope I am wrong.

The mystery of the ages to me is why cryonics is not a popular alternative to death. Until we know, definitively, why people who have a basic understanding of cryonics reject involvement, we won't be able to grow.

Selling soap flakes and political candidates takes polling. We have to know what the objections are before we can offer a solution in a palatable form. A public relations firm or an ad agency would try to discover what consumer attitudes are before they launched a campaign to sell cryonics. We all have our pet theories about the failure of cryonics to catch on, but the media is too expensive a playground for a shotgun approach to marketing cryonics.

With our horrendously limited resources, I suggest we do some very directed, inexpensive testing of attitudes about the concept of cryonics to both the unaware and most importantly to the superficially initiated.

We could and should be surprised by the results and we should be prepared to accept and act on the suggestions derived from the polling. In my experience, the last part of this plan is the hardest to implement.

Accepting and acting on polling results will test our organization's resolve to grow. If we really prefer to remain outsiders — as a confirmation of some moral or intellectual superiority — we are all probably doomed to remain a fringe group and we will all probably die a needless death. At best we will receive an inferior suspension with the correspondingly inferior resuscitation.

I'm aware that this plan will take board approval as it requires sending questionnaires to our mailing list and then follow-up in-depth interviews.

As many people are uncomfortable even being recognized as having an interest in cryonics, this project will take sensitivity. I feel that consumer attitude research is vital for us to be prepared to take the next step and hire a public relations firm to aggressively promote our "death alternative."

I willingly dedicate myself to the polling part of our growth campaign because it is important and it is something I have experience with. Also, I am fascinated, as a marketing professional, and dumbfounded, as an individual, by the determined resistance of the public to the concept of cryonics.

My best as always,
Michael Paulle
New York City

Last month's Cryonics *included just such a membership poll, designed and organized by Charles Platt. The surveys will be going directly to Charles, so I suggest that you contact him to get more involved. — Ed.*

To the Editor:

It was with shock and dismay that I read of (Jan., 1992 *Cryonics*) Mike Darwin's departure from Alcor. His reason can very well be guessed — a crushing work and responsibility load. He does not have to bear that, and he should not have to. Such a mammoth undertaking as cryonics must not rely on one person. I would like to wish him all the best, and I hope he will not disappear.

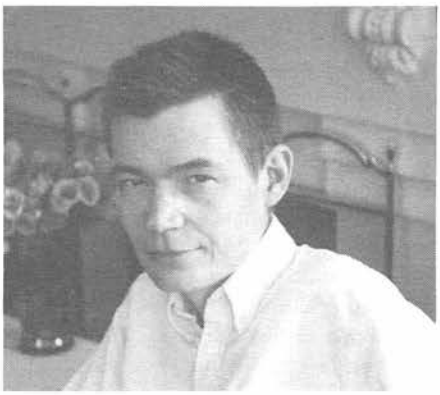
In the Dec. 1991 *Cryonics*, an article appeared in Up Front stating that the increase in incidence of melanoma (malignant skin cancer) was due to our greater exposure to sunlight. This is not evident. Melanoma often appears on parts of the body that have not been exposed to the sun. Moreover, unlike the UV-caused skin cancers, which are comparatively harmless and can be cured virtually all of the time if detected early enough, melanoma has no pronounced dependence on geographic latitude. For example, the whites of Northern Australia who have the highest incidence of UV-caused skin cancer have about the same incidence of melanoma as everyone else. Also, UV radiation has been decreasing since it has begun to be monitored in 1974, and the incidence of melanoma has increased by 800% since 1935. Because dependence on exposure and latitude is not evident, melanoma cannot primarily be caused by ozone layer thinning or UV radiation or anything to do with the sun.

My information comes from the July 1988, April 1989, and May 1991 issues of *Access to Energy*, a newsletter published monthly by Dr. Petr Beckmann (Box 2298, Boulder, CO 80306, $25/year, $27 in Canada). Prof. Fred Singer, a geophysicist at U. of VA, chief scientist at the Dept. of Transportation, pointed all this out in a letter to *Science*, which went unpublished. I wonder why.

I notice that you have been pushing yourself on publication of *Cryonics*. I got the Jan. 1992 issue on Dec. 31. Congratulations.

Yours truly,
James Wiebe

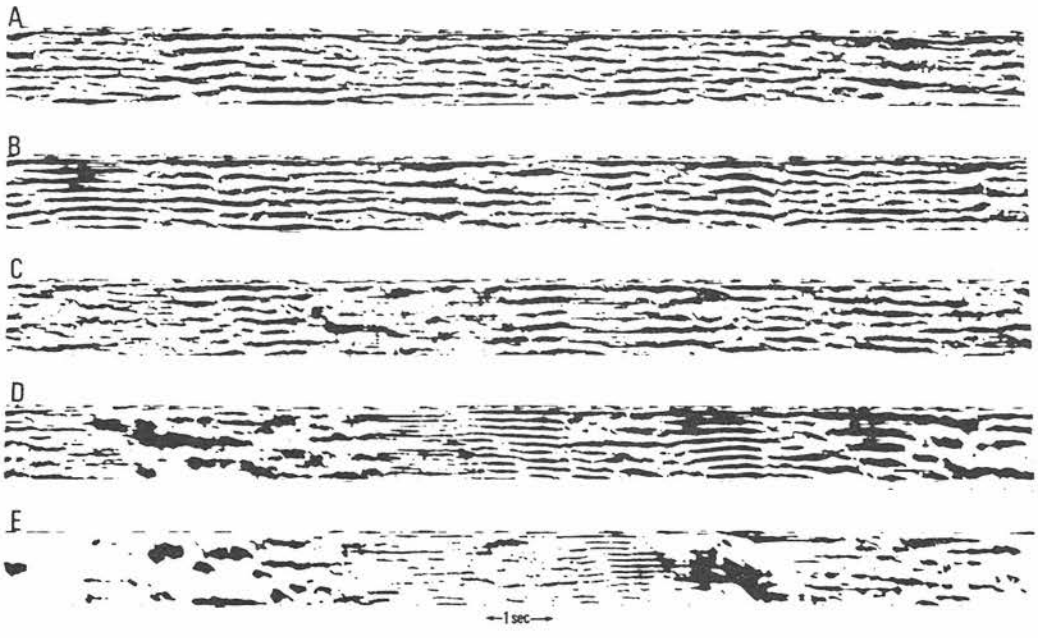
Why Cryonics Probably Will Work



Michael Perry

Will it work? is the burning question asked of cryonics, both within and outside the movement. Actually there are two closely related but distinct issues: (1) whether those in cryonic suspension *can* be resuscitated by some realizable technology (the "technical issue"), and (2) whether in fact they *will* be resuscitated (the "social issue"). A "yes" answer to (2) requires a "yes" on (1), and additional good fortune including civilization both holding together and not stupidly crushing out cryonics before our project can be completed. Question (2), important though it is, is beyond the scope of this article. What I want to focus on here is just the technical issue, question (1), although it is not independent of (2). An affirmative answer will, I think, increase the chances of actual resuscitations being carried out, and in turn possibly save many lives. If people believe cryonics is workable it will be harder for them to justify persecuting it, or for that matter, not endorsing and practicing it themselves.

Based on research already completed, I believe the chances are at least better than 50-50 that the eventual resuscitation of a person cryonically suspended under good conditions with today's technology will be possible. On technical grounds then, cryonics is probably workable. The arguments I will use for this conclusion are rather simple and do not exhaust the field of cryobiological research. Many arguments for the possible validity of cryonics exist (along with counterarguments). However the following seem particularly relevant, and not to have been stated exactly before. I will focus on what seems to be the most important work having a direct bearing on the validity of cryonics, mainly the research of Isamu Suda and colleagues with the freezing of cat brains, and briefly, some more recent work on the effects of deep freezing and ischemia. (Since this article is only a survey, many details are omitted which will be found in the references cited.)

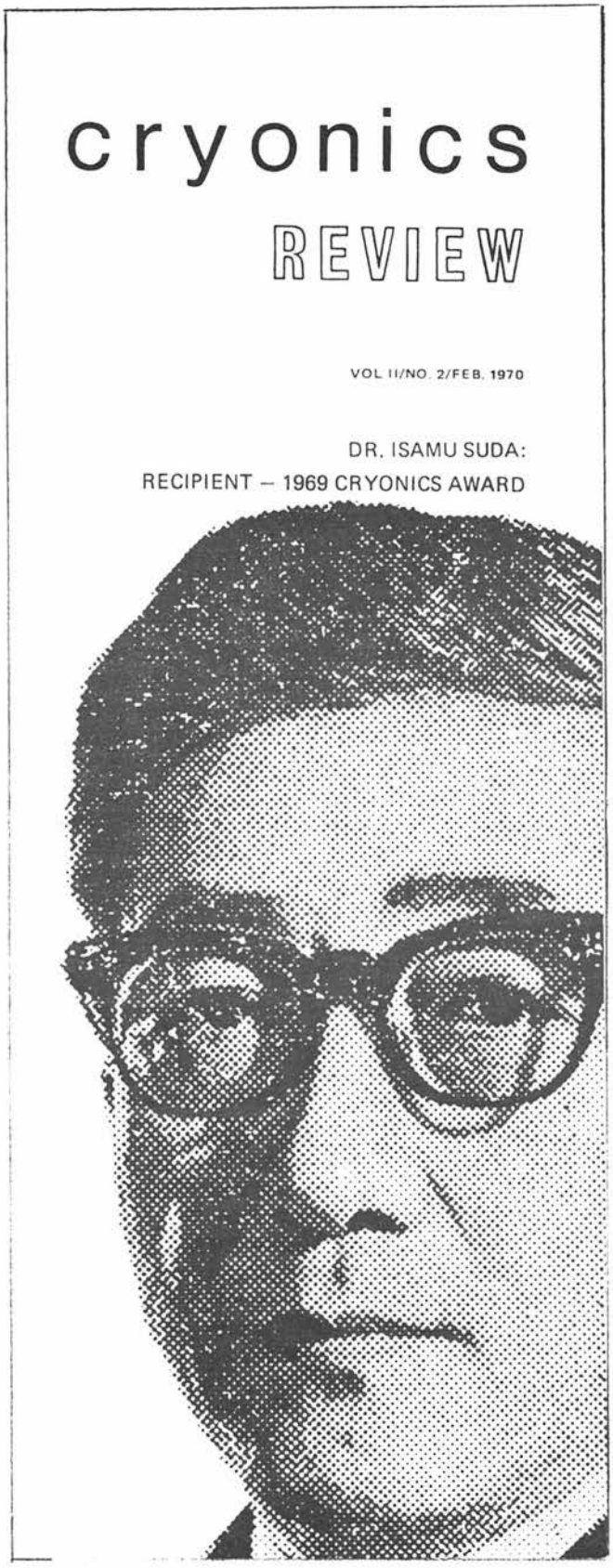


Autocorrelograms, a kind of mathematical "fingerprint," of brainwave (ECG) patterns. A:live cat; B-E: cat brains frozen to -20° C for 5 days, 203 days, 777 days and 7.25 Years, respectively, then rewarmed. Note similarity of live cat and brain frozen for 5 days (A and B).[5]

Cryobiologists study the behavior of biological systems under conditions of low temperature. On this basis it is often assumed they are the "experts" for assessing the validity of cryonics. Generally, however, cryobiologists have been doubtful, skeptical and sometimes openly hostile, even to the point of accusing cryonics of being a "cult" with no scientific foundation.[1,2,3] They base their conclusions on such factors as (1) the failure to date to demonstrate the resuscitation of large, multicellular organisms from deep freezing, and (2) emotional prejudice against the main thrust of cryonics, which is toward reversal of clinical death and attainment of biological immortality.

Freezing, of course, does inflict substantial damage in large masses of tissue, particularly when carried down to the temperature of liquid nitrogen (-196 °C), where biological activity essentially halts — such temperature being advantageous for long-term storage. It is not surprising then, that such tissue generally does not recover function on rewarming. After all, we are asking a lot through such crude thawing methods as are currently available — nothing less than for the cells to repair themselves. Although this self-repair is generally not possible, it is reasonable to expect that in the future, repair will be made *from the outside* through tiny, artificial devices (nanotechnology), and at low temperature, if necessary. The possibility of such repair means a frozen organism could have suffered considerably more damage than the minimum needed to render it nonfunctional, and still eventually be made to recover. In particular, we would expect that missing body parts could be recreated through information contained in the DNA of the remaining tissue. (Debilities caused by aging and diseases should also be curable, so the organism will emerge in a state of good health.)

What then, is the kind of damage that *would* preclude the eventual repair of cells and restoration of the original specimen to a robust, functioning state? This depends on what we mean by "the original specimen." If it is held, as it is by many, that identity, even for humans, is primarily genetic, then the requirements seem especially simple: from a copy of the DNA one could simply recreate the entire organism, including the brain. The new version of the organism will lack the earlier memories, and have small physical differences, but will still be remarkably similar. If this is sufficient, then even a single, nucleated cell of the original should be adequate to restore a functioning state. Any sizable tissue sample would contain many millions of such cells. It would probably not be necessary to store the tissue at liquid nitrogen temperature; chemical preservation at room temperature should be adequate.



Dr. Suda and his work were featured in this publication of the Cryonics Society of California.

Most of us cryonicists, however, are not satisfied with that, but demand also that memory information in the brain be preserved. For practical reasons, and because of uncertainty as to exactly which structures are essential for encoding memory, as a minimum the entire brain is normally stored in a way that will protect it almost indefinitely from deterioration: at liquid nitrogen temperature. Since the brain is a large mass of nucleated cells, it should be sufficient for the other repairs that would be needed for a functioning state. It would be reasonable to expect that an acceptable replica of the original body could be constructed from the information contained in the brain, and the old, repaired brain could be united with the new body to restore the functioning organism. Thus the workability of cryonics hinges on the question of whether memory information survives in a reasonably complete, inferable form, in a frozen brain. This brings us to the work of Suda alluded to earlier.

Looking back at this historic research, which was carried out at Kobe University in Japan in the 1960s and '70s, I don't know which to marvel at more: that it was done in the first place, or, with all the fantastic promise it showed, that it was not followed up. At any rate, results were gotten that strongly suggest, albeit indirectly, that frozen brains would retain substantial memory information.

