Cryonics

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Cryonics Funding — The Search For Stability

Feature Articles

Columns

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Cryonics

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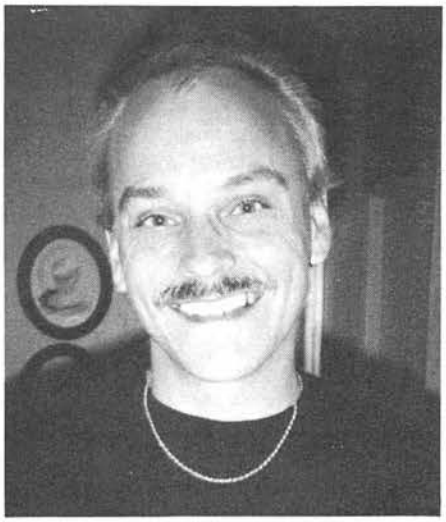
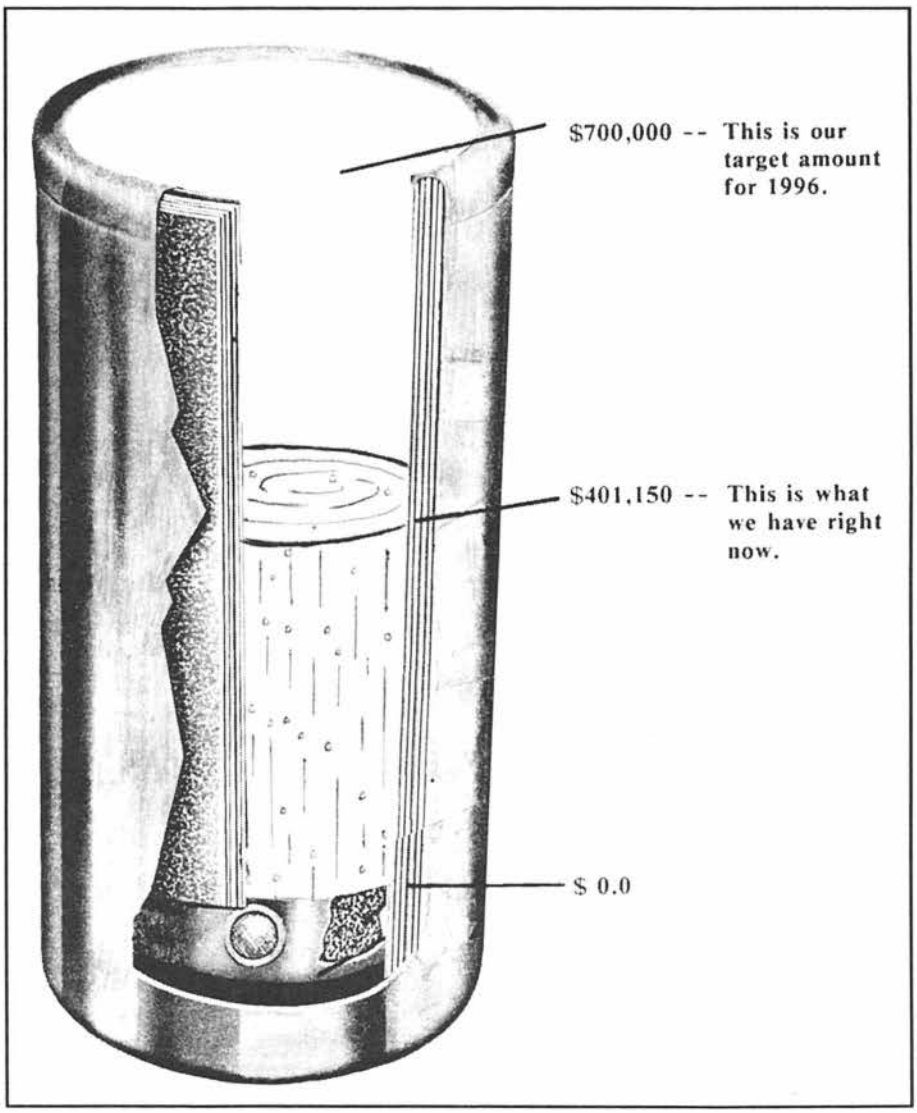
Cover:
Ben Best examines some alternatives for financing cryonic suspension in this month's cover story.

Alcor Board Elects New Vice-President



At our August 4th meeting, long time Alcor director Paul Genteman was elected Vice President. Paul has been an Alcor suspension member since 1977. Only eight of the people on our current emergency response list have been suspension members longer.

Paul has been on Alcor's board of directors since 1978, when he was also elected Corporate Secretary — a post which he still retains, and he is a volunteer on our suspension team as well. Paul lives in Northern California where he works in software development at a major company.



Keeping Up With the Jones Fund

The *JONES ENDOWMENT FUND* was created to provide a reliable source of income for Alcor's day-to-day operations. We have set a goal, based on our projected needs and growth, of $700,000 by July 1st of 1996. Contributions to this endowment are added to capital; only the income from the fund is available for our use.

An initial contribution of $400,000 was made by Alcor's Board of Directors, out of proceeds from the Dick Jones estate (hence the name of the fund). Since the fund was first mentioned in the June issue of *Cryonics*, we have received $1,150 in additional donations.

We will periodically publish this graphic to chart progress toward our goal.

Keeping the Roadway Clear

This issue contains our fifth article in recent months by Alcor member Allen Lopp, all of which concern the need to establish pro-cryonics legislation. Twice this summer Allen has written to the legislators who chair the committees in each legislative house that review bills addressing health matters. Again, they are Assemblyman Bruce Bronzan (D- 31-Fresno) on the Assembly Health Committee, and California State Senator Diane Watson (D-28-Inglewood) on the Senate Health and Human Services Committee.

We at Alcor would like to reiterate our concerns in this direction by joining

Allen in urging *all* cryonicists to write to Senator Watson *now*. Thank her for her interest in researching cryonics and her responsiveness to Allen's inquiries. You can write to her at this address:

The Honorable Diane Watson
California State Senate
4040 State Capitol
Sacramento, CA 95814

If you don't have time to write, call her Sacramento office (916) 445-5215. You might want to explain that you have been told that she is researching cryonics for possible legislative action, that you wish to thank her for her interest, and that you wish for cryonic suspension to remain legal and available in California. (With the current lack of cryonics facilities in most other states, you don't need to be a California resident to express your concerns.)

As always, the cryonic suspension that you defend may be your own!

A One Atom Switch

Progress in nanotechnology continues at a stunning rate. The 15 August issue of the prestigious British scientific journal, *Nature*, contains an article by D.M. Eigler, et al of the IBM Almaden Research Center (the folks who brought us the letters IBM in nanoscale writing) reporting the development of a **single atom switch.** The switch operates by moving a single xenon atom between stable positions on each of two conducting surfaces; one surface being the tip of the scanning tunneling microscope and the other the surface of a nickel crystal. The state of the switch can then be determined by measuring the conductance across the "leads."

The switches were assembled and operated in an ultraclean, ultra high vacuum chamber at 4 °K (about -269 °C). Thus, these devices are of a prototype nature and are a long way from practical application.

Almost as exciting as the announcement of the atom switch was an accompanying editorial under the heading, "Nanotechnology" which waxes eloquent about the possibilities this development represents. The editorial, by C.F. Quate, a noted researcher on molecular electronics, takes note of the possibilities, notes some of the problems, and points the way toward a possible solution:

"The prospect opened by this remarkable body of new work is the construction of electronic devices with atomic dimensions. But this will not be so easy in practice. Speed is the limiting factor. The dilemma is illustrated with memory type devices. For example, a cluster of 1,000 atoms could represent 1 bit of information, in which case the entire contents of the Library of Congress, equaling 200 terabits, could be stored on a silicon disc 12 inches in diameter. (In contrast, it would probably take 250,000 compact disks of a similar size to store this information with current techniques.) But even if one can create clusters at the exceptional rate of 10^7 per second it would take 230 days to fill the disk. Worse still, it would take an additional 230 days to read the information. The solution will be to work toward massively parallel reading and writing systems."

Clearly cell and tissue repair devices to reverse disease, old age and, freezing damage are some distance in the future. The reassuring thing is that things are unfolding **exactly** as we expected them to, and in some cases even sooner than expected.

Member Survey

by David Pizer

Several members have asked if Alcor could have a program where our members can make donations or dues payments to Alcor by authorizing *Automatic Deductions* from their bank accounts on a regular basis. Alcor is now with a bank that offers that option. The problem is that it's expensive to initiate. In order for us to offer automatic deductions to our members we would need to know that enough members wanted to participate in sufficient amounts, before we make a commitment to our bank.

If we do offer this service, members who want automatic donations deducted from their bank accounts would fill out a card authorizing the amount and then send the card to us. We would then forward that to our bank, which would electronically deduct the stated amount from the member's own bank account each month.

If this seems like a program you would like to use, please call or write me and let me know the amount you would want to donate each month. (This is not an authorization to start — just a survey to let us know what we might expect if we initiate this service.) If we receive enough positive responses, we will go ahead with the program.

Please let me hear from you.

Membership Status

Alcor has 257 Suspension Members, 505 Associate Members (includes 192 people in the process of becoming Suspension Members, and 19 members in suspension.

Letters to the Editors

Editor:

Cryonics will probably never have widespread appeal because most people don't value existence that much. They anesthetize themselves thoroughly to the here-and-now, even while enjoying health, freedom, and material abundance. What can Alcor possibly offer them in a future life but more of what they find so meaningless today? The popularity of alcohol, an incredible spectrum of drugs (both legal and otherwise), television, movies and other passive entertainments, high-fat diets, nicotine, fundamentalist religions, and other self-destructive behaviors too numerous to mention indicate that if Alcor is to survive into the future — much less prevail technologically — it had better prepare to do this as a tiny, highly sophisticated, superbly organized cell.

Sincerely,
Paul D. Mallamo

Dear *Cryonics*,

In your article "Funding Cryonic Suspension — A Critique" by Howard S. Katz (August, 1991), you were showing the way inflation affects whole life insurance, taking $120,000 as a base figure and recommending the insurance that starts cheap and increases with age (I couldn't remember the name as I have totally discounted this type of insurance). Now some points on this need to be mentioned, which

apply only to Australia. (A future article on insurance in various nations would be an idea!)

I chose approximately the fourth biggest insurance company in Australia as, although it isn't the biggest here, it is one of the biggest world wide (Zurich, Australia) and was recommended through a reliable agent. Also, being based in Switzerland (and the Swiss being excellent money managers) it offers a better chance of being beyond the reach of any potential socialist/communist government (remote). Also term/life or universal (I believe it's called) has no bonuses and the payments increase to a prohibitive level with age; therefore as one gets older or even unemployed the risk of loss of the entire insurance policy increases greatly. When the stage of the policy is reached where it pays for itself, a term or universal policy (if unable to pay) eats at the reserve a lot faster. For all these reasons and the facts that with whole life the bonuses on average increase the value of the policy by 600% and can never be lost by law unless the policy is terminated, I have chosen whole life insurance.