What Suda and his coworkers did was to freeze the isolated brains of cats after perfusion with a glycerol solution, then rewarm them and test for brainwave activity.[4,5] Brains were stored at subfreezing temperatures for varying amounts of time, the object being to assess viability after rewarming, flushing out the perfusate, and restoring blood circulation. Most

important, it was found that *brains could be frozen for long periods of time, then rewarmed and exhibit recognizable function including spontaneous electrical discharge*. Identifiable brain waves were obtained after up to 7.25 years of storage at the high subfreezing temperature of -20° C, where significant deterioration still occurs. As expected, brains stored for shorter lengths of time at this temperature showed activity more like that of a live cat, indicating less damage. In fact, for a storage of 5 days, the brainwave patterns were virtually identical (see illustration).[5] It is this latter result, rather than the more long- term studies (and also the lower temperature studies, which will be discussed shortly), that seems best for arguing the case for cryonics. This is because (1) perfusion and cooling to -20° is a major step in cryonic suspension, beyond which it is arguably unlikely that substantial disruption of the information content of the frozen tissue will occur, and (2) after 5 days at -20° (far longer than is normally the case with cryonic suspension) the brain is not already substantially damaged, as demonstrated by the apparently quite good recovery of brain function on rewarming. It should be noted that, although cat and human brains are different, there is enough similarity that results obtained for the cat are a strong indication of similar possibilities for the human.

At this point it is well to consider what the brain freezing results show and do not show in terms of direct evidence bearing on cryonics. First, the brains were anesthetized — with Nembutal, a commonly used drug. All brainwave activity thus represented an unconscious state and only indirectly supports a contention that memories survived. On the other hand, since no significant change in performance could be detected in the 5-day frozen brains, it seems reasonable to surmise that memory probably *was* substantially intact, though this of course is a matter for further investigation. (It is possible that there was some unknown destructive process connected with the freezing that would selectively affect memory but leave the anesthetized brain normal otherwise, but I am discounting that as unlikely.) Finally, it should be borne in mind that the brains were only partially, not completely frozen; at -20° C, only 62% of the original liquid volume of the brain was in the solid state.[6] When brains frozen to lower temperatures were rewarmed, significant modifications in brainwave activity were found, and no activity at all could be observed in brains cooled as low as -90° C. This raises the possibility that, along with other changes impairing function, substantial destruction of memory information may occur after all as cooling below -20°, which is necessary for long-term preservation, is carried out.

How likely is this possibility? Since memory mechanisms in the brain are not fully understood, this question cannot be answered with certainty. However, quite recent and as-yet unpublished studies shed light on the changes that occur in brain tissue as it is cooled down to -130° C (below the "glass transition temperature" at which the tissue is completely solidified).[7] What is found is both beautiful and disconcerting: feathery crystals of ice are seen everywhere, displacing and isolating dark cell masses representing brain tissue. In effect, the tissue is very thoroughly fractured on a fine scale. It is small wonder, then, that brains sufficiently cooled do not resume function on simple rewarming. It is also clear that no resuscitations of presently frozen cryonics patients are likely anytime soon.

But how serious is this problem from the standpoint of the ultimate workability of cryonics? That must depend not on whether the tissue, warmed by currently available methods, is able to resume function, but on whether it is likely that the original, functional state of the tissue is inferable from the frozen remains. An important discovery bearing on this question was recently reported by G. Fahy. He found that, though the breaks in the tissue induced by cooling were numerous, *they were also very clean*.[7] There was little evidence of "stirring" or formation of debris at the cellular level. The changes instead were rather like taking apart a jigsaw puzzle, with the pieces, though small and many, still in close proximity to their original neighbors, and still intact individually. Repairs, though impossible today, should be feasible once appropriate tools are developed, much as the puzzle could be fitted back together. In short, prospects seem good for eventually inferring the original, undamaged state of the tissue. It seems likely then, that a brain frozen to the temperature of liquid nitrogen retains substantially the information it had at higher temperatures, and thus, that a whole functioning organism, complete with original memories, can be reconstructed from it.

The above conclusion, which amounts to a claim that cryonics will probably work, rests on three main assumptions: (1) what is true for cats or other mammals will hold for humans too, (2) a cat brain at -20° C retains enough identity-critical information to reconstruct the original cat, and (3) a brain does not lose substantial identity-critical information on cooling from -20° C down to the glass transition temperature and beyond. If, as an interesting exercise, we assign probabilities to each of these three, fairly independent assumptions, we can estimate the chance of cryonics working. Thus if each has a likelihood of 80% (.8) then the likelihood of all three holding, i.e. cryonics working, is .8 x .8 x .8 or 51.2%. With a likelihood of 90% for the three assumptions, the likelihood of cryonics working is 72.9%, etc.

In the above we have assumed, of course, that the freezing occurs under good conditions, that is, with no prior period of lengthy ischemia or oxygen starvation. "Without oxygen brain cells begin to deteriorate in three to four minutes," begins a recent *Discover* article.[8] However, it continues, "... Recent research has shown that lack of oxygen doesn't immediately kill brain cells. Instead it triggers a cascade of events that can take several hours to destroy the cells." It is good if a cryonic suspension can begin within three to four minutes after clinical death, as occurs under optimal conditions, but far from hopeless even if there is much longer delay.

In their first paper on the freezing and reanimation of cat brains, which appeared in *Nature* in 1966,[4] Suda and his coworkers, Kyoko Kito and Chizuko Adachi conclude that "brain cells are not exceptionally vulnerable to lack of oxygen. It appears that even nerve cells of the brain can survive and be revived after long-term storage under special circumstances." Gerald Evans, a coordinator of Evan Cooper's Life Extension Society, was moved to remark: "These scientists. . . have given us more than atomic energy, more than space travel. They have given us something, which if developed will take the supposed ineluctability of death from the world for ever."[9] Unfortunately, however, they were not cryonicists, and did not go beyond their initial and brilliant successes. It remains for us to realize the great promise of this research.

References:

1. Darwin, M. and B. Wowk. *Cryonics: Reaching for Tomorrow*, Alcor Foundation, 1991, Appendix D, p. A-39.

2. Ettinger, R. *Man Into Superman*, Immortalist Society (Oak Park, MI) 1989, p. 264.

3. Prehoda, R. "To freeze the dead or dying at this time is totally unfeasible," *Freeze-Wait-Reanimate* **27** 1 (Sep 1966).

4. Suda, I., K. Kito and C. Adachi, "Viability of long term frozen cat brain in vitro," *Nature* **212** 268 (15 Oct 1966).

5. Suda, I., K. Kito and C. Adachi, "Bioelectric discharges of isolated cat brain after revival from years of frozen storage," *Brain Research* **70** 527 (1974).

6. Darwin, M. and B. Wowk, op. cit., Appendix A, p. A-4.

7. Fahy, G., private communication.

8. Allstetter, B. "Cheating brain death," *Discover* Aug. 1991, p. 24.

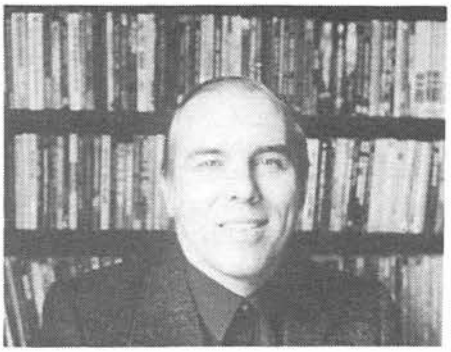
9. Evans, G., *Freeze-Wait-Reanimate* **29** 4 (Nov 1966).

Other estimates of the likelihood of cryonics working (including what has here been called the social problem) will be found in *Will Cryonics Work? Examining the Probabilities* by S. Harris, with commentary by M. Perry and T. Donaldson, available from the Alcor Foundation.

Future Tech

More on Getting There

H. Keith Henson



Sorry, but again my column is going to be on the immediate problems of Alcor rather than the future. Perhaps next time I can get back to more fun topics.

Prior to Jerry Leaf's being suspended and Mike Darwin's leaving, Alcor was well on the way to having suspensions done by "professionals," i.e., people who did cryonic suspensions as their main focus in life, and (in recent years) did enough of them so that they could get good at it. This professionalism was a substantial part of the difference between Alcor and the other cryonic organizations. After a thorough study of related fields of human knowledge, particularly cryobiology and some branches of medicine, Jerry and Mike had decided what was needed, how to go about it, and how to measure how good a job they had done. This last point, quality control, is a major problem for cryonics. We must rely on indirect ways to measure damage to our patients because the adequacy of our efforts will not be known for sure until the patients are revived.

One of the hardest parts about cryonics is knowing what level of "fidelity" will be required on the revival end of the process. If cryonics is to be worthwhile, there must be enough information left in the patients to do an adequate job of reconstructing them. Even nanotechnology-based cell repair machines cannot be expected to revive a person with their intact memory beyond some level of tissue scrambling. We can only make best guesses: the answer is decades off at least. The conservative approach is to do as little damage as possible — consistent with legal requirements — and, as always, to do it at a cost which remains within affordable limits.

Having been on recent stabilization/suspensions, and knowing enough biology to evaluate the data, I can state that in controlled situations Alcor has achieved very high-quality, i.e., very low tissue damage, cryonic suspensions for its members. Getting to this level of performance took many years of determined effort by Mike and Jerry, and substantial training/work by supporting transport and suspension team members. (Uncontrolled situations are another kettle of fish. Try not to get killed in a car wreck or die suddenly.)

It would be very painful for Alcor to be forced to aim for lower- quality suspensions.

Unfortunately, doing high-quality suspensions involves a time- critical sequence of complex tasks. A "time-critical sequence of complex tasks" is a fair description of commercial piloting, dentistry, surgery, or professional sports. There is not much room for errors or being slow on the uptake in any of these fields, and the same is true for cryonic suspensions. To do quality suspensions, we need full-time "professionals," and we barely have the resources to support volunteers.

Are there shortcuts? Could we just *hire* professionals when we need them? There are two problems with this approach. First, finding them. Association with cryonics has been extremely rough on medical people. One of the side effects of the Dora Kent suspension was a $40k legal bill to defend one of them. Second, cost. If the Donaldson case had gone our way and we could schedule suspensions, we might be able to use medical professionals. But we have to wait for days to weeks at our patients' bedsides for legal death to be pronounced. We cannot deploy expensive medical professionals this way without driving the cost of cryonics completely out of reach for most of us. Worse yet, the first few critical minutes of restoring breathing and circulation and administering damage-limiting transport medications are the most important. Fail here and all the professionals in the world will not get you a "gold standard" suspension.

Alcor is going to have to shape "cryonics professionals," or at least some very qualified non-professionals, out of what we have available: a substantial but

incomplete collection of written procedures, a lot of equipment, and a small number of volunteer transport and suspension team members who worked with Jerry and Mike. This is a lot better than nothing, but it is going to take years before we build up to a fully professional level (without a massive infusion of money).

With only one exception — the recent suspension in Canada — Jerry or Mike did blood washout at all the remote standbys. It is a general consensus among Alcor staff, medical advisors, and knowledgeable members that we should deploy field blood washout capability — at least where we have warning, and perhaps as part of the transport kits. The patients Jerry and Mike washed out in the field with tissue-preserving solutions arrived in much better shape and perfused much better than those who were not washed out. Part of this is likely due to faster cooling; as you can see from the temperature graph on patient A-1312 in the February *Cryonics*, the patient's temperature plunged once his blood was being cooled outside his body.

This means that we will have to constitute a transport team (or teams) that can use moderately complex surgical and perfusion skills in addition to the skills necessary to operate HLR machines and administer transport medications. The leadership of such a team or teams is in question as is the source of the people for the teams. Can we draw from the local teams who are already trained in some of the tasks? Is this level of skills too much to ask? We are also going to have to design and build less complex and expensive field washout equipment, and figure out how to store washout solutions. We are making progress in both training and equipment design.

If we go as far as training transport teams to do washouts, it is not a major step to training up our own cardiac-bypass technicians. We have to do this anyway because we cannot absolutely count on hired professionals to be available when we need them. Some progress is being made on learning to do the cardiac surgery. We have been looking at possible ways to simplify the procedures, but without much luck. On the other hand, we have found that ordinary surgical procedures, in particular purse-string sutures, are not as difficult as they look.

I do have one positive result to report: we have a way to make needle sticks much less likely. Needle sticks are common among operating room personnel, averaging close to one per complex operation. Considering that Alcor has suspended two AIDS cases in the past, and is likely to do more in the future, needle sticks are a very serious concern. One of the team members got a needle stick on the last (non-AIDS) suspension, and in the process of debating how to prevent sticks in the future, Hugh Hixon found the ideal device, a Vacutainer holder which hooks directly to the perfusion circuit and completely avoids using needles for sample collection.

While I do not want to generate too much member concern, I do not want to underestimate the task we have in front of us. Replacing the skills we had available is going to be very difficult.

Carlos noted in the February *Cryonics* that the quality of suspension you are likely to get from Alcor is still better than that available elsewhere. I agree with him, but I won't be happy until Alcor is back to the level we had with Mike and Jerry, or better.

Cold Comfort

Isn't That You Behind Those Foster-Grants?

Dave Krieger

Introduction

Eagerly awaited for decades, the patient awakens to the smiles and cheers of her friends and family. All possible steps are taken to ease the transition into a changed society; the patient is buffered as much as possible from the bewildering complexity of the new world, but even in this relatively familiar environment, a nagging uncertainty begins to grow. Both patient and loved ones slowly come to realize: this is not the person who went into suspension. The rejuvenated one withdraws from companions and spouse in depression and despair, forced by new tastes, opinions, and feelings to admit that she is no longer who she was, and that her former self is now lost forever.

This is a fear that nags at many cryonicists, and is often the last roadblock for those who haven't yet signed up for cryonic suspension: how do we know that the person who emerges from a cryonic suspension and reconstruction, or from other radical transformations, is the same person who went in? "Is that *me*?"

A major difficulty in this debate is the slippery notion of "identity." Disagreement on this subject often stems from underlying epistemological differences regarding the treacherous word "is." Disciples of General Semantics are fond of the maxim "Whatever you say it *is*, it *isn't*" — meaning that any verbal description of any phenomenon is insufficient to convey the totality of the phenomenon itself. At the opposite end of the spectrum, followers of Ayn Rand have elevated the tautology "A is A" to the status of divine revelation.

I submit that "identity" is not a sufficiently precise relation to be useful in discussions of cryonics. Max More prefers the term "continuity of personality." This is more precise, but still not quantitative. In this column I propose a quantitative relation that has strong analytical advantages over the vague idea of "is," at least in the realm of evaluating personal continuity.

The Problem With Identity

The word "is" serves the same function colloquially as the equals sign serves formally in mathematics, indicating that the two terms being equated both refer to the same quantity; the two terms are "identical," or "equivalent." The equals sign belongs to the set of mathematical operators known as relations; others are "is greater than," "is less than," "is relatively prime to," and so forth. An equivalence relation, like "is," is a relation which further meets these three criteria:

1) It is reflexive; that is A = A.

2) It is symmetric; that is, if A = B, then B = A.

3) It is transitive. If A = B and B = C, then A = C.

We can see that "is greater than" is not an equivalence relation: If A is greater than B, then B is definitely not greater than A.

We carry over these notions about equivalence relations into our discussions of our personal continuity. We expect the properties of the identity relation to apply to our past and future selves and to any possible duplicates and backup copies we may create, and frequently this expectation leads us into error. For example, suppose that **A** and **B** are two instances of a human being, such that **B** is a past version of **A**. It is easy to see that "is a past version of" fails to meet the symmetry criterion for an equivalence relation: if **B** is a past version of **A**, it certainly doesn't follow that **A** is a past version of **B**!

The "You-Ness" Function

In discussions on the Extropians mailing list, I proposed what I called the "You-ness" function **Y**, a mathematical expression of the congruence of two instances of a human being. The **Y** function is a more precise way of stating the relation between "you" and other bodies that may or may not be "you."

Y is defined using set notation. Suppose there are two instances **A** and **B** of the "same" human being, say, Keith Henson, for example. (We can borrow a tactic from the semanticists and employ subscripts to distinguish between them.) These might be the "same" person at different times ($\mathbf{Keith}_{'92}$ and $\mathbf{Keith}_{'84}$), the "same" person before and after a period of cryonic suspension ($\mathbf{Keith}_{before}$ and $\mathbf{Keith}_{after}$) or two concurrent Keiths produced through some molecular-level duplication process ($\mathbf{Keith}_{here}$ and $\mathbf{Keith}_{over\ there}$).

Let $\mathbf{E}_Z$ stand for the set of experiences (and memories, beliefs, values, opinions, and desires) of person **Z**. $\mathbf{E}_A$ would be the set of all events that person **A** has lived through, and $\mathbf{E}_B$ the set of all **B**'s experiences. Let the vertical bar notation $|\mathbf{X}|$ stand for the size of (i.e., the number of elements in) set **X**. So $|\mathbf{E}_A|$ is the size of the set of person **A**'s experiences. Disagreements over what categories of objects should constitute the individual members of the set **E** ("the qualities of mind that define individual personality") can be resolved by making **E** include any and all qualities that are representable in the physical state of the brain. This definition should be acceptable to all cryonicists, which is fortunate, since we cannot measure **E** directly, and probably will ever be able to do so.

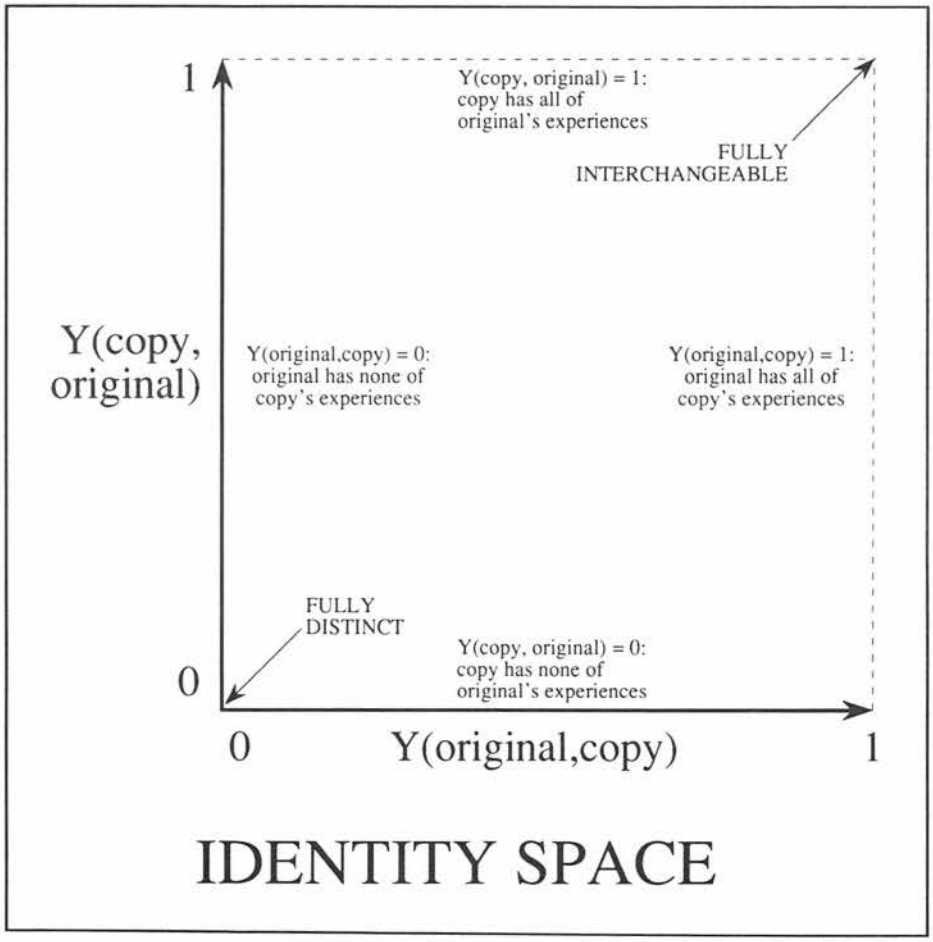
Finally, $\mathbf{X} \cap \mathbf{Y}$ is the intersection of sets **X** and **Y**, the set of all things that belong to both set **X** and set **Y**, the area where the two sets overlap. We can now define the **Y** function (the "You-ness" of **A** with respect to **B**) as follows:

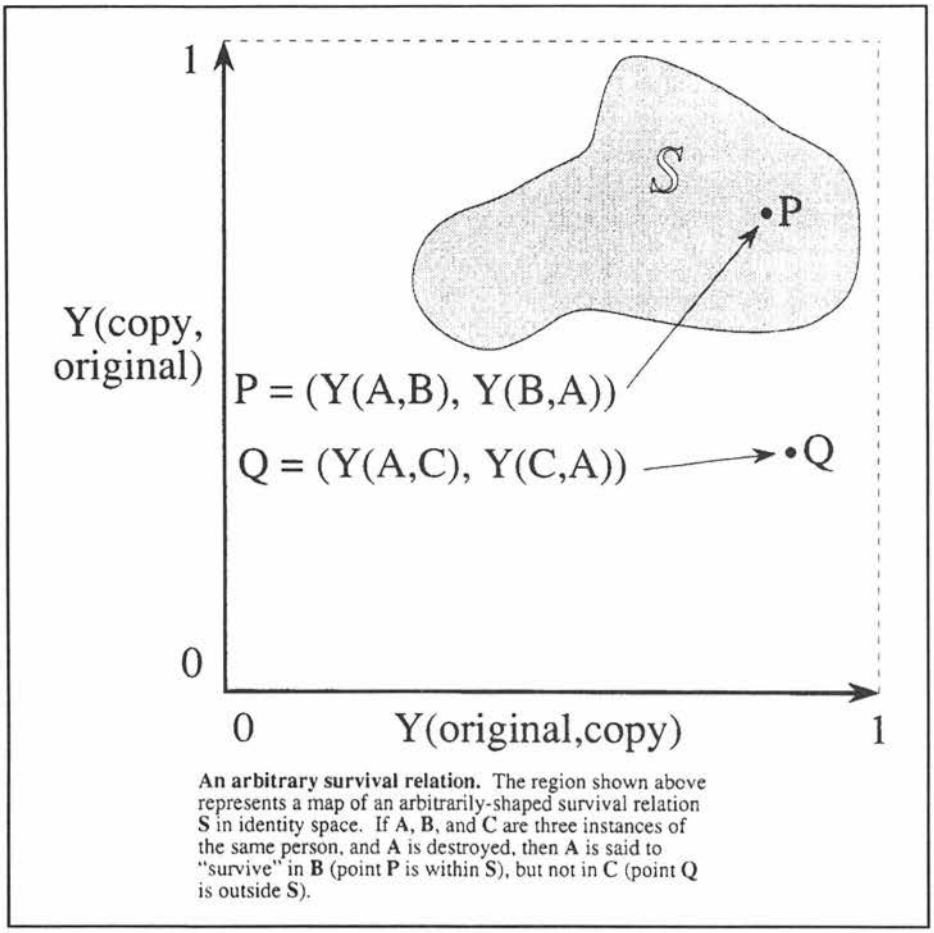
$$\mathbf{Y(A,B)} = \frac{|\mathbf{E_A} \cap \mathbf{E_B}|}{|\mathbf{E_B}|}$$

The **Y** function takes on values from 0 to 1 inclusive, and can be expressed in words in several ways:

"Y is the fraction of B's experiences shared by A."
"A has Y of B's memories."
"Y measures the value of A as an instance of B."
"Y measures how B-like A is."
"Y measures how much B is subsumed in A."
"Y measures how well A can 'stand in' for B."

Note, **Y** is a function, not a relation — it does not replace the "personal continuity" relation but provides a language to describe quantitative definitions for it. (Strictly speaking, we should assume $\mathbf{E}_B$ is nonempty in the above, and for the discussion that follows, $\mathbf{E}_A$ also.) We may not be able to measure it yet, but we can discuss it rigorously. For any two bodies, **A** and **B**, the two values of the **Y** function, **Y(A,B)** and **Y(B,A)**, together determine a point in the plane. (Fig. 1). This point is confined





An arbitrary survival relation. The region shown above represents a map of an arbitrarily-shaped survival relation **S** in identity space. If **A**, **B**, and **C** are three instances of the same person, and **A** is destroyed, then **A** is said to "survive" in **B** (point **P** is within **S**), but not in **C** (point **Q** is outside **S**).

to a square region of side length 1 (the "unit square") since values of **Y** are in the range of 0 to 1. This unit square in turn I will refer to as "identity space" since the position of a point within it, as determined from persons **A** and **B** via the you-ness function **Y**, says something about the "identity" of **A** and **B**. More specifically, it is an indication of how much the two persons should be considered the "same."

The "personal continuity" or "survival" relation **S** between **A** and **B** can now be defined in terms of a region within identity space. This follows because (1) *any* relation on the set of "persons" (the set of all possible **A**'s and **B**'s) is just a set of ordered pairs of the form (**A**, **B**) for certain **A** and **B** (those for which the relation is said to "hold") and (2) any such pair (**A**, **B**) can be mapped, via the function **Y**, to a unique point (**Y(A,B),Y(B,A)**) in the unit square. In this way it is possible, in fact, to visualize *any* relation on "persons" as some subset (region) of identity space. On the other hand, if we start with any region, we can define an associated relation as the set of all ordered pairs that map into this region. In this way we could define a survival relation **S**. In this case we would expect certain properties of the associated region, for instance, it should include the point (1,1) in the unit square corresponding to strict identity between persons **A** and **B**. (So that **Y(A,B) = Y(B,A) = 1**.)

Let's see how these thoughts could have relevance for the case of cryonic suspension and revival. If $\mathbf{Dave}_{\mathbf{frozen}}$ is the "me" who enters cryonic suspension, and $\mathbf{Dave}_{\mathbf{thawed}}$ is the "me" who emerges from the revival process, and the point defined by the two values $\mathbf{Y(Dave}_{\mathbf{frozen}}, \mathbf{Dave}_{\mathbf{thawed}})$ and $\mathbf{Y(Dave}_{\mathbf{thawed}}, \mathbf{Dave}_{\mathbf{frozen}})$ falls within the associated region for my idea of relation **S**, then I will feel that "I" have survived in the person of $\mathbf{Dave}_{\mathbf{thawed}}$. Formally, **S(A,B)** is true (**A** "survives" **B**) if the point **(Y(A,B),Y(B,A))** is in the region for **S**. The **S** relation turns the two **Y** numbers into a "yes or no" answer.

For a given survival relation **S**, the shape of the associated region (call it the "survival region") now allows cryonicists and others concerned with this topic to quantitatively define their individual views of personal continuity. More concretely I would ask, "If the body housing my present viewpoint were destroyed, but survived by body **X**, what values of **Y(Dave,X)** and **Y(X,Dave)** what do I consider sufficient to assure "my" personal survival?" This quantifies the differences of opinion on the "identity" question.

In my next column I will discuss maps of identity space and application of the survival relation to cases of molecular-level duplication, backup copying, normal growth and aging, and cryonic suspension and revival.

We Still Miss Him

By David Pizer

He was a quiet man
Yet his deeds spoke loudly
He could challenge you
He could shelter you
He held great moral values
He held no fears
He felt our pain
He shed no tears
He set standards
We will work hard to achieve them
He gave us leadership
He gave us dignity
He gave all of himself
How can we ever repay him?
He would have wanted us to have courage
Not grief
We still miss him
Jerry Leaf

ALCOR

LIFE EXTENSION FOUNDATION

FINANCIAL STATEMENTS

For the Twelve Months Ended December 31, 1991

A Special Supplement to CRYONICS *Magazine.*

ALCOR LIFE EXTENSION FOUNDATION

At year end 1991, as Alcor prepares to celebrate its twentieth anniversary, our financial statements show another level of maturity. Since we instituted our first manual accounting system in 1984, we have consistently grown in financial strength and reporting efficiency. In 1986 we computerized our accounting system. In 1989 our total assets surpassed the million dollar mark and our statements were, for the first time, prepared by an independent Certified Public Accountant. In 1991 we made the transition to a *fund accounting system.*

Fund accounting (usually used by non-profit organizations) provides us with separate balance sheet and income statement information for each part of our operations: the Patient Care Trust Fund, the Endowment Fund, the Research Fund, the General Fund, and totals for the whole organization. We now can present a clearer picture of how we are doing in every area.

One example of the advantage of fund accounting is that the shortfall in the General Fund is now plainly visible. As reported in *Cryonics*, we took steps in mid-year to reduce General Fund spending, and in fact the General Fund nearly broke even in the last quarter of 1991. The Endowment Fund was created to provide a long-term solution to General Fund needs: income from this Endowment is for use in the General Fund. Meanwhile, as the Patient Care Trust Fund continued to build strength, we created a reserve for patient care on the liability side of the Fund's balance sheet. This reserve is equal to the *current* required minimum for long term care multiplied by the patients we have in suspension, thus giving a fair picture of how well the Fund's assets match its liabilities.

Suspension Membership grew by an unprecedented 57% in 1991. We expect perhaps 30% growth in 1992. In order to continue providing the level of service which in part made these exciting growth rates possible, we must quickly recover from the recent loss of personnel key to our suspension capability. To achieve this, we will have substantial expenditures in 1992 for training--a program that is already well under way.

Overall, our assets grew by 11.3% in 1991, and our fund balances (net worth) grew by 12% (before the new Patient Care Reserve). In the year ahead, we look forward to continued financial improvement. We believe that our financial condition is an important indication of organizational stability and staying power. Management welcomes discussion of our present status and future prospects with all interested parties.

Carlos Mondragón
President

12327 DOHERTY STREET • RIVERSIDE, CALIFORNIA 92503, USA • TELEPHONE (714) 736-1703 • FAX (714) 736-6917

WARREN L. ROBERTSON
CERTIFIED PUBLIC ACCOUNTANT
405 Mission Road
Glendale, California 91205

Board of Directors
Alcor Life Extension Foundation
Riverside, California

I have compiled the accompanying balance sheet of Alcor Life Extension Foundation, a nonprofit organization, as of December 31, 1991, and the related statements of revenues and expenses and changes in fund balance and statement of cash flows for the period then ended in accordance with standards established by the American Institute of Certified Public Accountants.