Yours sincerely,
Colin A. Brooker

To the Editor,

I am, hopefully, a member-to-be. I have every intention of enjoying as much of the future as possible. I'm presently in the sign-up process waiting for a property sale before I can proceed.

Regarding Alcor's future costs of doing business, I hope that someone who knows a lot more about this subject than I do has figured all of this out already. But just to compare calculations, I'm citing my own very rough figures with regard to Alcor's funding needs as the years go by tomorrow and tomorrow and tomorrow.

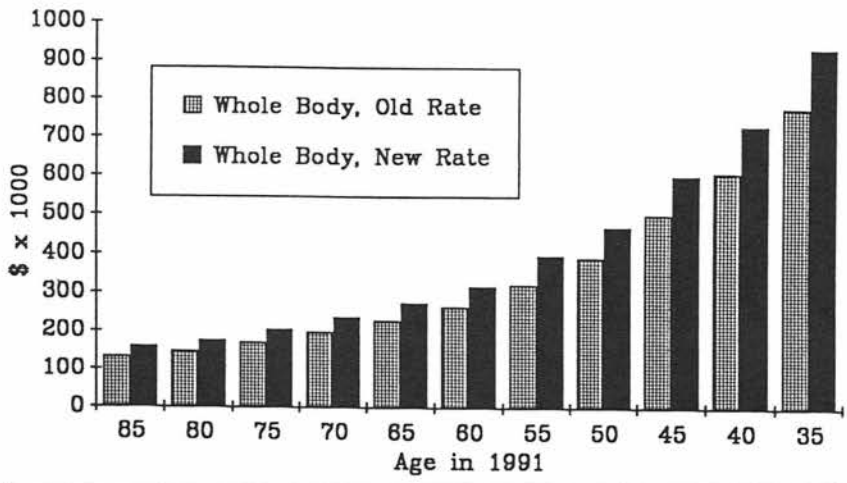
Based on the Bureau of Labor Statistics' (BLS) Cost of Living Index for the 29 years from 1960 to 1988, the average actual inflation per year was 5.01%. The highest year was 1980 at 13.5% and the lowest were 1961 and 1962 at 1.0% each. If we assume that 5.01% will be the future overall inflation rate (the actual trend was slightly upward), $100,000 in 1991 dollars will decline in real value to $50,000 in 14 years.

Put another way, the average age of Alcor's members is 42 and the average member will therefore deanimate in another 35.6 years, according to the BLS actuarial table. After 35.6 years (in the year 2027), $120,000 will be worth only about 20,600 of today's dollars and $41,000 will be worth about $7,000 of today's dollars. Looked at in reverse, an item which costs $1.00 today will cost $5.81 in dollars of the year 2027.

The $22.2 million provided for suspensions (quoting from the July 1991 Membership Statistics) will thus become available during a period the average year of which is 2027. It therefore has a value in today's dollars of 17.2%, or $3.8 million. As an investment base, that is the value it will have in today's dollars when it begins to earn income for or becomes usable by Alcor.

Furthermore, today's $120,000 commitment by a 30-year-old has far less value than the $120,000 commitment by a 75-year-old. The 30-year-old will deanimate in 46.8 years (the year 2038) and the 75-year-old in 10.7 years (the year 2002). In today's dollars the 30-year-old has committed about $12,100 and the 70-year-old has committed about 60,500 1991 dollars. It is important to think of it this way because there is no reason to believe that the

Potential Inflation Corrected Funding Requirements
(Life Expectancies from Bureau of Labor Statistics)



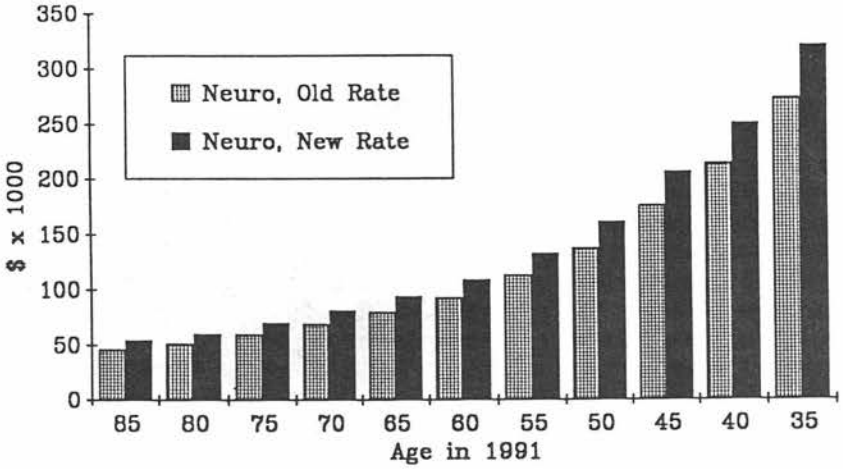
Projected Whole Body Suspension Costs

(based on age in 1991)

Old Rate	Age	New Rate
$ 134,086	85	$ 160,903
$ 147,858	80	$ 177,429
$ 171,213	75	$ 205,455
$ 198,257	70	$ 237,908
$ 229,573	65	$ 275,487
$ 265,835	60	$ 319,002
$ 323,248	55	$ 398,697
$ 393,059	50	$ 471,670
$ 501,893	45	$ 602,271
$ 610,287	40	$ 732,344
$ 779,269	35	$ 935,122

Above are graphic and tabular representations of the quantities in 1991 dollars necessary to counter and assumed inflation rate of 5.01% per year and meet Alcor's expenses at the expected time of suspension and hence collection, according to member age in 1991, for whole body suspension members.

Potential Inflation Corrected Funding Requirements
(Life Expectancies from Bureau of Labor Statistics)



Projected Neurosuspension Costs

(based on age in 1991)

Old Rate	Age	New Rate
$ 46,930	85	$ 54,975
$ 51,750	80	$ 60,621
$ 59,924	75	$ 70,197
$ 69,389	70	$ 81,285
$ 80,350	65	$ 94,124
$ 93,042	60	$ 108,992
$ 113,136	55	$ 132,531
$ 137,570	50	$ 161,154
$ 175,662	45	$ 205,776
$ 213,600	40	$ 250,217
$ 272,744	35	$ 319,500

Above are graphic and tabular representations of the quantities in 1991 dollars necessary to counter and assumed inflation rate of 5.01% per year and meet Alcor's expenses at the expected time of suspension and hence collection, according to member age in 1991, for neurosuspension members.

costs of liquid nitrogen, dewars, electricity, taxes, salaries, etc., will not stay constant in today's dollars, i.e. that these costs will not rise directly with inflation.

In January 1991, Mike Darwin said that whole body minimum suspension funding necessary to cover the costs was $113,000 and neuro was $34,000. If those were 1991 dollars there is a big problem. Alcor's current membership mix of 87 and 152 (whole body vs. neuro) would lead to a composite (whole and neuro combined) average funding need of $62,800 or $15 million total. The value of 15 million 1991 dollars is 87.2 million in the dollars of the year 2027, the year Alcor's average current member will deanimate. But apparently the members have "provided" 22.2 million of the year 2027's dollars (3.8 million 1991 dollars). If this is all true, there appears to be a shortfall of 65 (87.2 – 22.2) million year 2027 dollars (or 11.2 million year 1991 dollars). Unless I'm missing the point in some of the data published, Alcor's pledged amount should be about 87.2 million (15 million 1991-dollars), that is if costs rise with inflation, if inflation stays at 5.01%, and if the members deanimate in accordance with actuarial expectancy.

Care must be exercised in observing the age mix of membership. Consideration should be given to charging different amounts for different ages. A $120,000 single premium policy for an 80-year-old would be about $92,000 (if he could get one), but for a 30-year-old it would only be about $16,000. This difference reflects the differences discussed above.

Disregarding for the moment my own calculations, ie. assuming that $120,000 and $41,000 are indeed the correct amounts in dollars of today, and based on life expectancy and inflation, and regarding whole body inflation, equity would be approached if 30-year-olds had to commit now, to be paid at time of deanimation, $1.19 million, 40-year-olds $730,000, 50-year-olds $470,000, 60-year-olds $320,000, 70-year-olds $240,000, and 80-year-olds $180,000. Bizarre, I know, but the figures seem to me to be irrefutable — irrefutable, that is, if my expressed assumptions are correct. The figures for neuro would be about (age 30:) $410,000, age 40: $250,000, age 50: $160,000, age 60: $110,000, age 70: $81,000, and age 80: $61,000. The annual premiums for insurance for all of these amounts would be about the same to all parties in each of the 2 groups, because of the difference in ages. If single values are to remain for all ages for whole body and all ages for neuro, these calculations would lead us to $700,000 and $240,000.

The following is an alternative approach, arriving at somewhat different numbers, using the earlier data given in *Cryonics* of August 1990. That article reported in considerable detail the costs and expected costs of suspension and storage. Presumably they were expressed in current dollars. The suspension costs were $27,470 and $18,909 for whole body and neuro respectively. These numbers would become $160,000 and $110,000 respectively in the inflated dollars of the year 2027. The storage costs of $854.38 and $66.08 per year in Bigfoot rise to $4,965 and $384 per year in dollars of the year 2027. The funds (again, dollars of the year 2037) necessary to generate $4,965 and $384 at 2% are $248,000 and $19,000. In other words, the average member should be preparing to hand over to Alcor at time of deanimation $408,000 ($160,000 + $248,000) for whole body or $129,000 ($110,000 + $19,000) for neuro.

I expect that the learning curve and other factors (such as greatly reduced heat

transfer per patient when less surface per patient is presented to ambient, due to close packing of a larger frozen population; and also Alcor's members' tendency to take much better care of themselves than the average person — or would this latter point actually cost Alcor more because of the further inflation during the longer life time?) will lead to reduced costs. Such projected savings might best be treated as Alcor's minimum reserve for adverse factors not now known such as unforeseeable increased costs of litigation in the future, costs of reanimation, etc., and, more importantly, to bring the salaries of Alcor staff members in line with market salaries.

I'd appreciate a response.

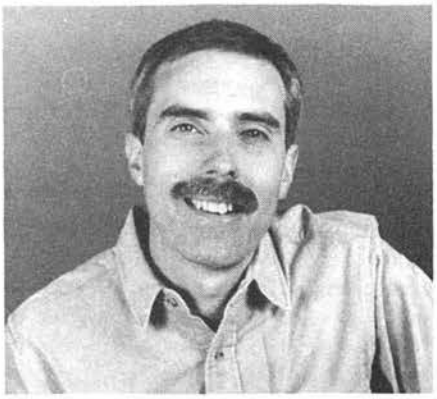
John Connole

Costa Rica

The points brought up in the above letters, as well as the subject matter of this issue's similar article by Ben Best and the August issue's finance article by Howard Katz, will be directly addressed by an article by Carlos Mondragón (Alcor C.E.O.) to appear in next month's issue. — Ed.