A compilation is limited to presenting in the form of financial statements information that is the representation of management. I have not audited or reviewed the accompanying financial statements and, accordingly, do not express an opinion or any other form of assurance on them.

Warren S. Robertson, C.P.A.

Glendale, California
March 11, 1992

ALCOR LIFE EXTENSION FOUNDATION
BALANCE SHEET

December 31, 1991

ASSETS

	TOTAL	GENERAL FUND	PATIENT CARE FUND	RESEARCH FUND	ENDOWMENT FUND
Current assets:					
Cash, CDs, CMAs, savings	$ 712,898	$ 1,795	$691,027	$ 12,072	$ 8,003
Accounts receivable	55,517	8,611	41,000	5,907	-
Total current assets	768,415	10,406	732,027	17,979	8,003
Fixed assets less depreciation	203,839	22,543	181,296	-	-
Other assets:					
Endowment trust	360,244	-	-	-	360,244
Deferred interest	4,019	4,019	-	-	-
Investments	61,695	2,019	59,676	-	-
Patent	483	483	-	-	-
Deposit	32,860	32,860	-	-	-
Due from other funds	113,763	65,258	5,000	211	43,294
Total	$1,545,318	$137,588	$977,999	$ 18,190	$411,541

LIABILITIES AND FUND BALANCES

Current liabilities:					
Accounts payable	$ 31,241	$ 31,241	$ -	$ -	$ -
Leases payable, current	5,662	5,662	-	-	-
Total current liabilities	36,903	36,903	-	-	-
Leases payable, long term	5,963	5,963	-	-	-
Deferred suspension income	60,000	-	60,000	-	-
Patient care reserve	864,416	-	864,416	-	-
Due to other funds	113,763	43,505	16,858	53,400	-
Total liabilities	1,081,045	86,371	941,274	53,400	-
Fund balances:					
Prior years	345,351	158,831	(179,964)	21,768	344,716
Current year	118,922	(107,614)	216,689	(56,978)	66,825
Total fund balances	464,273	51,217	36,725	(35,210)	411,541
Total	$1,545,318	$137,588	$977,999	$ 18,190	$411,541

The accompanying accountant's compilation report and notes should be read with these financial statements

ALCOR LIFE EXTENSION FOUNDATION
STATEMENT OF REVENUES AND EXPENSES
AND CHANGES IN FUND BALANCES

For the year ended December 31, 1991

	TOTAL	GENERAL FUND	PATIENT CARE FUND	RESEARCH FUND	ENDOWMENT FUND
Revenues:					
Program services	$ 95,823	$ 95,823	$ -	$ -	$ -
Public support donations	97,326	97,326	-	-	-
Investment revenues	12,749	9,601	3,148	-	-
Patient care	314,354	66,920	267,434	-	-
Research	26,347	-	-	26,347	-
Endowment fund donations	1,538	-	-	-	1,538
Gain on sale	87,494	22,538	-	-	64,956
Total revenues	635,631	272,208	270,582	26,347	66,494
Expenses:					
Salaries	84,781	49,278	22,598	12,905	-
Professional fees	20,365	18,665	-	1,700	-
Legal expenses	149,731	149,146	585	-	-
Postage	10,722	9,263	504	955	-
Rent	14,913	13,616	556	741	-
Telephone	12,250	12,250	-	-	-
Depreciation	17,922	7,642	5,142	5,138	-
Education literature/events	15,437	15,437	-	-	-
Emergency response	27,386	27,386	-	-	-
Medical/other supplies	19,012	3,071	2,526	13,415	-
Bad debts	10,376	10,376	-	-	-
Liquid nitrogen	17,106	-	17,106	-	-
Suspension expense	42,774	-	-	42,774	-
Magazine expense	17,162	17,162	-	-	-
Other expenses	56,772	46,530	4,876	5,697	(331)
Total expenses	516,709	379,822	53,893	83,325	(331)
Excess revenues over expenses	118,922	(107,614)	216,689	(56,978)	66,825
Fund balances:					
Beginning of year	1,209,767	158,831	684,452	21,768	344,716
Less: Patient care reserve	(864,416)	-	(864,416)	-	-
	345,351	158,831	(179,964)	21,768	344,716
Fund balances, end of year	$ 464,273	$ 51,217	$ 36,725	$(35,210)	$411,541

The accompanying accountant's compilation report and notes should be read with these financial statements.

ALCOR LIFE EXTENSION FOUNDATION
STATEMENT OF CASH FLOWS

For the year ended December 31, 1991

Cash provided by operations:	
Excess of revenues over expenses	$ 118,922
Non-cash items included in operations-	
Depreciation	17,922
Symbex partnership loss	1,476
	138,320
Other:	
Decrease in accounts receivable	68,238
(Increase) in Endowment trust	(360,244)
(Increase) in worker's compensation deposit	(32,860)
(Increase) in other assets	(6,554)
Increase in accounts payable	31,241
(Decrease) in accrued expenses	(10,696)
(Decrease) in leases payable	(5,738)
Increase in deferred suspension income	60,000
(Decrease) in payroll taxes payable	(851)
Funds were provided by:	
Sale of DJ house-net	509,358
Funds were used for:	
Acquisition of fixed assets	(3,692)
Investment in United Kingdom facility	(28,000)
Net cash provided	358,522
Cash, CDs, CMAs, savings:	
Beginning of year	354,376
End of year	$ 712,898

The accompanying accountant's compilation report and notes should be read with these financial statements.

ALCOR LIFE EXTENSION FOUNDATION
STATEMENT OF OTHER EXPENSES

For the year ended December 31, 1991

	TOTAL	GENERAL FUND	PATIENT CARE FUND	RESEARCH FUND	ENDOW-MENT FUND
Other expenses:					
Insurance	$ 7,531	$ 7,531	$ -	$ -	$ -
Payroll taxes	8,696	7,173	902	621	-
Worker's compensation ins.	2,500	1,550	550	400	-
Sign-up expenses	7,091	7,091	-	-	-
Repairs & maintenance	3,675	2,886	755	34	-
Utilities	3,890	2,957	197	736	-
Ambulance expense	1,339	1,339	-	-	-
Miscellaneous	4,521	2,248	2,263	10	-
Other research	3,087	-	-	3,087	-
Interest expense	1,676	1,676	-	-	-
Office expense	4,269	4,269	-	-	-
Shipping	2,190	1,705	209	276	-
Taxes & licenses	1,435	824	-	611	-
Travel	1,434	1,434	-	-	-
Other	3,438	3,847	-	(78)	(331)
Total	$ 56,772	$46,530	$ 4,876	$ 5,697	$ (331)

The accompanying accountant's compilation report and notes should be read with these financial statements.

ALCOR LIFE EXTENSION FOUNDATION
NOTES TO FINANCIAL STATEMENTS

December 31, 1991

1. Summary of significant accounting policies

A summary of the Foundation's major accounting policies which have been consistently followed in preparing the accompanying financial statements is set forth below.

Investments

Donated investments are reflected as contributions at their fair market values at date of receipt.

Fixed assets

Leasehold improvements and property and equipment are carried at cost. Major additions and betterments are charged to the property accounts while replacements, maintenance and repairs which do not improve or extend the life of the respective assets are expensed in the year acquired. When property is retired or otherwise disposed of, the cost is removed from the asset account, accumulated depreciation is charged for the depreciation provided and the difference, after taking into account any salvage is charged or credited to operations.

Assets are depreciated under the straight-line method over their estimated useful lives. The following lives are used:

Leasehold improvements	40 years
Property & equipment-admin.	5 years
Property & equipment-research	20 years

Restricted funds

As shown in these financial statements, the Patient Care fund, Research fund and Endowment fund are segregated from the General fund indicating they are restricted by outside sources or the the Board of Directors. These funds may be used only in accordance with the purposes established for them.

General fund

The General fund is used for the general operation of the Foundation as directed by the officers and members of the Board of Directors.

2. Nature of the organization

Alcor Life Extension Foundation is a nonprofit California corporation, organized in 1972 to perform research and public education. The organization is recognized as a charitable entity under Section 501(c)3 of the Internal Revenue Code.

The organization's research program concentrates on improving methods of cryonic suspension. Suspension members understand that cryonics offers no guarantees of success and that as present or future suspension patients, they are subjects of a long-term research program.

The Board of Directors and management employees of the organization acknowledge that, to the best of their ability, all assets received have been used for the purpose for which they were contributed, or have been accumulated to allow management to conduct the operations of the organization as effectively and efficiently as possible.

3. Program services

In addition to its research endeavors, Alcor provides an extensive package of information free of charge to the general public upon request. This package includes an 84-page booklet and a catalog of other educational books, papers and materials available from Alcor at cost.

The organization reprints dozens of papers and articles which range in subject matter from highly technical and scientific to sociological and philosophical, all pertinent to issues of health and life extension. The organization also maintains a unique library of books and peridicals revelant to its members' interests in all aspects of life extension.

Alcor publishes an award winning monthly magazine which has several hundred subscribers, including major libraries. It is the only publication of its kind, providing scientific, sociological and economic news bearing on life extension.

The Alcor Speaker's Bureau provides informative presentations to schools, other nonprofit organizations, companies and governmental agencies about Alcor's programs and the current technical and scientific bases for predicting the health care and medicine of the future.

4. Leases payable

Capital lease obligations, secured by office equipment are as follows:

	TOTAL	CURRENT	LONG TERM
Bell lease obligation, monthly payments of $249, matures January 1993.	$ 3,164	$ 2,990	$ 174
Citicorp lease obligation, monthly payments of $223, matures February 1995.	8,461	2,672	5,789
Total	$11,625	$ 5,662	$ 5,963

5. Investments

Investments consist of the following:

Perris building	$ 2,019
Symbex partnership (see note 6)	31,676
United Kingdom building	28,000
Total	$61,695

6. Related party transactions

Alcor is a limited partner in Symbex Property Group from which Alcor leases its operating facility at $463 a month.

7. Due from 1st Pacific Bank

A $96,852 receivable due from 1st Pacific Bank as shown on prior year financial statements was offset against $86,476 in legal fees based on an agreement with the lawfirm handling the collection resulting in a bad debt write off of $10,376. The lawfirm will offset their legal fees against any monies collected.

8. Patient care reserve

During 1991 the Board of Directors approved the establishment of a liability to more accurately represent Alcor's obligation to each patient in suspension. The amount of $864,416 was transferred from the Patient

Care Fund balance to a liability account entitled Patient Care Reserve. That amount represents the currently required minimun for each patient in suspension for long term care, defined by the Patient Care Trust Fund policy as fifty times the annual patient care expense.

9. Deposit

The deposit of $32,860 represents monies being held by the Workman's Compensation Insurance Fund at the end of 1991 while the Worker's Compensation board determined Alcor's liability for worker's compensation insurance. In excess of $26,000 was returned to Alcor in early 1992.

10. Due to/from other funds

The offsetting asset and liability accounts amounting to $113,767 represents monies transferred between the various funds in the daily operation of the organization as directed by Alcor management and the Board of Directors.

An Update on Membership Growth

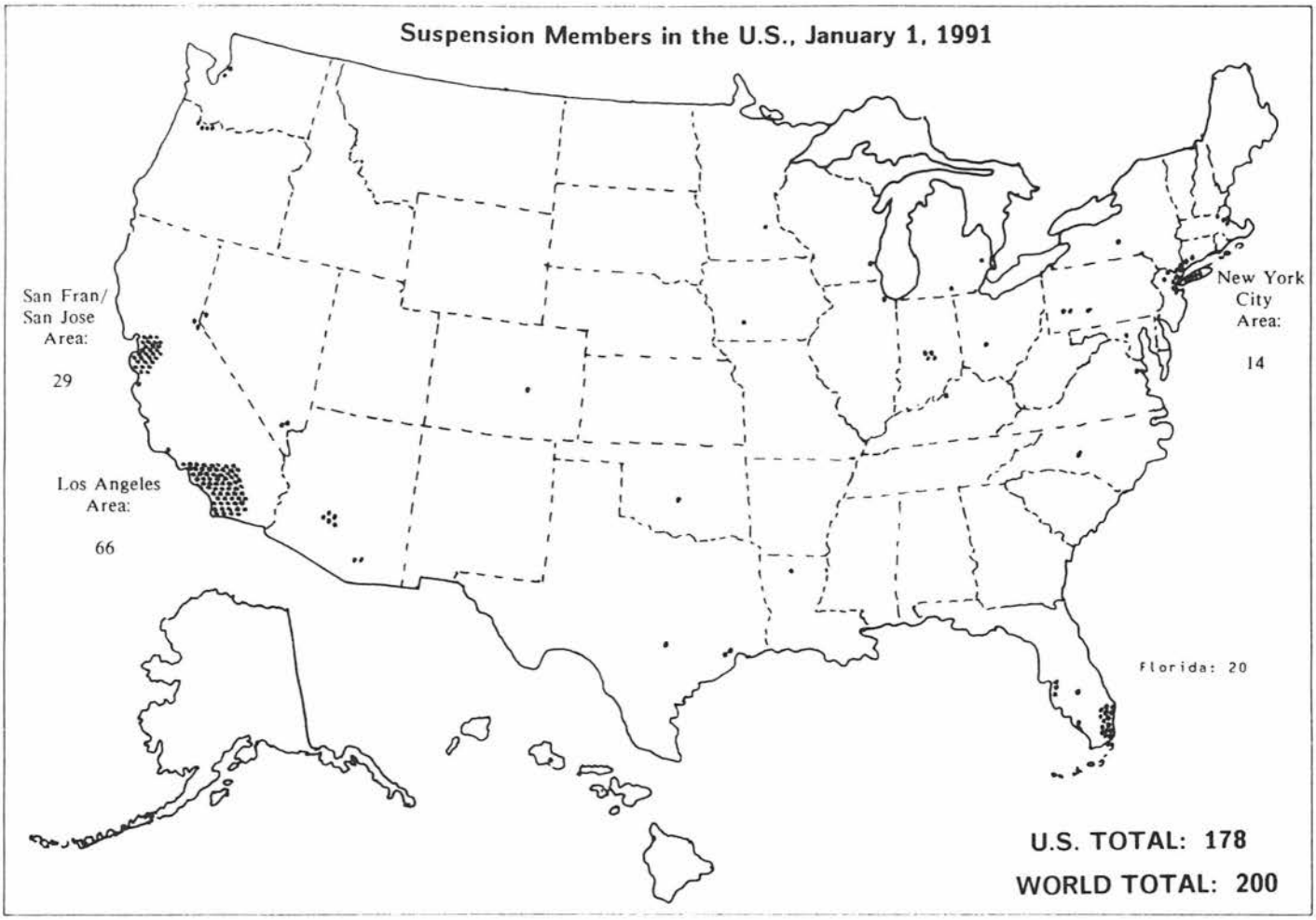
Ralph Whelan

Last year's April *Cryonics* contained an article by me entitled "When Do I Buy Alcor Stock?" which analyzed some numerical and geographic trends in membership growth over recent years. The article was written early in a year that I predicted would show unprecedented growth — at least 50% — while this article is being written early in a year that I predicted (last year) would show less but still impressive growth — between 20% and 30%.