A Report on Current Suspension Capabilities

Mike Darwin



The recent deanimation of Alcor Suspension Team Leader Jerry Leaf has had a serious impact on Alcor's capability to deliver suspension services. That's the bad news. The good news is that under **most** conditions our suspension capability remains as good as ever, and in some areas it is even improving.

Jerry had an enormous range of medical/surgical skills. The most critical of these (and the least easily duplicated) was his cardiovascular surgical expertise; in particular the depth of his experience which allowed for him to a) quickly and efficiently recover from the inevitable errors made from time to time, and b) handle unusual or difficult cases such as patients with prior coronary artery surgery, anatomical abnormalities, or tumor disease in the chest which affected the anatomy/physiology of the central circulatory system.

Another major advantage Jerry gave us was **flexibility**. To some extent Jerry's skills and my skills overlapped. I am reasonably competent at doing remote blood washouts and connecting patients to the heart-lung machine using the groin and neck (femoral, jugular, femoral bypass). I am also a competent cryonics perfusionist (I supervised and/or operated the pump acting as perfusionist on virtually all Alcor suspensions to date). This meant that Alcor had a good measure of flexibility both in terms of dispatching personnel to the field for standby *and* in the operating room.

For all intents and purposes this level of skill and flexibility is gone from Alcor for the foreseeable future. It's as simple as that.

I do not feel confident establishing bypass using a thoracic (central) approach. I am currently working to build skills in this area, although with our very low case-load and the minimal opportunity to practice under skilled guidance I will very likely only be able to handle "plain vanilla" cases; those which do not involve prior bypass surgery or extensive tumor involvement of the great vessels of the chest.

For cases which I cannot do, we have a back-up surgeon who has been functioning as our primary surgeon for the last two cases. This surgeon is highly skilled and very competent. Unfortunately, he is very time- constrained and will not drop everything to do a suspension. He also is unavailable from time-to-time. We are in the process of making arrangements for two other people with the desirable level of surgical skills. We are also in what we hope is the final phases of negotiating with several perfusionists who will be available on an on-call basis to operate the pump and supervise sample taking, thus freeing me up for more critical (and less commercially available) tasks.

The bottom line here is very simple. Right now and for the foreseeable future Alcor has much less technical reserve capacity than it has had in the past. This means we will NOT be doing high-level standbys outside the United States. I am also unavailable for any international travel for the indefinite future. All training sessions for international groups will now be conducted in Riverside, CA.

An unpleasant related effect is that I am now a virtual prisoner of civilization. It will no longer be possible for me to go into remote areas camping and hiking with my lover as I used to do. I mention this here because this kind of responsibility is a crushing one which seriously impacts my life. I think everyone needs to understand this and the effect(s) this is likely to have on me.

The solution to the problems brought about as a result of Jerry's deanimation are not going to come quickly or be easy. Major areas which are being addressed are as follows:

1) Standard Operating Procedures (SOPs) are being written for all major areas of our suspension operations in incredible detail (right down to telling people what shelf in what cabinet each item needed for a job is located). This is a daunting task that will take months to complete.

2) Training is being stepped up into high gear in all phases of local operations. We will be doing work on pigs in the near future to practice cardiovascular surgical skills.

3) We will be repeating one or two dog blood washout/deep hypothermia experiments to establish that our bypass

skills and basic knowledge are intact even without Jerry. This is especially important because if we can't get a dog down and back from washout then it's very likely we can't washout/perfuse a human patient without causing serious (and unnecessary) injury.

4) We are vigorously trying to recruit others with the surgical/perfusion skills we need so that we have a *pool* of people to draw from in any emergency.

5) We will soon be holding a training course for the cryoprotective perfusion portion of our operation just as we have done for the transport portion. This course will run 1 – 2 weeks and will consist of classroom work plus at least three cryoprotective perfusions using an animal model. I am looking for volunteers who wish to be trained to carry out specific functions in the operating room. If you are interested in being trained to a do specific task on the Alcor Suspension Team *and you live in the Riverside/Orange County/Los Angeles area (or are willing to regularly commute)* please let me know. The following positions are open:

Position: Laboratory Technician
Job Description: Calibrates and operates test equipment including osmometer, refractometer, blood gas machine, centrifuges, and prepares perfusate and checks it for quality/suitability.
Requirements: background in in medical technology and/or basic laboratory techniques is highly desirable.

Position: Operating Room Circulating Nurse
Job Description: Maintain inventory, stock cabinets in OR, lay out supplies for the suspension and prepare the OR for the suspension, obtain supplies as needing during the conduct of the suspension and hand them off to Scrub Nurse, clean instruments after case and prepare them for sterilization, set up trays for next case.
Requirements: organized, well-disciplined person capable of putting in a substantial amount of time *memorizing* the names, locations, and purposes of myriad surgical supplies.

Position: Sample Technician
Job Description: Draws samples for chemistries, blood gases, and cryoprotective agent determination during course of perfusion.
Requirements: Very level temperament (this is a high stress job). Prefer someone who is HIV+.

Position: Scribe
Job Description: Lays out/prepares data logging sheets, takes notes during suspensions and requests information and orders samples drawn on a regular basis, writes information down, charts the basic flow of events, and notes any unusual events or pertinent observations.
Requirements: good familiarity with medical terminology and an ability to learn to read laboratory instrumentation and become thoroughly familiar with the overall flow of events during a suspension.

Position: Phase III Cool Down Technician
Job Description: Prepares and lays out all materials required for cooling patient to dry ice temperature. This includes preparing the Silcool bath and insuring that it is at the proper temperature when the patient comes off the pump.
Requirements: Someone who is good with his/her hands, works well with equipment, and has a strong back.

Position: Chief Surgeon
Job Description: Performs all surgery necessary to connect the patient to heart-lung machine.
Requirements: Extensive experience in cardiovascular surgery on either animals or humans.

I want to fill these positions with people who are willing to put in significant amounts of time becoming **professionals** at what they do. I also want to point out that I need TWO people to train for each position so that a back-up will be available in the event of an emergency.

Good News

Some good news is that we have done two suspensions without Jerry's skills being available to us. Both went reasonably well, and the problems that have arisen so far are, in my opinion, unrelated to Jerry's absence. We have been fortunate that in both instances the surgical skills needed were available from our back-up surgeon.

Finally, a word needs to be said about me and my role here during a suspension. I am now Alcor Suspension Team Leader. However, beyond the the "title" I wish to (sadly) point out that I am now also the only person at Alcor who has both the necessary width and depth of understanding of cryonic suspension (as we currently practice it) to be able to supervise a suspension and insure that everything happens as it should.

This is an especially unfortunate situation for me, since if I need suspending I am liable to get a pretty crummy ride the way things are now. I am thus highly motivated to CHANGE this situation.

There will be no easy way to do this. Both Jerry and I had not only the medical background, but years of experience, training and independent study in medicine, cryobiology, and the physiology of hypothermia/ cryoprotective perfusion. What will be needed to replace both Jerry and me is an individual with a solid medical background, a deep love of cryonics and a willingness to spend inordinate amounts of time learning the job of Suspension Team Leader. That means countless hours spent in the lab, countless more hours spent doing suspensions, and a deep desire for economic punishment in the bargain. Are there any takers?

If there aren't, each and every one of you needs to understand the likely consequences. Sooner or later I will be ill or otherwise unavailable. Then it will be your turn to be the man on the bubble and hope it doesn't burst.

Fyodorov — The Grandfather of Immortalism

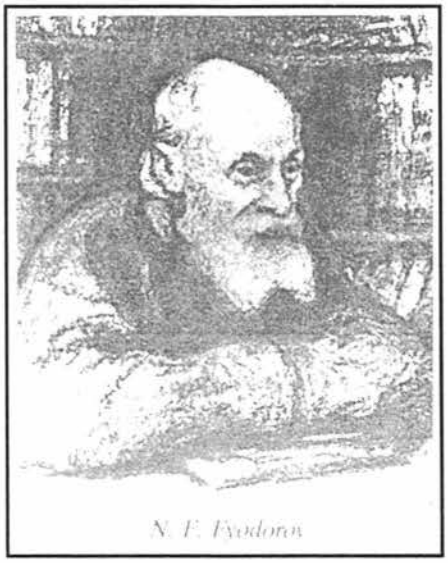
Michael Perry

Imagine yourself, a good end-of-the-20th-century cryonicist, suddenly flung by a twist of black magic into the 19th century. It is the era of the horse and buggy. Radios, TVs, computers — all are dreams of the future, for the few who dare to dream so far. Telephones, electric lights, automobiles — the province of a few eccentric tinkers, at best. There is *no* cryonics.

Maybe, with great presence of mind, you would arrange to have your brain preserved in formaldehyde, upon your demise, in hopes that *some* information would get through to the future, probably a forlorn hope as far as memories are concerned. (Maybe, if you know a lot about chemical fixatives, you would arrange for other preservation, but that's presupposing knowledge that probably didn't exist at the time we're considering.) In short, you face *destruction*, with no chance of reprieve.

Everybody had to face this unhappy prospect, until a few short decades ago. Not everybody was willing to go complacently, then as now. There were many who could not accept that their lives must end after a brief interlude, and they pinned their hopes upon whatever seemed the safest prospect of deliverance — generally, the intervention of a putative higher power. This is the way it has been, in fact, for many centuries, perhaps as long as man has been on earth. It is only in the latter half of the 20th century, with the ever-growing avalanche of technological marvels, that other possible means of ending mortality are finally and reluctantly being widely considered.

But in 19th century Russia, long before the advent of cryonics and the prospect of nanotechnology, there was a man who imagined solving the problem of mortality through science, and shaped a philosophy to fit. His name: Nikolai Fyodorovich Fyodorov. The science of his time was archaic by our standards, and his proposed methods seem far from workable to most scientists today. However, considering the circumstances his achievement was remarkable indeed. It foreshadowed the modern immortalist movement, with its much sounder technological base, and what is more remarkable, it offered a rationale and a program for an immortal society, that is simply without parallel in human thought.



N. F. Fyodorov

Fyodorov, who lived — according to best available estimates — from 1828 to 1903, was a strange embodiment of many of the principles he espoused. Reticent and self-effacing, he spent much of his early career as an itinerant schoolteacher and his later years as the librarian in the Rumiantsev Museum in Moscow, where he had access to much scientific and technical literature. His lifestyle was a study in self-denial and a benevolent otherworldliness. He never married; he lived alone in a room the size of a closet with no furniture and only a humpbacked trunk for a bed. His food consisted of hard rolls and tea, supplemented occasionally by an old piece of cheese or dried fish. He spent nothing on entertainments or luxuries. His salary was meager.

Nevertheless he consistently aided penniless students, even as he resolutely turned down positions of greater authority and income. And, though he possessed no degrees, his knowledge was encyclopedic; Authorities from many fields consulted him as an equal or superior. At the museum Fyodorov had contact with many of the leading intellectuals of the day, along with younger scholars whom he befriended and instructed without pay. The most famous of his pupils was the pioneering Soviet space scientist, Konstantin Tsiolkovsky.

Fyodorov was deeply concerned about the problems of human existence, and saw injustices pressing from many sides. Much of this concern no doubt stemmed from personal experience. The illegitimate son of a Russian nobleman, he spent his earliest years in plenty, but the father's death when the boy was about four thrust the young family, including several other children, into poverty. Many years later Fyodorov would write:

From the years of childhood three memories remain clear to me: I saw black, very black bread, on which (I heard people say) the peasants fed in what was probably some year of famine. From childhood I heard an explanation of war (to my question about it) that put me in terrible confusion: in war people shoot each other. *And, finally, I learned that some people are not one's kin but strangers, and even one's kin are not kin but strangers.*

Fyodorov became concerned about

the problems of hunger, war, and lack of feelings of kinship among humanity. The death of his father and the privations it brought must have also underscored the need, somehow, to redress the problem of death. Fyodorov, like many before and since, longed for a world of peace, harmony, and freedom from sickness and mortality. But what was to be done, given the way the world actually was?

He then hit upon a fantastic idea: to use the powers of science to solve all of men's problems, including even the problem of death. The latter goal in fact became the cornerstone of his whole program: He proposed nothing short of restoring to life everyone who had ever died. (In doing this he did not break entirely with religion, but felt it a moral obligation for man to use his God-given powers in solving this one great problem, from which the solution of other problems would follow.) Resurrection in fact was seen as the great "common task" that would unite mankind in a society of eternal brotherhood, a position that was defended at great length in his writings. Though it would restore the bad along with the good, Fyodorov regarded an evil nature as a curable affliction; thus everyone would benefit in the end. The methods he proposed for resurrection would not inspire the scientist of today, but were not inconsistent with what was then known about the world.

Briefly, his main rationale was as follows. All things are made of atoms, particles whose motions were apparently predictable given sufficient information about their positions and velocities. Such predictions were routinely made about planetary motions, for example. Along with predictions it was possible to make retrodictions and determine what had happened in the past. If this same principle could be extended to the atomic level, it would be possible to determine history in the most minute detail. At death, decomposition causes the atoms of the body to dissipate again into the environment. But by retrodicting with sufficient precision, we would obtain enough information to trace the paths of the atoms back to their positions in the living individual. No known instruments could accomplish this; microscopes were far too crude, for example, but it was assumed that more powerful tools would be developed in the future. Similarly, although no known devices could manipulate atoms individually, such devices would be perfected with time, so that the atoms could be placed in their correct positions to actually carry out a resurrection.

There were many difficulties, of course; what to do, for example, if the same atoms occurred in more than one individual at different times. More serious, from the standpoint of more recent physics, is the problem that the motion of atoms cannot be traced with arbitrary precision; this is a consequence of the Uncertainty Principle. Information can be lost, and thus the past is not completely recoverable. (Some possible means of dealing with this loss of information have been explored by a small circle of latter-day Fyodorov enthusiasts, including the present writer, but the proposed solutions are not the sort that would be implemented anytime soon.)

Fyodorov's great project thus is not a realistic one for our time. But something similar is being attempted, on a small scale, through the modern cryonics movement. Like Fyodorov, we are depending on future advances to complete our task. But unlike him we have a specific procedure, cryonic suspension, which is a necessary part of that task, and which, if all goes well, will assure its completion within a century or two.

Sources:

Holquist, M. "The Philosophical Bases of Soviet Space Exploration" *The Key Reporter* Winter 1985-1986, 2.

Young, G. M. Jr.*Nikolai F. Fedorov: an Introduction* Nordland, 1979. [The quote from Fyodorov appears on p.18.]

Zakydalsky, T. *N. F. Fyodorov's Philosophy of Physical Resurrection* Ph.D. Dissertation, Bryn Mawr College, 1976.

Life Extension

Smoking — Implications for Cryonicists

Steven B. Harris, M.D.

On July 10, Alcor Vice-President and chief surgeon Jerry D. Leaf experienced chest pain at dinner, and decided it was indigestion. It wasn't. Within a relatively short time he collapsed at home and could not be resuscitated. He was 50 years old.

Jerry was a long-time heavy smoker whose mental projection of his own demise involved chronic lung disease and perhaps lung cancer. All *that* was supposed to be in the middle-distant future, though. Those of us who were Jerry's friends tried to get him to pay more attention to his health in the meantime, but we were unsuccessful. I cannot be certain even now how important that failure was, for I cannot prove that Jerry's health habits were to blame for what finally happened to him. Still, the probability is high that this relatively young man was not the victim of a freak occurrence, for we know that 75% of apparently healthy men who suffer sudden death without warning are identifiable *before* the fact by the presence of two or more health risk factors for cardiac disease.

Jerry was (and is) an adventurer who chose to live his life in a certain way, and it is not my place to criticize the trade-offs he made in this (indeed I have no objective basis for doing so, for freedom is different things to different people). Nor can I presume to know what Jerry would have done about his smoking even if he had been given the chance to see the present; some of his friends suggest that it is quite possible that he might do exactly the same. Now that Jerry is safely in cryonic suspension, however, I do not believe he would mind if I use his experience to illustrate for his fellow cryonicists the medical advice which he himself chose not to follow, but from which other people with different tastes may still benefit.

Lesson for this month's medical essay: *cigarettes* kill. Not only do they kill, but they often kill in ways that involve more ischemia to the brain — the average cryonicist's worst nightmare. The reason for this is that cigarettes are not just "cancer sticks" (as I recently heard yet another Alcor smoker refer to them) but also "heart attack sticks." Cigarettes may

Age-specific death rates from coronary heart disease per 100,000 persons by age, sex, and smoking status.

Age and sex	Smokers of cigarettes only	Nonsmokers	Excess rate smokers/nonsmokers [1]	Mortality ratio
Males:				
45 to 54	422	150	272	2.8
55 to 64	996	542	454	1.8
65 to 74	2,025	1,400	625	1.5
75 to 84	3,871	3,132	739	1.2
Females:				
45 to 54	66	33	33	2.0
55 to 64	275	163	112	1.7
65 to 74	941	653	288	1.4
75+	2,349	1,973	376	1.2

[1] Calculated from the data.

SOURCE: Hammond, E. C. [(47), p. 145.]

kill 120,000 Americans each year as a result of lung cancer, but a fact less well known is that they also kill roughly that same number of additional people as a result of smoking-induced heart disease. The result is that smokers not only live lives that are statistically 11 years shorter, but at the end of their shorter lives, if they are cryonicists, they often get suspensions that are incomparably worse.

Heart disease, you see, is insidious: it may present no symptoms at all — right up until the time you topple over. Up to one fifth of all people ultimately discovered to have heart disease get their first and only clinical manifestation of disease (we can't call it a warning) in the form of their own sudden death. Such a case was Jerry's. In this country some 200,000 people each year suffer essentially instantaneous death without trauma or warning, and the majority of such patients on autopsy are found to have diffuse coronary (heart) arterial disease, involving at least two out of three major cardiac vessels. In this context we know that even a one pack-a-day smoking habit increases the chance of developing heart disease by a factor of three (men seem to be more vulnerable at all ages), and we also know that the chance of sudden death is increased by a similar factor in male smokers aged 35 to 54.

It isn't clear how cigarettes do this. It is suspected that some noxious chemical(s) in cigarette smoke (as of a few years ago, over 3000 pyrolysis products had been found in tobacco smoke) damages the thin layer of epithelial cells that makes up the inner lining of arteries. In the short term, the health of the epithelium of an artery is necessary to prevent spasm of the tiny muscles inside the artery wall. Such a spasm may cause a blood clot at the spasm site which may interrupt blood flow, causing an M.I. or "myocardial infarction" (death of part of the heart wall), also loosely called a heart attack. In the long term, smoke- related damage to the epithelium of arteries also seems to help trigger off the process called atherosclerosis, in which artery walls develop fatty tumors which also impede blood flow and contribute to spasm and clot. As if this weren't enough, smoking raises blood pressure and cholesterol levels, which contribute to vessel disease, and smoking also causes changes in blood platelets, which encourages not only the formation of clots, but also perhaps atherosclerosis.

When an M.I. occurs, a great many things happen to the heart, but the most dangerous effect is that if a large enough section of the heart wall dies, or if the electrical organization of the heart is sufficiently deranged (smoking decreases arrhythmia thresholds), the heart simply quits effective beating. When this happens, unconsciousness ensues in ten or 15 seconds, and brain damage which is irreversible at present levels of technology begins in five to ten minutes. Cardiopulmonary resuscitation (CPR), if instituted, can hold off this damage for a few minutes, but it becomes ineffective at maintaining blood flow to the brain very quickly. The sad fact is that less than half of the people who suffer M.I. make it to the hospital alive.

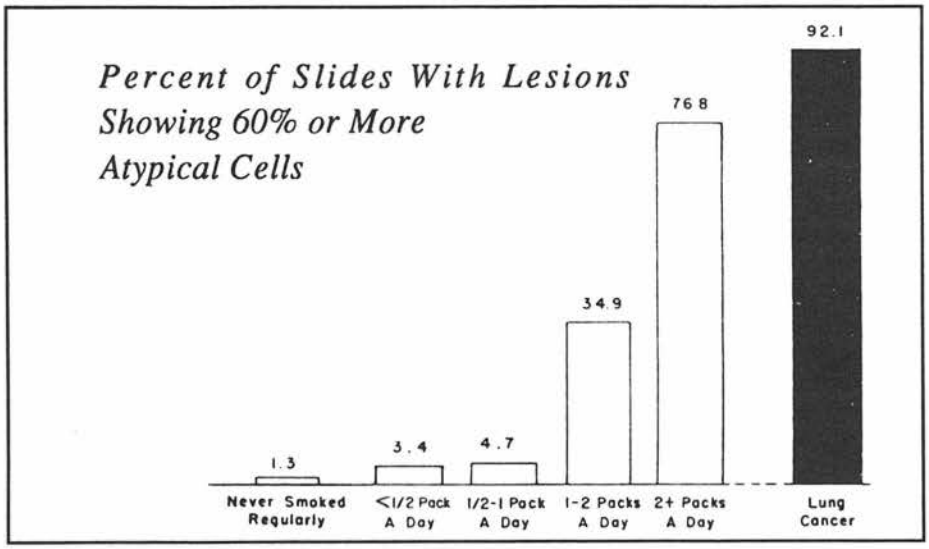
For the fraction of people who suffer cardiac arrest outside the hospital the chances are particularly grim — less than a one in four chance of surviving the episode, even in cities with the best of paramedic programs. In addition, cryonicists who suffer sudden cardiac arrest face a threat unique to them: a period of warm brain ischemia which, because of surprise circumstances, often continues for a long period after the question of immediate resuscitation is no longer an issue. To return to our illustrative case, we find that Jerry Leaf ironically suffered several hours more warm ischemic time than the best-case suspensions which he/Alcor had done in the past, and even so (considering the physical insult) was incredibly *lucky* to have done no worse than he did. *(Ed. Note: Jerry suffered 6 hours of ischemia at temperatures above 20°C, plus another 5 hours of "cold" ischemia while cooling from 20°C to 2°C, before perfusion began.)* Jerry, you see, suffered a *witnessed* arrest not far from a hospital, and did get CPR. But he might just as easily have suffered cardiac arrest while asleep, with the fact not discovered until morning. Or he might have suffered his M.I. while driving at high speed, or even while SCUBA-diving off the coast of Hawaii or traveling in a foreign country (both of which he did recently).