Now, a year later, I'd like to take a more informed look at those predictions, and maybe come up with a few to check on *next* April.

First, let's look at the raw figures. A glance at the maps along the bottoms of this and the next page will be helpful. At the beginning of 1991, Alcor had 192 Suspension Members in the world. I know, the map says 200, but that was actually a miscount resulting mainly from a misunderstanding on my part. I had just taken on the job of Alcor's administrator when that 200 figure was first published, and it wasn't until weeks later that I was organized enough to realize my mistake. By the time I realized it, we really *did* have 200 members (rather than 208), so I just left it at that.

So, for the sake of complete accuracy, let's keep in mind that we started 1991 with 192 Suspension Members. Now, as I reported last year, 1987 showed an increase in membership of 16 percent, 1988 provided 14 percent, 1989 had 32 percent, and 1990 had 33 percent. The upward trend was obvious and impressive, and there was every reason to believe it would continue. When we raised the suspension minimums at the end of 1990, at least 130 people rushed into the sign-up process to beat the deadline. Based on this, I predicted that 1991 would be a year of unprecedented growth, with at least a 50 percent increase in membership. Assuming 200 members at the beginning of the year



(which I did at the time), that gave me a target of 300 members by January 1, 1992 to achieve my prediction.

Thanks mostly to copious volunteer assistance by Tanya Jones, we in fact entered 1992 with 302 members. Given that the initial figure was 192 rather than 200, this indicated an actual growth rate of just over 57 percent for 1991.

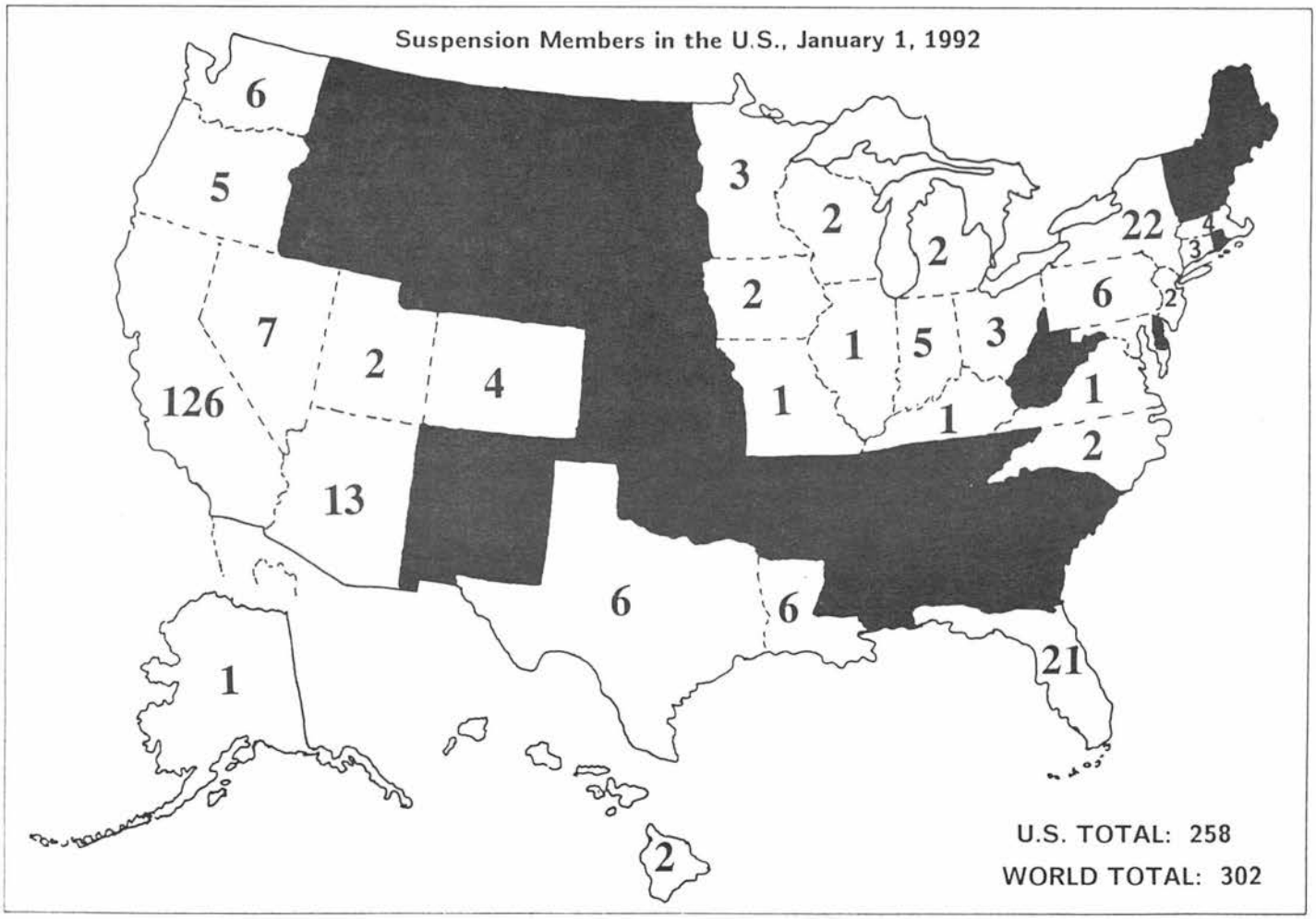
This would seem to indicate success in my prediction. However, I feel obliged to point out two things about these figures. First, I probably never would have managed 300 by year-end had I not had Tanya's assistance and Carlos' baleful looks and elephantine memory. In other words, this was something of a self-fulfilling prophecy. . . or else. Second, I must admit that the 300 figure I gave as a likely membership total by early 1992 was laughingly conservative — I thought. That is, I was practicing tactical CYA (Cover Your Aft) maneuvers in predicting far less than I *thought* we would achieve. When I took over the position 15 months ago, I naively thought that I would be slapping bracelets on people production-line style within 3 months. Surely we'd have 400 to 450 members by the end of 1991! So, while I'm proud of the work that I've done, I've gained a deep understanding of the energy and patience necessary to do this job well.

As for 1992, I said last April that "I strongly suspect that 1992 will be a year of sharp *de*celeration in membership growth." Specifically, I guessed we'd see about 25 percent growth in 1992. I stand by that now, meaning that I predict roughly 378 members by year-end 1992. If I was feeling youthful and optimistic, I'd predict 400. But I'm not; I'm feeling like covering my aft. If we make 400, that will be a growth rate of roughly 33 percent, and that's what I'd like really like to see. But last year saw 112 new members out of a pool of 231 applicants at year- beginning. Can I pull 98 out of a pool of 163 at year-beginning? Hem. . . haw. . . .

It's also interesting to examine the rate at which people have been entering the sign-up process, rather than the rate at which they've been *completing* the sign-up process. Since a fairly constant percentage of entrants will roll over into members, the sign-up entry rate is actually more indicative of the overall trend. So then, how many people entered the sign-up process during each month of 1991? The figure for January is zero, since any checks that arrived that month were treated as having arrived before December 31 because we're nice folks. The remaining months appear as follows:

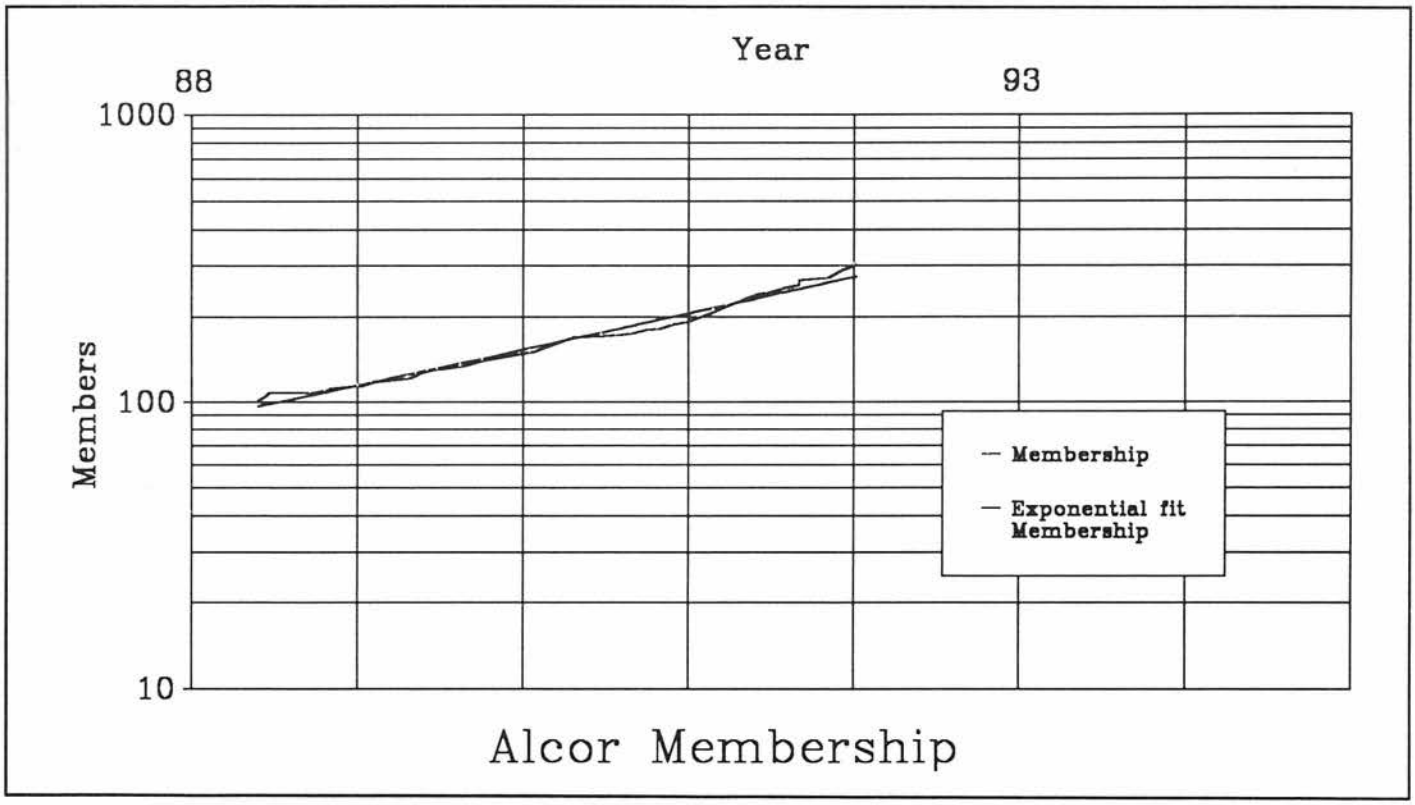
February 2
March 8
April 5
May 5
June 2
July 8
August 3
September 4
October 3
November 8
December 3
TOTAL: 51

Omitting January from the calculations, for the reason stated above, 51 divided by 11 yields an average of 4.64 entrants per month. This compares favorably with the average for 1990, which was approximately 3.5 entrants per month — so I'm told. It's interesting that the in-



crease in applicants for 1991 over 1990 is 33 percent, a figure that's suddenly popping up all over. It might be appropriate at this point to hope for an increase in the rate of applicants of 33 percent again *this* year, to match the growth rate of last year and the 33 percent increase to 400 full members that we'd like to see this year. (So much for CYA. . . .)

If 33 percent is what we want, how many applicants do we need this year, and how are we doing so far? As a total, we'd need to acquire 74 new applicants during 1992 to show a 33 percent increase over the 51 acquired during 1991. (If your math shows that as a 45 percent increase, you're forgetting that we're omitting January in our calculations; use the monthly rate of 4.64, rather than the year total.) That 74 figure for the year works out to 6.17 per month. Do we seem likely to achieve that? Well, as of this writing (March 8) there have been 17 new applicants in the year of 1992. This is 3 more than we'd need so far to meet the 33 percent minimum, so things are looking good. With the tremendous response to Charles Platt's *Omni* article (724 so far) and more good things on the horizon, I'd say we have a good chance of making it.



A Touch of Human Engineering

Thomas K. Donaldson

Of course we all want human engineering, at least in one critical respect. How else could we expect to go on forever? But right now, unfortunately, that seems far away. On the other hand, if you keep your eye out for such things, you will get a distinct impression that the range and variety of achievements made in that domain have increased steadily. Usually that increase has happened without any special notice, mainly because the proposed applications haven't really touched anything anyone could regard as fundamental. Curing cancer has very little opposition: curing aging, however, would cause a storm.

But once we understand aging, techniques invented for other problems might well be enough to apply a cure, not to mention carrying out still other changes we might like to make. With these points in mind, this article tells a bit about the current state of human engineering (theoretical and actual). What can we do now or reasonably expect to do soon? Where does the frontier presently lie?

Vectors and Retroviruses

The first problem that any proposal to change the genes in *any* living animal must solve is that of how to do it. The first method, and still the most popular, came originally from cancer research. Viruses fall into two classes, the DNA viruses (which encode their own plan in DNA) and

the RNA viruses (encoding themselves into RNA). In each case, a virus uses the machinery present in cells it infects to reproduce. The DNA or RNA is read off into a protein coat, the genetic substance is duplicated and placed inside that coat, and another virus then exists. However, some RNA viruses go even farther than that: they actually generate (again using the cell's own machinery) a special enzyme which uses the viral RNA as a template to make DNA, which the system then inserts into the DNA of the host cell. The HIV virus for AIDS provides one example; some viruses known to cause leukemia in either humans or animals provide another example.

Such a device at once raises the possibility that it might be controlled, to specifically insert a special gene into the DNA of its host cell. Since their own genetic material becomes part of the genome of their host, these viruses don't directly destroy the cells they parasitize. They may persist for years before they finally start reproducing en masse. To control them, and control the genetic change produced, turned out very simple, at least in concept. First, the RNA corresponding to a specific gene is spliced into the viral genome RNA. Second, the special sections of this genome which allow the virus to reproduce are removed. These sections generally make special enzymes (other than the critical enzymes needed to create DNA and insert it in the host).

We now have an altered virus, unable to reproduce itself but still able to insert its own genes into the nucleus of a host cell. I shall call it the vector. The third step is to grow massive amounts of this vector virus in combination with another helper virus, which provides the crucial enzymes for it to reproduce. Inject this vector virus into a subject animal and the many copies enter the subject's cells, changing their genetics as they do so.