Annual death rate per 100,000 from cornary heart disease by age, cigarette-smoking status, and number of cigarettes smoked per day, U.S. veterans study.

Number smoked per day [1]	45–54		55–64		65–74	
	Current cigarette smokers	Ex-smokers [2]	Current cigarette smokers	Ex-smokers [2]	Current cigarette smokers	Ex-smokers [2]
1 to 9	195	125	594	432	1,374	1,105
10 to 20	297	133	830	557	1,577	1,260
21 to 39	390	57	912	743	1,701	1,366
40+	502	.....	1,101	646	1,955	1,482

[1] This is the current rate of smoking for current cigarette smokers and the maximum rate attained for ex-cigarette smokers.
[2] Ex-smokers who stopped for reasons other than doctor's orders.

SOURCE: U.S. veterans study (*52*).



The above are not even the worst-case possibilities, cryonics-wise, for the person with a surprise cardiac arrest. For one thing, sudden deaths are routinely autopsied (Jerry escaped, but that can't be counted on). Just as devastating a possibility for the cryonicist is suffering cardiac arrest but being resuscitated after prolonged ischemic insult to the brain. In such circumstances the heart continues to beat, while the brain (which continues to suffer ischemic injury long after the initial insult because of micro-circulatory damage) continues to degenerate at body temperature. The result is a doomed and comatose person stuck on a ventilator ("life-support") who has fewer neurons every hour, but who has, until brain death or the passage of some time, almost no legal options. Because the heart is unfortunately so much more amenable to resuscitation than the brain, this scenario is quite common — nearly every large ICU has more than one such case (for example, actor James Franciscus, a smoker who died in July, suffered this fate). Yet another class of ventilator- dependent people with severely damaged and even destroyed brains, often found in ICUs, are severe stroke victims. Smoking is a risk factor for stroke, too. The bottom line to all of this is that smoking can kill you Dead with a capital D, even if you *are* a cryonicist.

There are a great many other reasons not to smoke, of course. Female smokers suffer a higher incidence of wrinkled skin, osteoporosis, earlier menopause, and (recent studies show) late-life incontinence. Elderly and middle-aged male smokers do not escape their own set of problems, including a far higher incidence of impotence than nonsmokers — a testament to the fact that healthy medium-sized arteries are important to the function of more organs than just the heart and brain. All these pathologies, however, are beyond the scope of this essay. I write here mainly of the length of life, not the quality of it.

A man is no younger than his arteries, and cigarettes are the perfect artery damaging tool. The good news, however, is that apparently some of the damage is reversible in surprisingly short order when a person stops smoking. When a smoker quits, most of his excess risk for M.I. disappears within one to two years, and a disproportionate amount of the risk which disappears is the increased risk for sudden death. (This is in contrast to the excess risk of lung cancer, which goes away with a "half-life" of seven years). The two year figure for MI has not been explained, and is a little bit odd. Probably it is too long to be explained by postulating that any noxious toxin is being washed out of the body, but on the other hand it is too short an interval to imagine that anything is happening to full-blown atherosclerotic disease in arteries (which regresses very slowly indeed even under the best of circumstances). It is a good bet that *something* is being *healed* on this time-frame, and one possible candidate is the epithelial lining of arteries discussed above. Another possibility is that it takes the catecholaminergic endocrine system (which is revved up by smoking and which is involved in producing heart arrhythmias and high blood pressure) more than a year to wind down. Whatever the mechanism, however, the relatively immediate salutary effect of quitting on cardiac mortality risk is unquestioned.

It is never too late, then, to quit smoking — or to help someone you love quit. There are many possible ways to do this which I won't detail here. I recommend only that, if you need to don't hesitate to enroll yourself or someone you love in a smoking cessation program (a general rule of thumb in medicine is that when you're sure of your problem, see as specialized a person as you can get). The problem for most smokers is not that they could not quit if they marshaled all resources — most could. The problem for most smokers is that they are addicted to a drug, and not wanting to admit this to themselves or anyone else, have found a number of complex ways to rationalize *not* attempting to fight.

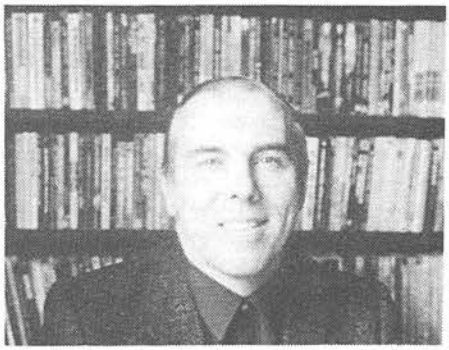
There is a self-serving but irrational view to tempt every human being. One of the most common ones to have if you are a smoker is to fixate on some other smoker who is a lot older than you are, and imagine that there is some Law of Nature that forbids you to die until you are at least as old as that. (Jerry's father, a smoker in poor health, is still alive — Jerry and I talked about him often. Younger smokers at Alcor I think looked to Jerry himself as a totem). Another favorite view among smokers seems to be that if you freely admit that cigarettes are going to kill you *eventually*, then the Cigarette God, mollified at having His sovereignty recognized, will agree not to take you just *yet*. Yet another rationalization is that "You've got to die of something," and that it doesn't particularly matter much what. For cryonicists who care about their brains, this last is a particularly bad idea, as I hope I've successfully argued.

There's very little more I can add. I can only throw up my hands and wish all well who struggle with the smoking problem. Keep trying. In future columns I will have more to add about the other risk factors for heart disease and sudden death. In the meantime, I hope that the reader will forgive me for the slightly emotional tone of this article as regards this one particular risk factor. When it comes to smoking, emotional reactions are an occupational disease of physicians. Oscar London, M.D., a well known San Francisco internist and writer, has this advice to his patients: "If you drink, don't drive; if you smoke, don't bother wearing your seat belt." Dr. London is being a bit facetious, but I understand the sentiment perfectly. I loathe cigarettes — I cannot begin to adequately say how much. Every internist does; all of us have seen too many horrible things happen to our patients as a result of smoking.

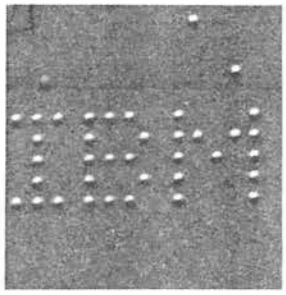
And all of us have lost too many friends that way.

Near-Term Nanotech

H. Keith Henson



One of the most common questions I hear from people interested in nanotechnology is, "Where can I invest in nanotechnology?" (Another one is where do I get a job in . . . ?) Mostly you can't, because speculation has outrun technology. This situation may be about to change. As reported elsewhere in this issue of *Cryonics*, IBM researchers used a scanning tunneling microscope (STM) to demonstrate a single-atom memory switch. Turning this demonstration into practical products is not likely any time soon, but it is sure to be a major goal, stimulating other companies to R&D investment in the STM/nanotechnology area.



The expansion of research in this area opens a market for improved STM tools. One might be an "aerial mapper" for surfaces at the nanometer scale. Remember about a year ago the xenon-atoms-on-nickel spelling of "IBM"? If a five-cent piece were blown up to the size of the earth's disk, the letters would have been 10 feet high. Can you imagine finding a single signboard somewhere on earth from space? If the IBM researchers had lost the spot they were working on, they never would have found their way back by random search. There is a simply mind-boggling amount of area when you look at a surface with the resolution a scanning tunneling microscope provides.

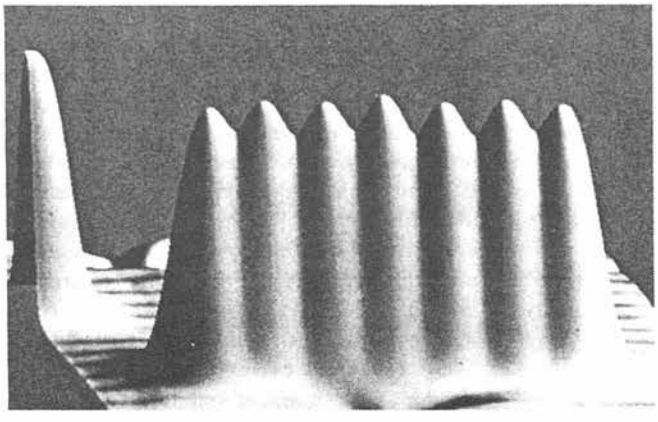
A zoom and pan method with ways to find interesting places again by coordinate reference would be useful. Part of the problem is the small range of motion which can be obtained from an STM tip. If you want to look at more, you have to unlock the substrate and mechanically move it. Perhaps an automatic stepped scan of a surface while generating a map from overlapping images would be the best way to locate interesting features or relocate work sites.

Besides locating something, we need methods to move things "long" distances across scanned surfaces. Perhaps a robust version of the STM tips, or a miniature overhead crane, though a large range of motion tends to be incompatible with vibration resistance. Perhaps something akin to a conveyer belt could be made.

Another problem is "getting a handle" on prototype nanotech devices. Workers who build micromachined gears from silicon already have this problem. One sneeze and a month's work is gone. Nanoscale stuff is even worse; it is more likely to wind up in your lungs than on the floor.

One possible solution might be to build (or self-assemble) a few types of nanoscale devices on top of silicon "handles." This is a natural-feeling tactic, approaching an objective by starting "somewhere near" in scale. How far apart are conventional micro circuits and the nanotech realm? "State of the art" for the smallest wires to be found on commercial integrated circuits is around 1 micron (10^{-6} meter, or a thousand nanometers). It is hard to do, but electron beams can make features on silicon surfaces as small as 10 nanometers, and conductive features as small as one nanometer have been made with STM tips. The size of a ribosome (the molecular machine in our cells which reads RNA "tape" and assembles proteins) is about 10 nanometers, so there may be enough overlap in the two ranges to be useful.

A short explanation of the protein-making process will help in understanding the following proposal: mRNA ("messenger" RNA) is copied from DNA, a process facilitated by a group of proteins. In eukaryotic cells (ones with a nucleus) the mRNA undergoes an editing process where parts of it are discarded. It migrates (or perhaps it is pushed) from the nucleus to the cytoplasm of a cell, and there encounters ribosomes, and an environment including transfer RNA (tRNA). A ribosome needs only mRNA and loaded transfer RNA to make proteins — amino acids strung together in a specific order. The mRNA fits into a grove on one side of a ribosome, a tRNA loaded with an amino acid on one end diffuses in to mate with a complementary three-nucleic acid pattern. The tRNA then wraps around the ribosome, and attaches its amino acid to the growing protein chain. The ribosome ratchets the mRNA forward three nucleic acids, and the actions are repeated. A few



of the 64 possible codes are used for "start" and "stop" signals; the rest specify one of the 20 coded amino acids. The protein-making process is under several levels of control starting with what parts of a cell's DNA gets mRNA copies of it made. To a great extent, what proteins a cell makes determines what kind of cell it is.

An (entirely hypothetical) method to read RNA might be to get ribosomes to stick to a prepared silicon surface, perhaps using antibodies to link them to a site consisting of three or four carefully spaced fine conductors on the surface. (Incidentally, I have no idea how to stick one end of antibodies to a conductor, or even if they and the ribosome conduct well enough to be used for this purpose.) The physical contortions a ribosome goes through while adding another amino acid to a growing protein chain might result in a detectable signal in the form of changed tunneling current through a ribosome bound to conducting pads on the surface. There would be little noise pickup if the amplifiers were fabricated out of nearby silicon. If there were enough signal differences, the types of amino acids could be determined. If not, transfer RNAs holding different amino acids could be washed over the ribosome in sequence until there is an indication one was added to the chain.

Such a device would constitute a crude gene reader. Refinements might permit reading DNA directly instead of RNA copies. There is a known market for such a device, or rather for the gene data itself. The human genome project alone is a multi-billion dollar effort expected to take decades with current technology.

A very small piece of silicon could have thousands of sites on it. "Fabrication" would involve dipping the surface in antibodies and then in suspended ribosomes. Even if 99% of the ribosomes were damaged or failed to work, electronics in the silicon could distinguish the working ones from the damaged ones. The silicon could incorporate signal processing elements up to a microprocessor.

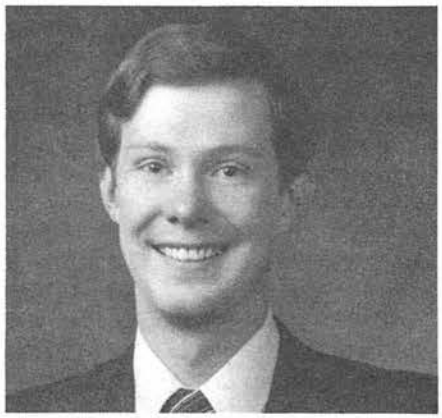
While I don't see such a product leading directly to general purpose replicating assemblers, it would be a useful and perhaps profitable first stage product, sparking commercial interest in the area.

Next time I might consider how rapidly we might go from a world with little or no nanotechnology to one almost entirely dependent on it.

Legislative Watch

Stirring Up a Hornet's Nest?

Allen J. Lopp



Recent events indicate that gaining the attention of the state legislature by cryonics advocates may be easier than we expected. I'm not sure that's good news.

Any bill relating to cryonics would probably first be examined by one of two legislative committees that deal with health issues, either the Senate Health and Human Services Committee or the Assembly Health Committee. Knowing this, I concluded that likely legislators to write to first about cryonics would be the members of these two committees. So in June and July I wrote to the chairpersons of these two committees, Senator Diane Watson and Assemblyman Bruce Bronzan. This may have been a wise move, or this may have been like swatting a hornet's nest.

I have yet to hear from Bronzan's office or the Assembly Health Committee. But in July I received a message on my home answering machine from a Ms. Jillian Kong, who works with the Senate Health and Human Services Committee. Before returning her call, I talked to Carlos Mondragón to get the latest on Alcor's court cases — they were sure to be central topics in my talk with Ms. Kong.

I learned from Carlos that he had already talked with her, and had an extended phone conversation in which he covered the basics of the court cases and the various indirect ways that cryonics organizations are already regulated.

When I talked with Jillian Kong, we covered basically the same issues. In addition, she asked what legislative need there was relating to cryonics. I responded that I wasn't sure there is any need for legislation, but that I was concerned that the DHS or other state officials might approach the legislature about making cryonics illegal. Thus, I was writing to Senator Watson and other legislators to see what their response would be to such an approach. Moreover, I wanted to point out that at least three superior court decisions have found that cryonic suspension is a constitutional right under the privacy provisions of the California state constitution — thus, an outright ban of cryonics is not appropriate, and if enacted might be found to be unconstitutional.

As the conversation closed, I asked if she had any feedback from Senator Watson about her initial stance on cryonics. She said she didn't have any such feedback.

Still, it was clear that Watson had decided that cryonics was worth extensively researching. Similar research was done in 1989 by a staffer for Senate pro tem David Roberti, and it resulted in the most thoughtful response I have received from any of my letters to legislators. Generally, I think the research work by legislative of-

fices is a good thing, but it is risky because there is no guarantee they will not evaluate something they uncover in a negative light. Admittedly, Alcor and other cryonics groups have made our mistakes — but then, so have savings and loans, insurance companies, stock brokerage houses, airlines, railroads, pharmaceutical companies, etc., etc.

When I precipitate such an investigation, I try to remain optimistic — but paranoia always sets in. (I sometimes hope that a rational control of my own paranoia might be one of the few good things that old age bestows upon me.) I tend to have visions of state legislators running up a Transylvanian mountainside holding burning torches far above their heads, pounding on the heavy wooden doors of the dusty stone castle, insisting that the frozen humans inside deserve a Christian grave and that they be allowed to commence their eternal Rest In Peace without delay. On the other side of the heavy wooden doors is Allen Lopp, pounding away frantically on his little word processor, and cursing himself for buying that prime rib dinner instead of another roll of 29-cent stamps.

I decided to offer to go to Sacramento and have a personal visit with Jillian Kong. She accepted.

The visit covered the same ground yet again, including another review of the difference between legal death, clinical death, and biological death. It included my nervous explanation that biological death has no clear thresholds, since we don't know at what instant acceptable recovery of identity becomes theoretically impossible. And what is "acceptable" recovery of identity? Yet, I asserted, an optimum suspension performed immediately after declaration of legal death is clearly deserving of rational hope, and our goal is that some day *most* suspensions might fit into this category.

Ms. Kong's questions were quite intelligent, and if they were repetitive, I got the impression that some of that was testing whether I would give the same answers every time, and also checking that the info I gave her jibed with other sources. She took copious notes. I did not wish to bury her with literature, so I left her with copies of the letters on cryonics I have received from other legislators, a copy of Ben Best's article about how cryonics was banned in British Columbia (to justify my desire to educate legislators about cryonics), and a copy of Alcor's informational booklet, "Cryonics: Reaching for Tomorrow."

She was guarded in the information she gave me, but she did say that Senator Watson indicated that cryonics is an area where legislation is probably necessary. She said that she did not get messages from the Department of Health Services or the Attorney General's office that either state entity feels that cryonics should be illegal, only that the DHS does not want to be responsible for allowing an activity which current law does not address and which could later result in bad situations. (This was clearly an allusion to the Chatsworth disaster, although neither of us directly discussed Chatsworth.)

She said that everyone all around sees that if new legislation addressed cryonics, then the DHS case would become unnecessary. She appeared careful not to even imply that that legislation would necessarily *support* cryonics. She did, however, again ask me that if legislation were necessary, what would I like for that legislation to be.

I listed four points: 1) A clear statement that cryonic suspension is a legal disposition for humans that have been declared legally dead (I left it at that even though we did discuss Thomas Donaldson's case briefly); 2) Disclosure requirements ensuring that prospective cryonics clients are told that cryonics is not a sure thing, and prohibiting a cryonics organization from making fraudulent promises, such as that revival is certain; 3) A clear mechanism for a person who wishes to be suspended to transfer control of their body to a cryonics organization (I discussed the intricacies of the UAGA at this point); 4) A way that deaths which are coroner's cases can be handled without unacceptably compromising the cryonic suspension of those individuals.

Finally, I asked once again if I could expect a reply from Senator Watson, and she said she couldn't promise that because that is Senator Watson's decision.

What will come of all this? I don't know! It might result in nothing at all, and it might result in a bill addressing cryonics. Watson may simply be getting all the facts before deciding what her action will be, which is an admirable approach. Or she may have already concluded that cryonics is suspicious at best, and she is out collecting ammunition — in which case a bill addressing cryonics may be imminent, and might be not at all to our liking. Time will tell.

(By the way, I shared with Ms. Kong that, as of May, Alcor has 239 Suspension Members, 211 in the sign-up process, and 17 members in suspension. While in Sacramento I bought the California Political Almanac which says the Department of Health Services has 5,232 employees and an annual budget of $13.3 billion. Maybe I better buy an *extra* roll of stamps....) Are you willing to help? Now would be a wonderful time for cryonicists to write to Senator Watson about our desire for cryonics to remain legal and available — and especially cryonicists who live in Watson's district. She represents Senate District 28, which includes Inglewood, Hawthorne, Lawndale, Venice, Marina Del Rey, and LAX. You may want to thank her for her interest in cryonics and her responsiveness to my inquiries. Write her at this address:

The Honorable Diane Watson
California State Senate
4040 State Capitol
Sacramento, CA 95814

If you don't have time to write, call her Sacramento office at (916) 445-5215. Just explain that you have been told that she is researching cryonics, that you wish to thank her for her interest, and that you wish for cryonic suspension to remain legal and available in California.

On a separate matter, I would like to thank Marce Johnson for writing her state senator, Marian Bergeson, and for forwarding Senator Bergeson's reply to me. Bergeson said that "there is no legislation relating to cryogenics [sic] pending in the State Legislature. However, should such legislation be introduced, I will certainly keep your comments in mind."

I have come to realize that such a response is about the most that one can reasonably expect from an initial letter about cryonics. Legislators simply don't always have a position instantly on everything — and this is especially true for a complex issue such as cryonics, which is a real head-scratcher for a lot of people. Obviously, you cannot tell them everything they need to consider about cryonics in a short one-page letter. Thus, do not expect your representatives to be instant allies. It will be necessary to educate these folks, and that will take time, effort and tender loving care. Senator Bergeson's response is a good first step.

By the way, Senator Bergeson sits on the Senate Health and Human Services Committee also.

Good work, Marce, and thanks for helping!

A Plea for Inflation-Proof Cryonic Financing

Ben Best

Inflation

Inflation is an economic reality for every nation in the world. As long as governments control the money supply and the central banks, this situation will continue into the foreseeable future. It is therefore urgently necessary that cryonic financing take cognizance of this fact.