As time has passed, scientists have devised other methods to alter cell genetics in a living animal. One method now used experimentally, which might become prominent in the future, is called electroporation. The DNA sequences are suspended in culture medium, together with the cells they are to enter. With the right electric currents passed through this medium, the cell membranes open and allow entry of the new DNA. Even direct injection of DNA into cells turns out to produce a proportion of cells which integrate this DNA into their own genetics. (The possibility that these processes or something like them may even occur naturally also raises the first serious question about Darwinian theories of evolution since Darwin himself). But as for technology, the method described at the beginning of this article still remains the principal technique. It is also the technique which caused so much mindless furor when it was first proposed. (What? Change genes in a living animal! That's infringing upon God! It must surely somehow be mortally dangerous.)

One short and serious point about all the furor these techniques originally caused: fundamentally, genetic modification is no more than another kind of surgery. I see no special moral issues to it. Like surgery, of course, it can be done morally or immorally. But any act at all raises such issues.

Some Difficulties and their Solutions

From the original proposals, the use of retroviral vectors for genes continued, though only on animals and plants. By now it has become a major technology in plant and animal breeding. But as it was originally proposed, it suffered from some quite major defects as a tool for human medicine. The major defect lay in the fact that the precise cells into which these vectors inserted their genes were not at first controllable. Vectors to insert genes for normal hemoglobin in animals with defective hemoglobins (similar to the defective hemoglobin of sickle-cell anemia in humans) failed to work as planned. Instead they inserted these genes in many different kinds of cells, brain cells, muscle cells, liver cells, all of which proceeded to make hemoglobin. Rather than a cure, they created a new pathology (this is why we use animals to test our treatments!). In general it has turned out that the major problem in genetic engineering is exactly that of directing it to the proper cells and only to them.

The time has very nearly come when virtually any specific organ can be targeted for gene transfer.

Currently several responses have been tried. One of them is to find viruses which primarily infect particular tissues. For instance, gene therapy of asthma or cystic fibrosis might be done by using vectors made from viruses infecting cells in lung tissue. A second technique very intensively studied consists of constructing, rather than simply the single gene desired, a combination of this gene with other genes normally expressed only in one kind of tissue (cf. EG Shesely *PROC NAT ACAD SCI* 88(1991) 4294-4298; SA Rosenberg, *CANCER RESEARCH* (suppl.) 51(1991), 5074s- 5079s). One of the most prominent techniques recently, because of its possible application to cancer, consists of transferring special genes to lymphocytes (white blood cells). This technique has potential applications not just to cancer, but also to several other inherited conditions, including one kind of inherited emphysema and another inherited inability to make an essential enzyme, ADA.

The basic idea behind using lymphocytes comes directly from the fact that they already contain machinery which can direct them to cluster around (and in the normal state, attack and kill) cells with particular proteins (antigens) in their cell membranes, and most important, only those cells. Furthermore, they can be grown up in culture to many times their original number. For cancer treatment this process isn't simple. One trait of many cancers is that they tend to inhibit immune reactions to them; at the same time, no one wants to create lymphocytes which do not respond to any inhibition, since they might go on not only to attack cancer cells but many other healthy cells too.

The trick here is to first culture the lymphocytes together with cells from the cancer and another hormone, Interleukin 2, which promotes their reaction to the cancer cells alone. (Lymphocytes each react to one specific chemical, not to any others; if one lymphocyte encounters such a chemical, it will divide repeatedly. For them to attack cancer cells, the chemical should be one which appears in the cancer cells and not elsewhere; such chemicals are known.) Then these cells, already primed to attack the cancer, can receive still other genes to increase the damage they will do to their target cells. For instance, one factor increasing the ability of these modified lymphocytes to attack the cancer is called TNF (tumor necrosis factor). Currently this therapy is actually being tested in human subjects. Lymphocytes taken from each patient are cultured separately in tumor tissue taken separate from that patient. The lymphocytes proliferate in culture, and survive for many months when injected into human subjects. Once injected into the

patient, the modified and cultured lymphocytes go directly to the tumor, gathering there. Their normal reaction is to kill these tumor cells; when modified to contain TNF, which they secrete at the tumor, their killing ability becomes more vigorous.

Unfortunately, right now (1992) this therapy remains experimental. A lot of work still goes on to increase the ability of these modified lymphocytes to kill their target cancers. Still, one patient with metastatic melanoma (among several tested) saw her tumors disappear and has continued alive for 11 months up to the present.

Bioengineers can grow lymphocytes easily outside the body, targeting them to some desired substance. It's also possible to modify their genes to treat some inherited diseases of the immune system. For instance, very similar methods to those used on cancer have already been used experimentally to treat a child suffering from ADA (adenosine deaminase, an enzyme) deficiency. If a child cannot make this enzyme, its immune system grows severely impaired. After a few years the child will die.

We know that lymphocytes and many other blood cells, including red blood cells, grow from undifferentiated cells (stem cells) in our bone marrow. Attempts have been made to alter these, with the aim of creating a system which would persist on its own once implanted in our body. So far, for reasons yet unknown, genetically modified stem cells do not persist. It also needs saying that stem cells have been hard to isolate; if the modified cells were actually *not* stem cells, they would grow into fully formed blood cells and eventually disappear. This seems to be a solvable problem; once solved, we would have not only permanent cures for inherited deficiencies of the immune system, but also cures for conditions such as hemophilia and sickle-cell anemia.

The Near Future and Further

The idea of seeking specific viruses which attack the tissues we want to modify is important. A little thought tells us that a lot can be done simply by finding such viruses in nature. Beyond that, the process by which a virus inserts its own genetic material in its target cell has been studied; we might see modifications of this machinery, making it respond only to certain features on the surface of the target. Such a modification would essentially mean that we had found a way to *create* a targeted virus, rather than search for one in nature.

Finally, our ability to create modified DNA sequences in which the genes will only express themselves in some specific tissue has also increased. It's now common not just to carry out this modification with a single gene, but to first add to that gene other DNA sequences aimed at causing it to work only in one specific tissue. These methods were used recently to insert human genes, which code for a protein related to Alzheimer's disease, into mice (D Quon et al *NATURE* 352(1991) 239-241). Neither rats nor mice show any condition similar to Alzheimer's disease normally; the modified animals can be used to study that condition. So far, this way of targeting gene transfer has only been used in animals, but it's certain that someone will use it in human patients in the relatively near future.

The time has very nearly come when virtually any specific organ can be targeted for gene transfer. So long as a fault derives from failure of a single identifiable gene, it will soon (no more than a few decades) become curable. That is, almost any fault due solely to *one* faulty gene will be curable. Currently, drug companies aim to design specific chemicals which often in some way emulate the character of enzymes (sometimes they *are* modified enzymes): they work to cause specific reactions. We can expect an evolution a bit like that of electronics, to a higher stage in which one major research front would be the design of entire viruses (is your virus FDA-approved?).

This ability alone will leave us facing some interesting questions. One point shown by evolutionary genetics is the importance of *polymorphism*, in which some condition persists not because it's always valuable but because it's sometimes valuable. Originally, sickle-cell anemia also gave extra resistance to malaria to any relatives of the afflicted person who carried one rather than two copies of the gene. Once we can change these conditions, we may have to ask ourselves whether we really *want* to; and the answers may force us to change our own judgments about conditions everyone now denigrates. Some evidence now exists, for instance, that a tendency to depressive illness associates with an artistic creativity much greater than average (this is not universal, but artists get it much more often than "normals"). Other kinds of brilliance may bring with them other faults.

Unfortunately, it's quite unlikely that all faults, including ones like aging, and others (less controversial!) such as deformities or susceptibility to heart disease, depend only on one specific gene. Both development and aging depend on the interactions of many genes. Furthermore, any serious genetic improvement (over our present basic design) very likely depends on more than one gene. (If that were not true, mutated genes of the desired kind would already exist). To go further than modifying single genes we must understand how a specific group of genes work together. That understanding will very likely depend on the specific genes involved, with few substantial generalizations usable for other problems. Ultimately the understanding needed goes to levels beyond that of genes, to physiology and function themselves. (And do I hear people whispering about Uploading? We cannot Upload ourselves, either, until we understand these things. There is no free lunch.)

But we also live at the start of a large project (which ultimately will prove far larger than its proponents think). This is the well-known Human Genome Project. If we hope to alter ourselves, we first need the basic information about just what our genetic structure is in the first place. The HGP will give this only in its barest form: distinguishing each gene on each chromosome as a chemical entity, without providing information about just what that gene does. That will take much more work than simply reading out a chemical sequence. I personally would not be surprised if the HGP found information which caused us to radically revise our entire concept of genetics and gene action itself.

One important fact about genetic modification is that it can also be a very powerful experimental tool for exploring just this question of how groups of genes work (or don't work) together. The problem of targeting a modification disappears when we modify an animal when it is only one cell. Strains of mice already exist that contain human genes controlling their hemoglobin type; gene transfer to make modified mice which then develop Alzheimer's disease gives an example of just what we can do now.

An ability to design viruses to specification will not itself mean that we can modify ourselves. But as an experimental tool it will give us a powerful means to understand how all our genes work together. With that understanding it becomes possible to think of modifying interconnecting systems of genes. That is the redesign to which we aim.

Cryonicists — Not Afraid, Just Angry

Fred Chamberlain

A frequent accusation by those opposing cryonics on TV talk shows is that cryonicists are "afraid of dying." My partner, Linda Chamberlain, asks if this doesn't apply to anyone who dials "911" upon noticing symptoms of a heart attack.

But it goes deeper than that. Cryonicists, as a rule, have an entirely different emotion concerning death, compared with people fleeing in panic to an emergency ward. We're not afraid; we're extremely annoyed. And we're fighting back, versus making believe death doesn't exist or giving in.

In Plutchik's model[1], rage and terror (or anger and fear) are opposites, as are disgust and acceptance, joy and sadness, and anticipation and surprise. In positive/negative reinforcement, fear is linked with withdrawal or cowering, while anger is associated with aggressive response; attack or destruction. As to physiology, fear is typified by a lowered blood pressure and pale complexion, while anger produces an opposite response.

In some fear reactions, victims deny the source of the fear, like ostriches burying their heads. The feeling "it won't happen to me," "it's not happening," or "it can't be happening" is frequently seen with cancer as well as heart attacks. Most people do not confront death, but evade the idea of it. Our culture is geared to help, with a wide variety of institutionalized fantasies about life after death. Mysticism in general seems to have a primary function of concealing the underlying terror that "there's nothing there!"

By comparison, cryonicists are not fleeing, denying or hiding from death. They are turning upon it, seeking to corner it, contain it, to utterly eliminate it. Cryonicists are staunch advocates of the idea that aging will be conquered; without this, cryonics would be meaningless. But beyond this, in maintaining as an "open question" whether their members can be reanimated, even in compromised cases, cryonicists are (far from denying death) confining it to the tightest of corners, giving no ground until such is required by the determinations of future technology that no hope is justified.

Person who do fear death and wish to deny its existence find cryonicists discomforting. Rather than facing this squarely and dealing with it, they smugly call the cryonicists "cowards" and go to their graves, perhaps with some sort of sneaking hope that a glorious sunrise in another dimension awaits them, without the necessity of cost or effort.

But reality does not provide free lunches, and wishing for an effortless, endless life in a divine realm is almost certainly no more than an overture to oblivion. Fantasizing about life after death was a grim necessity for non-stoics of past ages, where nothing whatever could be done to confront and attempt to circumvent death. Even today, the difficulties of cryonics and the uncertainties of its workability make its general rejection no surprise. But cryonicists do not fear death; rather they despise it. . . they are the first of a new society which will virtually obliterate it.

1. From *Approaches to Oblivion*, ed K.R. Scherer & P. Ekman, 1984.

Sparky Enters Suspension

Tanya Jones

Hugh Hixon: *Suspension Team Leader*
Carlos Mondragon: *Surgeon*
Tanya Jones: *Surgical assistant, Medications*
Ralph Whelan: *Perfusionist*
Paul Wakfer *Airway Management, Photographer*
Mark Connaughton: *Physiological Monitoring*
Mike Perry: *Scribe*

It was an atypically dull Thursday morning in February that we received a telephone call about "Sparky." (She and her owners have requested anonymity.) The 12 1/2 year old Airedale terrier of an Alcor couple was in a veterinary hospital with terminal cancer, and her prognosis was grim.

We requested a stay of suspension for a few days, since we had a training session scheduled for the following Saturday and wished to complete it before doing an actual suspension. But "Mr. Jacobsen" told us that Sparky's condition had deteriorated enough that to wait even *overnight* would be risking our opportunity to perform a pre-mortem suspension. (Remarkably, animals currently get better suspensions than human patients, due to our freedom to offer them premortem cryonic care.) Car-

los agreed to perform the suspension that evening, and Mr. and Mrs. Jacobsen agreed to bring Sparky to the facility at 16:30.

Sparky's vet sedated her for the trip from the vet hospital, some hour's drive away. Mr. Jacobsen was even provided an additional dose of Valium for Sparky, in case she began exhibiting signs of discomfort before she arrived at the Alcor facility. To further assist the Jacobsens with the suspension, the vet placed an IV access port in Sparky's right front leg.

They arrived promptly, and we couldn't believe that *this* dog was terminal. She looked great! It wasn't until we began petting her that we realized the extent of the cancerous deterioration. Beneath her curly coat, Sparky was emaciated. Since we were still making preparations when Sparky and the Jacobsens arrived, we tried to make Sparky as comfortable as possible during her wait. She was not impatient.

Photo: Paul Wakfer

Sparky ponders the implications of immortality.

While Sparky lay on blankets in the operating room, the team completed the preparations for her suspension. At 19:35, an initial dose of sodium pentobarbitol was administered by Carlos to ease his task of shaving of all the fur from the areas of operation. As Hugh placed an endotracheal tube, to ease the administration of other medications, the remaining preparations for surgery and perfusion were completed. A second dose of sodium pentobarbitol was given directly before she was placed on the operating table. Carlos and I scrubbed for surgery. Due to our not having placed disposable, sterile hand wipes out for use beforehand, Carlos and I had to dry our hands on surgical drapes before donning the sterile gloves. This left us two towels short for surgery. We also discovered that we'd scrubbed too soon, and found ourselves observing the last minute preparations, rather than assisting.