Inflation is an increase in the supply of money relative to the supply of useful goods and services which money can buy. A massive crop failure or massive government diversion of economic resources to the production of useless goods and services can cause inflation even if there is a decline in money supply. Government expansion of money supply, however, is a more common cause — most crudely when governments resort to printing large amounts of money as a significant means of financing themselves. Taxes, government debt, and foreign-exchange policies will also contribute. Moderate expansion of money supply is frequently justified by government economists as being necessary for economic growth. However, in the period from 1980 to 1987, the average annual inflation for Brazil was 166.3%, for Israel 159.0%, for Canada 5.0%, for the United States 4.3%, for West Germany 2.9% and for Japan 1.4%. It is doubtful that inflation creates anything but an illusory increase in prosperity. From 1926 to 1987, the average annual inflation in the United States was 3.2%. If the past is a predictor of the future, a 5% annual inflation might be a conservative assumption for financial planning over the next 60 years. But there are no guarantees that government policies and economic conditions will not radically change.

Inflation-Proof Financing for Suspension Members

Minimum cryonic suspension funding arrangements might make it appear that a person is contracting for the delivery of future goods and services at a fixed price. But consider the effect of 5% inflation. In 10 years, $41,000 set aside for neurosuspension will be worth about $25,000, in 25 years will be worth about $11,000 and in 50 years will be worth about $3,000 — in current dollars. With double-digit inflation, the results could be far worse. For Alcor to agree to do neurosuspensions for the equivalent of $3,000 when Alcor's costs are $41,000 would be to threaten the survival of *all* members. For the same reason, "grandfathering" (not raising suspension minimums for old members when inflation requires price increases) is very dangerous. If prospective new members are asked to subsidize the "grandfathers," those prospects may decide to find or create a cryonics organization charging market-level prices.

Point 8 of the Warranties and Limits of Liability section of Alcor's Cryonic Suspension Agreement states that "Alcor does not warrant that the minimum required amount of the Suspension Fund will be adequate to pay for the Patient's cryonic suspension and maintenance." The Alcor Cryonic Suspension Agreement is *not* a contract to deliver suspension services at *every* future date in exchange for the amount of the current minimum funding requirement. Nor should it be.

At the beginning of 1991, minimum funding requirements were increased from $100,000 and $35,000 to $120,000 and $41,000 for whole-body and neuro patients respectively — a 20% increase. With inflation averaging 5% per year in twentieth-century America, we should expect a similar increase roughly every four years. In the 1991 minimum funding increase, Alcor chose to "grandfather" existing members at their original funding levels — meaning that existing members minimum funding requirements did *not* increase to $120,000 and $41,000. But there is no guarantee that this policy will be applied to future minimum funding increases. Alcor has no general policy which would automatically include grandfathering in any future price increase.

Of course it *could* happen that a large growth in suspension members could result in tremendous economies of scale. Technological advances could make costs drop. Although labor costs would prevent suspension costs from dropping as dramatically as the costs of computer hardware, the impact could still be considerable. But it would be dangerous to *count* on such an eventuality. Since our lives are at stake, an inflation-conscious conservative fiscal policy is far more prudent.

Alcor cannot remain on a sound fiscal footing without regular increases in minimum funding to keep up with inflation — and without abandoning the policy of grandfathering. It follows, then, that with each increase in minimum funding, Alcor must tell its members whose funding falls below the minimum that they must either increase their funding or have their suspension agreement terminated. For an aging Alcor member with declining income and an eroded capacity to make increased insurance arrangements, this process would be terrifying. For Alcor, the administrative costs of this procedure might be difficult, the emotional costs would be wrenching and the loss of members would be devastating.

A common plea to deal with this situation is to increase the minimum funding to some astronomical level. For example, if a member expects to die in 50 years, a $1.4 million life insurance policy will have a real value of $120,000 in 50 years at 5% inflation. There are many problems with this "solution." For one thing, it is *very* expensive. If the member dies in 25 years, a lot of money will have been wasted on insurance. And if the member dies in 60 years, the insurance will probably be inadequate. The insurance

will also probably be inadequate if average inflation exceeds 5% in the 50 years. To have spent great amounts of money on insurance, only to see the expected benefits destroyed by hyperinflation would be devastating.

One Possible Scheme

Consider an alternative approach. Suspension funding arrangements could consist of a two-part program: (1) an Insurance Policy Minimum-Fund (IPMF), and (2) a Contributed-Capital Minimum-Fund (CCMF). IPMF offers protection against near-term death with insufficient funding. CCMF offers protection against inflation and loss of insurability or earning-power with age. The cryonic suspension agreement could require that IPMF plus CCMF add up to the $120,000 Minimum Funding (MF) in 1991 dollars, as determined by the Consumer Price Index (CPI). The capital plus interest in the CCMF would always be enough to offset the loss of the value due to the inflation of the IPMF.

For example, suppose that Alcor did have the requirement that MF be $120,000 in 1991 dollars. If a member so chose, he or she could immediately give Alcor $120,000 to be placed in the CCMF (no IPMF). If Alcor invests this money in inflation-resistant assets, the amount in CCMF should remain at least equal to $120,000 1991 dollars despite any passage of time or any rate of inflation (although an initial amount above MF would be a prudent way of increasing protection).

A 40-year old might opt to begin suspension arrangements with a $160,000 IPMF and contribute 2,000 1991 dollars per year to CCMF. In less than 20 years, the growth through interest of the CCMF could exceed the attrition through inflation of the value of the IPMF. Thus, before the age of 60, the member could stop paying-into CCMF and be ensured of an MF that is greater than 120,000 1991 dollars for the rest of his or her life.

For younger members, larger IPMFs and smaller initial contributions to CCMF will probably be the most suitable. Each member would tailor the financing according to age, income, neuro or whole-body arrangements and other factors. Although this plan might seem like an administrative nightmare, a fully-computerized system might be fairly smooth-flowing.

One objection that might be raised against the IPMF/CCMF plan is that Alcor should leave the ultimate funding responsibilities to the members. There may be concern over the responsibility of Alcor for the return on the CCMF and the desire of members to manage their own CCMF investments. Moreover, the added financial burden of CCMF may discourage some people from becoming members altogether. But pricing cryonics below its true cost to gain additional members is a dangerous practice because eventually the prices must rise with inflation. Either the fiscally dangerous policy of grandfathering will be applied, or underfunded members will be forced out (with much bitterness and nothing to show for their years and their cost of membership). Putting the *total* cost on the table to present and prospective members — both current cost and future costs due to inflation — is the most honest and comprehensive means of arranging cryonic funding.

Other Schemes

The CCMF scheme amounts to a pre-payment for suspension services, since Alcor must manage the fund. Many suspension members who are conscious of inflation currently buy an insurance policy which names Alcor as the beneficiary, and make additional financial arrangements on their own, for example a tax-sheltered retirement savings plan. However, inflation-conscious financial arrangements must ensure that Alcor is the owner or irrevocable beneficiary of all suspension financing, at least to the minimum funding levels. This means that Alcor will eventually have to be the beneficiary not only of the insurance policy, but of the savings plan (or a portion of it — a portion increasing with inflation).

It would be nice to be able to maintain funding without placing an undue hardship upon oneself. A suspension member who is gaining equity in a house by paying off a mortgage might prefer a plan which confers ownership of his/her portion of the house to Alcor. This approach has the danger, however, of involving Alcor in the intimate personal and legal disputes of its members — and of making Alcor appear to be a member- controlling financial octopus comparable to the popular depiction of Scientology.

Moreover, any financing scheme outside of insurance may present a problem for an elderly suspension member faced with few assets, declining health and no possibility of buying affordable life insurance. With insurance benefits eroded by inflation and other financing going to medical bills, the member may be eventually unable to afford a suspension. Governments are becoming increasingly active in seizing personal funds to pay for medical bills — and it may be difficult to justify ownership by Alcor of members' assets paid for services not yet delivered.

Under such conditions, Alcor must, in order to survive, cope with the wrenching process of dissociating itself from members whose funding becomes inadequate. An excessively intimate relationship with member finances could easily lead Alcor into costly lawsuits. But Alcor must ensure that minimum funding is available before beginning a costly remote rescue and suspension. This includes both insurance and non-insurance financing. To complete a perfusion on the basis of inflation-eroded insurance and be forced to abandon the patient because maintenance funds are not available, would be awful for all concerned.

Although there are no guarantees, a prudent combination of insurance and non-insurance financing will probably be adequate to protect most suspension members from inflation. What is required by Alcor is an efficient mechanism for including non-insurance member financing into assured minimum funding when minimum funding price increases exceed insurance coverage. Specifically, members must make some financial arrangements anticipating periodic inflationary increases in suspension minimum funding. Also, Alcor must have the administrative machinery in place to verify or adjust the suspension minimum funding of members during the periodic increases necessitated by inflation (and modulated, hopefully, by increasing economies of scale). Finally, Alcor must fully disclose to prospective members the dangers and responsibilities imposed by inflation so that members do not begin making suspension arrangements without awareness-of and preparation-for periodic minimum funding increases.