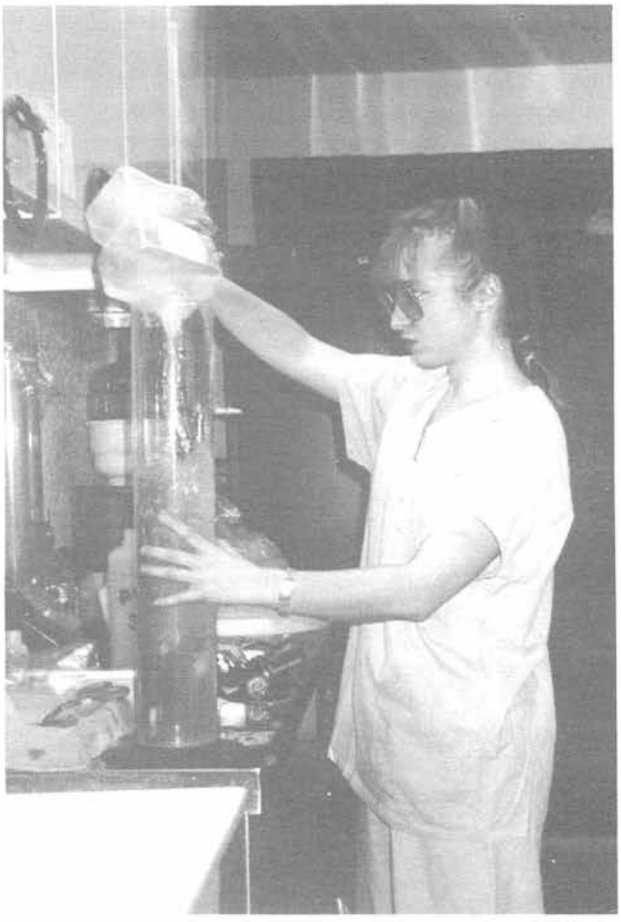
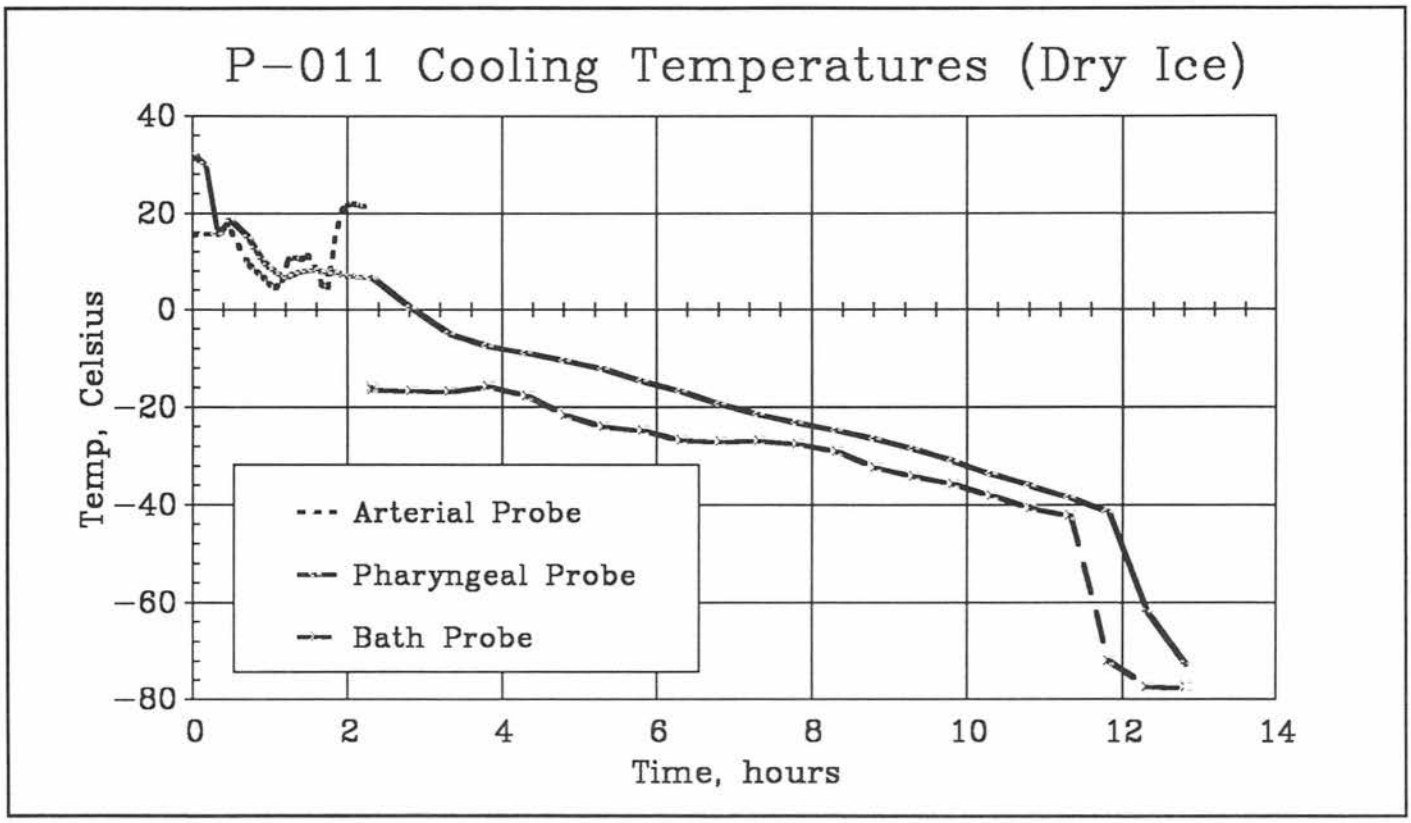


Photo: Paul Wakfer

Tanya mixes perfusate in preparation for the suspension.

Once Sparky was securely positioned on the operating table, Paul began administering the medications which I had laid out earlier. Because Sparky was receiving premortem care, not all of her medication could be given at the beginning of the operation. (The usual dosage of heparin, for example, would have made operating more difficult due to its anti- coagulation properties.) Sparky was draped for surgery, and at 20:16 we began the femoral cutdown. Our progress proceeded rapidly, and after 41 minutes, we had successfully exposed and cannulated the right femoral artery. I found that operating on a dog is *much* easier than working on the pig models we currently use for training. Several things of note occurred during that 41 minute interval.

Our cutdown *began* on the left side, but a subsequent nick in a bifurcation of the femoral artery, although completely clamped within five seconds, encouraged us to expose the right side for potential bypass cannulation. We were giving ourselves a choice of which side would be better for the bypass circuitry. Cannulation of the left side was preferable, and it went quickly. Unfortunately, we were all concentrating on the surgical aspects of the procedure and failed to notice that I had mistakenly cannulated the right femoral vein with the *arterial* cannula. A minor error, this was rectified within two minutes and the subsequent arterial cannulation (with a new arterial cannula) followed without difficulty. Returning to the left side, we placed a pressure monitor in the femoral artery. Next, the bypass circuit was connected, and we were making the final preparations to begin the blood substitution. Cannulation and connection of the bypass circuit went extremely smooth-



ly. The few errors that we made were quickly and efficiently handled. None of the errors resulted in damage to the patient, as was to soon be evidenced by the excellent perfusion Sparky was to receive.

During the cannulations and monitor placement, Hugh and Ralph were running the perfusion pump through a loop that didn't flow through the patient, making certain there were no leaks or errors in the tubing arrangements of the lines. Hugh accidentally clamped this circuit, and the hose blew off the top of the oxygenator. Ralph replaced the line and re-established the circuit within five minutes. This served to emphasize the importance of communication between people in the surgical field and the perfusionist.

Photo: Paul Wakfer

Sparky is anesthetized by Carlos, with Tanya's assistance.

Then the next complications: Sparky's heart began displaying erratic behavior. Her heart started and stopped until full cardiac arrest occurred and normal rhythms were no longer spontaneously reoccurring. At 22:14, she was unrevivable. At any other time during the surgery, this would have been more inconsiderate of Sparky, but we were completely hooked up for bypass and were about to stop her heart ourselves with the perfusion. While the final preparations for perfusion were made, Ralph Whelan began rapid chest compressions to keep the blood circulating, and Paul Wakfer began bagging the airway to maintain her oxygen levels. Mark Connaughton quickly packed Sparky's head in ice. Mild hypothermia compromised her strength, as her temperature was hovering around 30°C at this time. The hypothermia surely contributed to her early arrest, but it was a trade we were willing to accept in that any resultant ischemic damage was lessened by the low temperature.

It was a full fifteen minutes before we discovered that there was another reason contributing to Sparky's cardiac arrest: incorrect placement of the surgical drapes. Apparently we hadn't correctly placed the surgical drapes, nor did we properly secure them to the patient. As a result, when Carlos attempted to secure the bypass tubing

in a convenient holder and secure that holder to the drapes, the arterial cannula punctured the wall of the artery. Very little volume was lost through the wound, and Carlos rapidly used the hole to re-cannulate the artery. By 22:42, Sparky was on bypass.

We were happy with the return we began receiving. Sparky's tongue even began returning to a healthy shade of pink, quite the change from the pale blue noticed during the chest compressions. By the time the perfusion was complete, Sparky had achieved an apparent glycerol concentration of 4.66M (venous). A high concentration of glycerol is desirable, as it is the primary cryoprotective agent for the cells. We strive to achieve a concentration above 4M. Sparky exceeded that goal. Substantial ocular dehydration was another sign of her good perfusion. The perfusion was halted at 23:59, and the cephalic isolation took place shortly thereafter.

As the first one without the services of both Mike Darwin and Jerry Leaf, Sparky's suspension went better than anyone had hoped. We all want more practice before we are faced with a human patient, and we'll work to see that we get it. Sparky's suspension came at a good time for us to test the training we've already completed, and we were all pleased at how well things came together. Perhaps the unexpected nature of this suspension and the fact that Mr. and Mrs. Jacobsen were reluctant to postpone the procedure did us at least as much good as any delay would have.

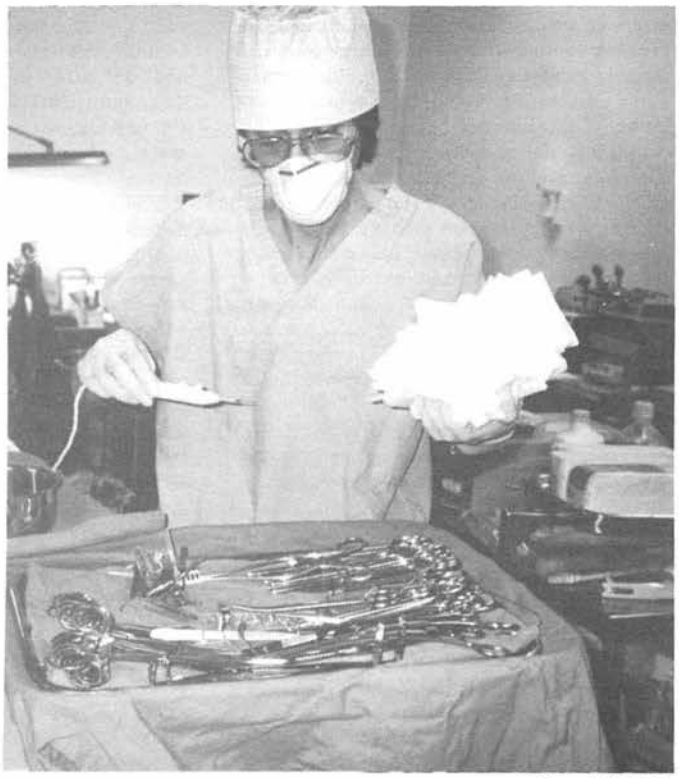


Photo: Paul Wakfer

Carlos makes the final adjustments to the surgical tray.

Recent Abstracts of Interest

Blumenthal JA Emery CF Madden DJ Schniebolk S Walsh-Riddle M George LK McKee DC Higginbotham MB Cobb FR Coleman RE

Long-term effects of exercise on psychological functioning in older men and women.

J Gerontol 1991 Nov;**46(6)**:P352-61

The purpose of this study was to determine the psychological, behavioral, and cognitive changes associated with up to 14 months of aerobic exercise training. For the first 4 months of the study, 101 older (greater than 60 years) men and women were randomly assigned to one of three conditions: Aerobic exercise, Yoga, or a Waiting List control group. Before and following the intervention, all subjects completed a comprehensive assessment battery, including measures of mood and cognitive functioning. A semi-crossover design was employed such that, following completion of the second assessment, all subjects completed 4 months of aerobic exercise and underwent a third assessment. Subjects were given the option of participating in 6 additional months of supervised aerobic exercise (14 months total), and all subjects, regardless of their exercise status, completed a fourth assessment. Results indicated that subjects experienced a 10-15% improvement in aerobic capacity. In general, there were relatively few improvements in cognitive performance associated with aerobic exercise, although subjects who maintained their exercise participation for 14 months experienced improvements in some psychiatric symptoms. However, the healthy subjects in this study were functioning at a relatively high level to begin with, and exercise training may produce greater improvements among elderly with concomitant physical or emotional impairments.

Vaillant GE

The association of ancestral longevity with successful aging.

J Gerontol 1991 Nov;**46(6)**:P292-8

A cohort of 184 men from socioeconomically advantaged ancestors has been followed from ages 18 to 65. In order to test the hypothesis that ancestral longevity would predict both mental and physical vigor, the men's physical and psychosocial health have been prospectively monitored, and the age at death of their parents and grandparents obtained. Ancestral longevity was strongly predictive of chronic illness at age 60 +/- 1 years and mortality at age 68 +/- 1 years. Long-lived ancestors, however, exerted little effect in predicting psychosocial vigor and mental health at age 65.

Nagaraj RH Sell DR Prabhakaram M Ortwerth BJ Monnier VM

High correlation between pentosidine protein crosslinks and pigmentation implicates ascorbate oxidation in human lens senescence and cataractogenesis.

Proc Natl Acad Sci U S A 1991 Nov 15; **88(22)**:10257-61

Pentosidine is a recently discovered protein crosslink, involving lysine and arginine residues linked together in an imidazo [4,5,6] pyridinium ring formed by a 5-carbon sugar during nonenzymatic browning (Maillard reaction). The presence of high ascorbate levels in the human lens and its ability to undergo nonenzymatic browning led us to investigate pentosidine formation in the aging human lens. Incubation of lens crystallins with ascorbate and its oxidation products dehydroascorbate and 2,3-diketogulonate leads progressively to the formation of pentosidine crosslinks in the presence of oxygen. Under nitrogen, however, pentosidine forms only from 2,3-diketogulonate or xylosone, a degradation product of 2,3-diketogulonate. A high correlation between pentosidine crosslinks and the degree of lens pigmentation is noted in cataractous lenses. Pentosidine is found to be primarily associated with alpha-crystallin fractions of 300-5000 kDa. These results suggest that redox imbalance in cellular senescent systems such as the ocular lens may lead to irreversible ascorbate oxidation and protein crosslinking by xylosone. This mechanism may play an important role in the pathogenesis of "brunescent" cataracts.

Fahy GM

Short-term and long-term possibilities for interventive gerontology.

Mt Sinai J Med 1991 Sep;**58(4)**:328-40

Worldwide demographic trends, including the

aging of the human population and the steadily declining fertility rate in developed nations, are creating enormous economic pressures due to the ever-increasing demand for health care services for the elderly and the ever-decreasing ability of the young to pay for these services. An attractive cost-containment strategy is accelerated research on basic molecular mechanisms of aging and rapid clinical application of the results. This approach should result in maintenance of health and productivity over a longer fraction of the lifespan and thereby to a reduction in the ratio of health care expenditures to lifelong earnings. This strategy should lead to many important improvements in the human condition. Sooner or later, our armamentarium will be supplemented by powerful and useful tools from the field of molecular engineering. With proper care, both these developments may help us to live longer, healthier, happier lives.

Engberg G Elebring T Nissbrandt H
Deprenyl (selegiline), a selective MAO-B inhibitor with active metabolites; effects on locomotor activity, dopaminergic neurotransmission and firing rate of nigral dopamine neurons.
J Pharmacol Exp Ther 1991 Nov;**259(2)**:841-7
Utilizing behavioral, biochemical and electrophysiological methods, central effects of the monoamine oxidase-B inhibitor deprenyl (selegiline) were analyzed. Administration of deprenyl (3-30 mg/kg, i.p.) caused a dose-dependent increase in the spontaneous locomotor activity. In the striatum, deprenyl (10 and 30 mg/kg) changed the dopa accumulation following 3-hydroxybenzylhydrazine hydrochloride in a biphasic manner. Deprenyl slightly decreased the firing rate of dopamine-containing neurons in substantia nigra, zona compacta. However, increases in locomotor activity and dopa accumulation induced by deprenyl were almost totally prevented by pretreatment with the microsomal liver enzyme inhibitor proadifen hydrochloride (50 mg/kg, i.p., 30 min), indicating that metabolites of the drug are of pharmacological significance for deprenyl's central actions. Furthermore, administration of l-methamphetamine, a major metabolite of deprenyl, affected spontaneous locomotor activity and striatal dopa formation and the firing rate of dopamine-containing neurons in the substantia nigra within the same magnitude as deprenyl itself when given in doses relevant to the formation of l-methamphetamine from deprenyl. However, unlike the effect of deprenyl, the l-methamphetamine-induced increase in locomotor activity and striatal dopa formation was not antagonized by pretreatment with proadifen hydrochloride. The data suggest that the stimulatory effect on locomotor activity and dopamine synthesis is not related to a monoamine oxidase-B blocking action of the drug or to a putative effect on DA reuptake, but rather to effects of metabolites of the drug (e.g., l-methamphetamine). It is proposed that metabolites of deprenyl should not be disregarded to account for the clinical benefits of the drug.

Pitsikas N Garofalo P Manfridi A Zanotti A Algeri S
Effect of lifelong hypocaloric diet on discrete memory of the senescent rat.
Aging (Milano) 1991 Jun;3(2):147-52
The memory retention abilities of aged rats fed different diets were assessed in two different avoidance tasks. The standard passive avoidance procedure revealed an age-related memory impairment in old rats fed a standard diet (ST), whereas old rats fed a hypocaloric diet (HY) behaved similarly to young animals. To clarify whether this deficit could be attributed only to cognitive decay and not other factors, such as the tendency of old rats to prefer darkness to light more than young and adult animals, a multiple passive avoidance task was performed. This test offers rats the possibility to escape to a dark chamber in which they have never been shocked, and thus provides a means of checking factors other than memory retention abilities. All the old rats showed a more marked preference to escape to darkness compared to young and adult animals. However, senescent animals fed a ST diet had poor memory retention abilities compared to aged animals fed the HY diet, and young and adult rats. The results of this test confirmed the findings of the standard passive avoidance task.

Dluzen DE McDermott JL
The effect of long-term treatment with deprenyl on basal and L-dopa evoked dopamine release in vitro from the corpus striatum of aged rats.
J Neural Transm Gen Sect 1991;**85(2)**:145-56
In the present experiment, male rats (15-17 months) were injected with deprenyl (0.25 mg/kg) three times per week for six months. At 21-23 months of age the male rats were sacrificed, the corpus striatum removed and superfused in vitro. Basal and evoked dopamine and DOPAC levels, as obtained with either two infusions of L-dopa (L-dopa/L-dopa) or L-dopa followed by amphetamine (L-dopa/AMPH), were measured from effluent superfusion samples and compared with values obtained from similarly aged animals treated identically with saline and from that obtained with young (2-4 months) animals. Treatment with deprenyl resulted in significantly greater basal dopamine and significantly lower basal DOPAC output compared with basal release levels from saline-treated aged rats and young animals. Responses to L-dopa/L-dopa or L-dopa/AMPH evoked dopamine and DOPAC release did not differ between deprenyl and saline-treated aged rats, however, both groups showed a significantly reduced response profile to these stimulations (L-dopa/L-dopa or L-dopa/AMPH) compared to that of young rats. These results indicate that the selective Type-B monoamine oxidase inhibitor, deprenyl, exerts a basic change in dopamine metabolism within the corpus striatum of aged rats resulting in an increase of endogenous dopamine and a decrease in endogenous DOPAC output.

Advertisements, Personals, Meetings and Announcements

Advertisements And Personals

The Alcor Life Extension Foundation *and* Cryonics *reserve the right to accept, reject, or edit ads at our own discretion and assume no responsibility for their content or the consequences of answering these advertisements. The rate is $8.00 per line per month (lines are approximately 66 columns wide). Tip-in rates per sheet are $90 (already printed and folded); or $180 (printed one side) or $270 (printed both sides), from camera-ready copy. Tip-in ads must be clearly identified as such.*

MARY NAPLES, CLU and BOB GILMORE — CRYONICS INSURANCE SPECIALISTS. New York Life Insurance Company; 4600 Bohannon Drive, Suite 100; Menlo Park, CA 94025. (800) 645-3338.

EXTROPY: The Journal of Transhumanist Thought, #8. Ideas Futures Markets, Dynamic Optimism: Epistemological Psychology, Artificial Life, more Futique Neologisms, Extropia: An Evolving Extropian Community, Human-Transhuman-Posthuman, reviews of new Drexler and others. $4/issue from *Extropy*, PO Box 77243, Los Angeles, CA 90007-0243. E-mail info from more@usc.edu.

Do you want to keep up with science and technology bearing on cryonics? ***PERIASTRON*** is a science newsletter written by and for cryonicists, only $2.50 per issue. ***PERIASTRON***, PO 2365, Sunnyvale CA 94087.

In So. Cal. call Dave Montoya, agent Kachok & Co. Ins, Inc. 619-587-2727 or 714-674-0151. Serving locally since 1961.

Meeting Schedules

Alcor business meetings are usually held on the first Sunday of the month. Guests are welcome. Unless otherwise noted, meetings start at 1 PM. For meeting directions, or if you get lost, call Alcor at (714) 736-1703 and page the technician on call.

The **SUN, APRIL 5** meeting will be at the home of:
Saul Kent and Jo Ann Martin
16280 Whispering Spur, Riverside, CA

Directions: Take the Riverside Freeway (Hwy 91) east to Riverside and get off going south (right) on Van Buren Blvd. Whispering Spur is south of the freeway four miles, and 1.0 miles beyond Mockingbird Canyon Rd., on the left. 16280 is the second house on the right, at the end of the white fence.

The **SUN, MAY 3** meeting will be at the home of:
Russell Cheney
5618 Ruby Place Torrance, CA

Directions: Take the Harbor Freeway (110) south from the San Diego (405).

Exit on Carson, going west (right), and go all the way to the west end of Carson, in Torrance. Follow Carson as it angles right (north) and becomes Howard Avenue. Go about 1/4 block and turn right onto Ruby Place. There is a bear in the front yard.

There is an Alcor chapter in the **San Francisco Bay area.** Its members are aggressively pursuing an improved rescue and suspension capability in that area. Meetings are generally held on the second Sunday of the month, at 4 PM, followed by a potluck. Meeting locations can be obtained by calling the chapter's Secretary, Lola McCrary, at (408) 238-1318 or (E-mail) Lola@lucid.com.

The **SUN, APRIL 12** meeting will be held at the home of:
Ralph Merkle and Carol Shaw
1134 Pimento Ave., Sunnyvale, CA

After the business meeting and potluck there will be an *Introduction to Cryonics* talk at 7 PM, followed by a question and answer period.

Directions: Take US 85 through Sunnyvale and exit going East on Fremont to Mary. Go left on Mary to Ticonderoga. Go right on Ticonderoga to Pimento. Turn left on Pimento to 1134 Pimento Ave.

The **SUN, MAY 10** meeting will be held at the home of:
Leonard Zubkoff and Lola McCrary
3078 Sulphur Spring Court San Jose, CA
Tel: (408) 238-1318

The business meeting will start at 4:00 p.m., and the potluck around 6:00 p.m.

Directions: Take 101 south past the 880 and 280/680 junctions to the Capitol Expressway exit, (third exit past the 280/680 junction). Take Capitol Expressway East (back over 101) toward the San Jose foothills. Go right on Aborn Road (second traffic light; there is a Red Lobster on the corner where you need to turn). Go left on White Road (third traffic light; White is to the left and San Felipe is to the right at this intersection). Go right on Stevens Lane, which is the next traffic light. Go down Stevens, past the stop sign, and then take Mount Isabel, (second street on the right after going through the stop sign). Turn left onto Sulphur Spring Court, which is the next street. 3078 is the second house on the right.

NOTE: Leonard's house is definitely not child-proof; in fact, the proliferation of equipment, connecting cables, and tools should probably be considered child-hostile. I have no objection to children visiting, but their parents must be prepared to supervise them adequately so that no accidents occur.

There are two Alcor groups in the **Greater New York area.** Details may be obtained by calling either Gerard Arthus, at (516) 689-6160, or Curtis Henderson, at (516) 589-4256.

The ***Alcor New York Group*** meets on the the third **Sunday** of each month at 2:30 PM, at **72nd Street Studios.** The address is 131 West 72nd Street (New York), between Columbus and Broadway. Ask for the Alcor group. Subway stop: 72nd Street, on the 1, 2, or 3 trains.

Meeting dates: **April 26 (4th Sunday – to avoid Easter)**
May 17, June 21.

The ***Alcor New York Stabilization Training Meeting*** meets on the first Sunday of every month, at 2:30 PM, at the home of Gerry Arthus. The address is: 17 Mystic Way, Stony Brook, L.I., telephone (516) 689-6160.

Meeting dates: **April 5, May 3, June 7, July 5.**

There is a cryonics discussion group in the **Boston area** meeting on the second Sunday each month at 3:00 PM. The April 12 meeting will be at the home of David Greenstein. Further information may be obtained by contacting Walter Vannini at (603) 595-8418 (home) or (617) 647-2291 (work).

There is a an Alcor chapter in **England,** with a full suspension and laboratory facility south of London. Its members are working aggressively to build a solid emergency response, transport, and suspension capability. Meetings are held on the first Sunday of the month at the Alcor UK facility, and may include classes and tours. The meeting commences at 11:00 A.M., and ends late afternoon.

Meeting dates: **April 5, May 3, June 7, July 5.**
The address of the facility is:
Alcor UK, 18 Potts Marsh Estate
Westham, East Sussex

Directions: From Victoria Station, catch a train for Pevensey West Ham railway station. When you arrive at Pevensey West Ham turn left as you leave the station and the road crosses the railway track. Carry on down the road for a couple of hundred yards and Alcor UK is on the trading estate on your right. Victoria Station has a regular train shuttle connection with Gatwick airport and can reached from Heathrow airport via the amazing London Underground tube or subway system.

People comimg for AUK meetings must phone ahead – or else you're on your own, the meeting may have been cancelled, moved, etc etc. For this information, call Alan Sinclair at 0323 488150. For those living in or around metropolitan London, you can contact Garret Smyth at 081-789-1045, or Russell Whitaker at 071-702-0234.

Other Events of Interest

Alcor's 20th Anniversary and the 25th Anniversary of the Freezing of the First Man

A banquet will be held on Saturday, April 4th, 1992 at the Marriott Hotel, 2200 E. Holt, Ontario, California to celebrate the 20th anniversary of the Alcor Life Extension Foundation and the 25th anniversary of the freezing of the first man, Dr. James Bedford. The evening will include good food, conversation with fellow cryonicists, and excellent speakers talking about cryonics then and now.

COST: $50. Payment and reservation must be received no later than March 26, 1992. Please make checks payable to Alcor Foundation, 12327 Doherty St., Riverside, CA 92503, or call 1-800- 367-2228 to use your MasterCard or Visa.

NOTE: A group rate on hotel accommodations will be offered to Alcor guests by the Marriott Hotel.

Sunday, April 5th, 1992, those who wish to can attend the monthly Alcor Business Meeting, to be held at the home of Saul Kent. Alcor will also be conducting tours of the Alcor facility.

The 14th Annual J. Lloyd Eaton Conference

Immortal Engines:
Life Extension and Immortality in Science Fiction and Fantasy

The University of California at Riverside will be hosting this year's Eaton Conference on science fiction as literature. The topic will be one of interest to all of us: Immortality. Among the speakers will be James Gunn, Kim Stanley Robinson, Greg Benford, Fredric Jameson, Sheila Finch, Steve Harris, and Carlos Mondragon. The Conference is April 10-12, on the campus of the University of California, Riverside.

Topics are as follows: (Friday afternoon) *Immortality and* The Immortal*; Immortality and the Real World; Living Off the Dead: Legacies, Posterity, and the Private Property of Subjecthood; Immortal Dreams/Social Realities (panel).* (Saturday morning) *IBMortality: Putting the Ghost in the Machine; How Cyberspace Signifies: Taking Immortality Literally; Information as Immortality: A Darwinist Perspective on Science Fiction; Living Forever or Dying in the Attempt: Mortality and Immortality in Science and Science Fiction; The Immortality Myth in Technology.* (Saturday afternoon) *Alienation as the Price of Immortality: The Tithonus Syndrome in Contemporary Science Fiction and Fantasy; Immortality and Obliteration: Science Fiction's House of Saul;* Way Station*: The Hero as Architypical SF Writer/The SF Writer as Seeker of Immortality; This Is My Body: Relatedness, Mortality and the Fantasies of Redemption; You Bet Your Life: Death and the Storyteller; A Quest of Eternal Life.* (Sunday) *Is There Life after Lazarus Long? An Eccentric View form the Literary Bridge; No Woman Born: Immortality and Gender in Feminist Science Fiction; Best-Selling Immortality: Marie Corelli's Electric Gospel; Cosmifantasies: Humanistic Visions of Immortality in Contemporary Italian Fiction; Flight into Fulfillment: J.G. Ballard's Surreal Immortality; Models of Immortality; Dual Immortality, No Kids: The Dink Link Between Deathlessness and Birthlessness in SF; Zen and the Art of Mario Maintenance: Cycles of Death and Rebirth in Video Games and Children's Subliterature.*

Conference Registration is $55, and the Banquet is $25 ($75. combined). Day tickets are $20. It is possible that we will be able to get free tickets on a limited basis. Contact Alcor for an update.

ALCOR LIFE EXTENSION FOUNDATION
12327 Doherty Street
Riverside, CA 92503

Non-Profit Organization
U.S. POSTAGE PAID
Permit No. 11
Portland, OR 97208

FORWARDING AND RETURN POSTAGE GUARANTEED
ADDRESS CORRECTION REQUESTED

For information on cryonics call Alcor:
1-800-367-2228 (toll-free, non-members only) or 1-714-736-1703 (members).