Investment

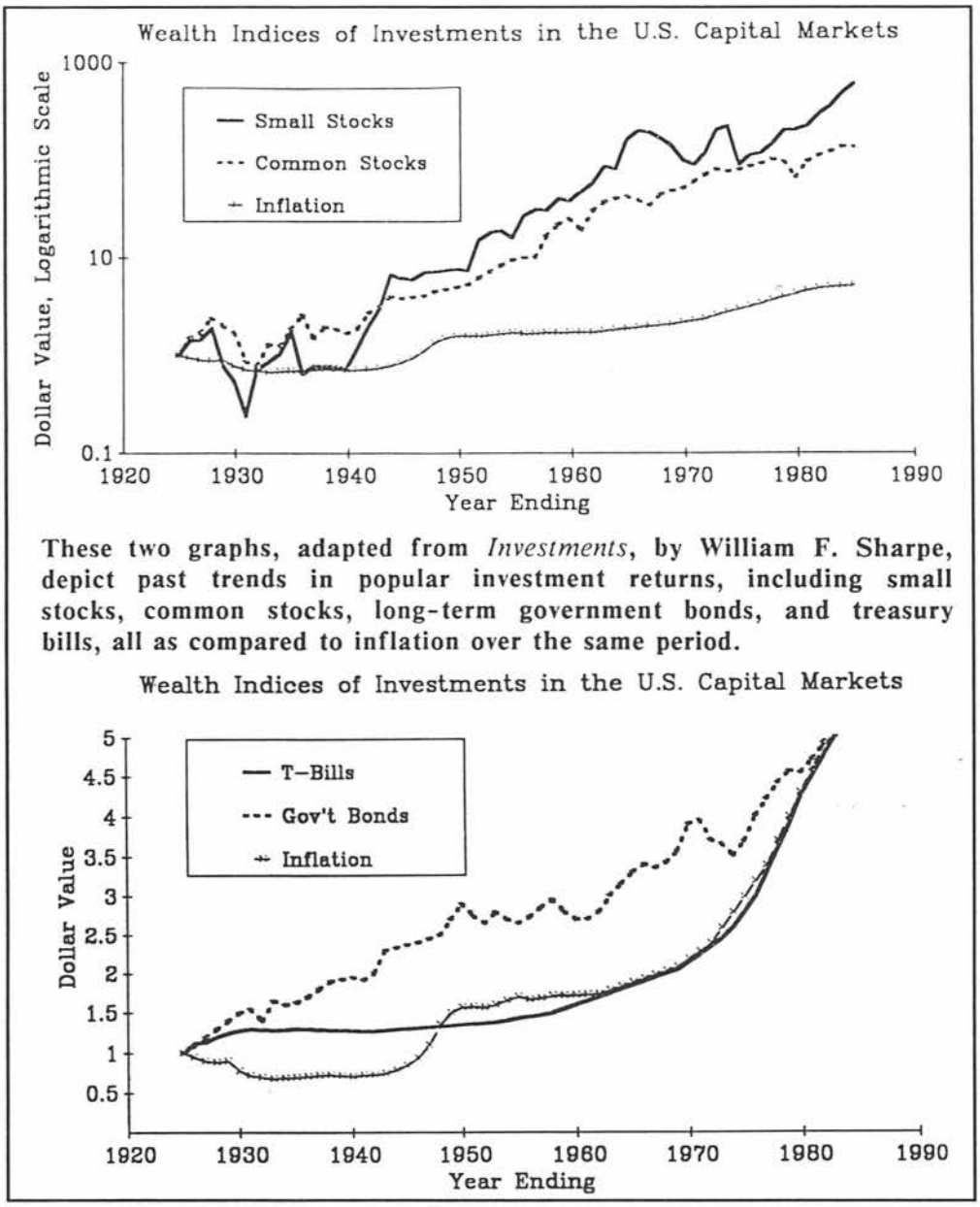
The most compelling contemporary model for investment analysis is the Capital Asset Pricing Model (CAPM) of William Sharpe and John Lintner (for which they recently won a Nobel Prize in Economics). In CAPM there is a market for money, where "return" is the price paid for money. "Return" will be *interest* for savings accounts, bonds and T-Bills (US Treasury Bills), and *dividends* plus *price increase* for stocks. The greater the risk to

an investor, the greater the return, *ie*, return is the price paid for risk.

Powerful empirical evidence for the CAPM can be found in the very authoritative study *Stocks, Bonds, Bills and Inflation* by Roger Ibbotson and Rex Sinquefield. This study was published as a monograph in 1977, 1979 and 1982 — and has been published in the form of yearbooks since 1983 by Ibbotson Associates (Chicago). The *1988 Yearbook* provides data on average annual returns from various forms of investment during the 1926 to 1987 period in the United States. Using *real* returns (*ie*, adjusted to eliminate the effects of inflation), the average annual real returns for small stocks, common stocks, long-term corporate bonds, long-term government bonds, intermediate-term (5-year) government bonds and T-Bills was 14%, 8.8%, 2.3%, 1.7%, 1.9% and 0.5%, respectively for the 62-year period. The standard deviation (a measure of risk) for these returns was 35.2%, 21.2%, 10.0%, 10.2%, 7.1% and 4.4%, respectively. (Small stocks are defined as common stocks in the bottom 20% of capitalization, *ie*, price times number of shares outstanding).

Viewing the data from a 62-year vantage-point obscures certain trends, however. In the ten-year periods from 1926, stock price variability gradually fell from standard deviation 33.5% in the first decade to below 20% in the last decade (although the 1987 crash has increased variability again). Inflation was much lower in the earlier years than it has been since 1970. The inflation-adjusted returns for T- Bills from 1926 to 1982 were 0% annually; only the long bull market of the 1980s forced the Fed to pay a small real return. But in early 1991 real returns from T-Bills were *less* than inflation (stock returns were far less than inflation). (Sometimes investors can do no better than minimize losses due to inflation or recession.)

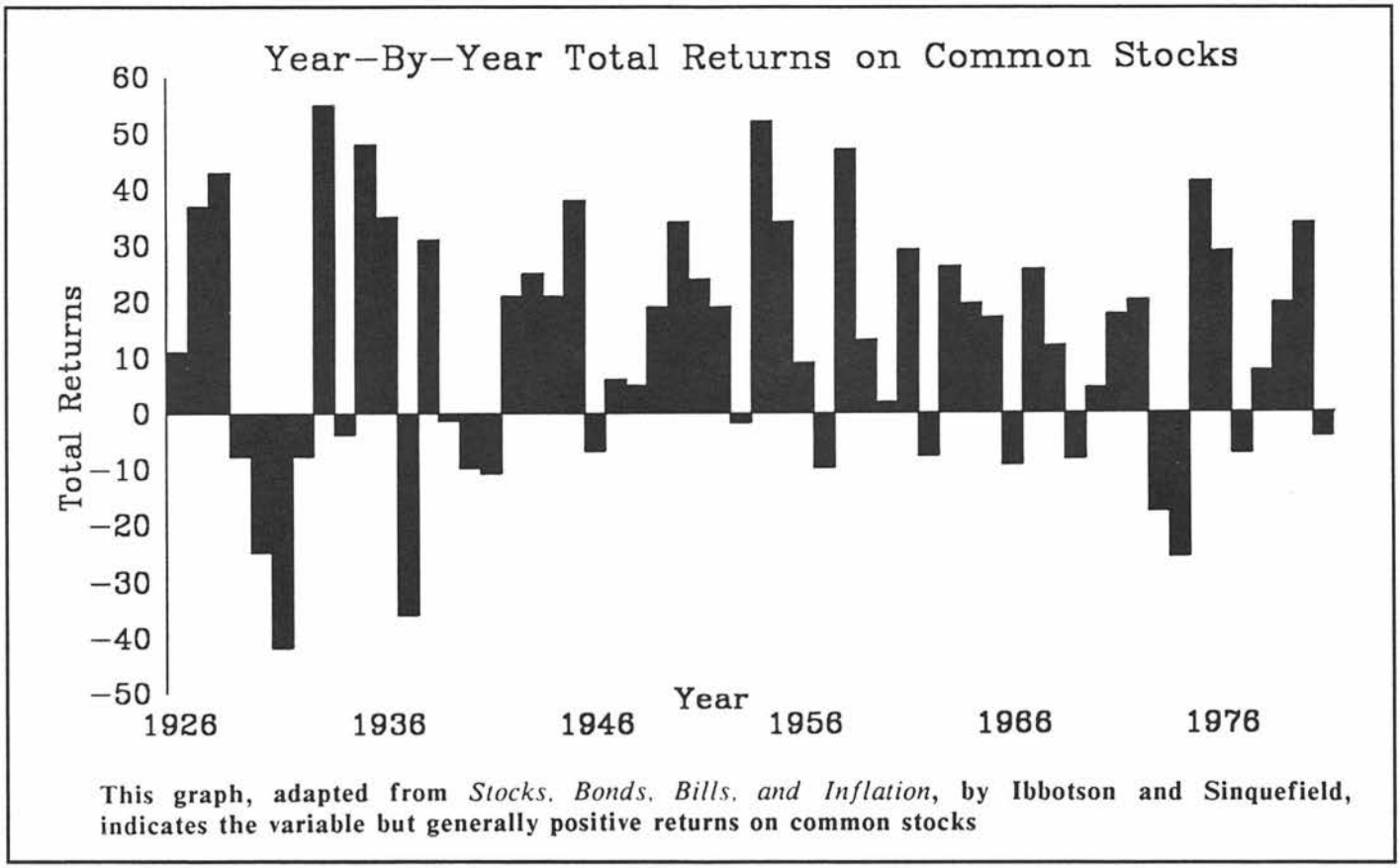
The *risk* of concern to cryonicists is the risk of default rather than the risk of price volatility. So-called "junk bonds" (high yield, high risk-of-default bonds used to finance risky ventures) are not likely to be of interest to cryonicists. Small stocks may also have a greater likelihood of "default," in the sense that they may more often drop out of the exchange altogether due to company failure or other reasons. But the *risk* underlying CAPM is a variability "risk," more than a default risk.



These two graphs, adapted from *Investments*, by William F. Sharpe, depict past trends in popular investment returns, including small stocks, common stocks, long-term government bonds, and treasury bills, all as compared to inflation over the same period.

Funding cryonics requires long-term investment thinking. A higher probability of a loss in a given year from stocks (as opposed to bonds) should be of less concern than the long-term greater return from stocks. Moreover, stocks are inflation-proof in a sense that bonds are not. Should the United States be stricken by sudden hyperinflation, even short- term T-Bills could result in huge losses (in real terms). But stocks represent ownership of businesses — which will increase their prices 1000% in a 1000%-inflation period (for example), and stock prices will eventually rise accordingly (because stock prices are ultimately a reflection of the valuation — present and future — of corporate assets). Bonds and T-Bills are "risk free" only in *nominal* (numerical) dollar value, not *real* (inflation-adjusted) dollar value. The short-term risk that stock prices may fall in any given year must be weighed against the long-term near-certainty that stocks do a better job of staying ahead of inflation than do bonds or T-Bills.

Investors, of course, do not buy generic "common stock," they buy individual stocks. Conservative investors do not try to "outguess" the market by buying large amounts of a few individual stocks which they hope will outperform the market. The best way to avoid the risk of individual stock prices is through diversification — the purchase of many different stocks and many different *kinds* of stocks (not just "high-tech"). Conservative cryonicists may want to buy mutual funds



This graph, adapted from *Stocks, Bonds, Bills, and Inflation*, by Ibbotson and Sinquefield, indicates the variable but generally positive returns on common stocks

to achieve diversification — although this means paying a fee (indirectly) to the fund managers. Purchasing stock is cheaper in *board lots* (packages of 100 shares, usually) rather than *odd lots*. If a cryonicist or group of cryonicists purchased eight board lots of common stocks chosen at random, the return should be within 20% of a market index diversification, with standard deviation of 25% (*Journal of Business*, April 1970, pp. 99-134).

Real estate is also an inflation-proof investment. Moreover, it is an investment which can provide a place to live. Paying-off a mortgage does more to build equity than does paying rent. It is also possible that equity held in a house would be less vulnerable to government attempts to seize assets to pay health costs than would investment funds (although this might be complicated by the assigning of a real estate lien to a cryonics organization).

Inflation-Proof Financing for Members in Suspension

Alcor members in suspension have their liquid nitrogen and other expenses paid-for by a distinct fund: the "Patient Care Fund." In an attempt to be as conservative as possible, the fund is administered by strict guidelines, including the requirement that an amount equal to 50 times the projected patient care be invested in investments with "negligible risk." Small or moderate risk is allowed only for amounts in excess of the previous requirement — and cannot be used for more than 20% of the total Fund.

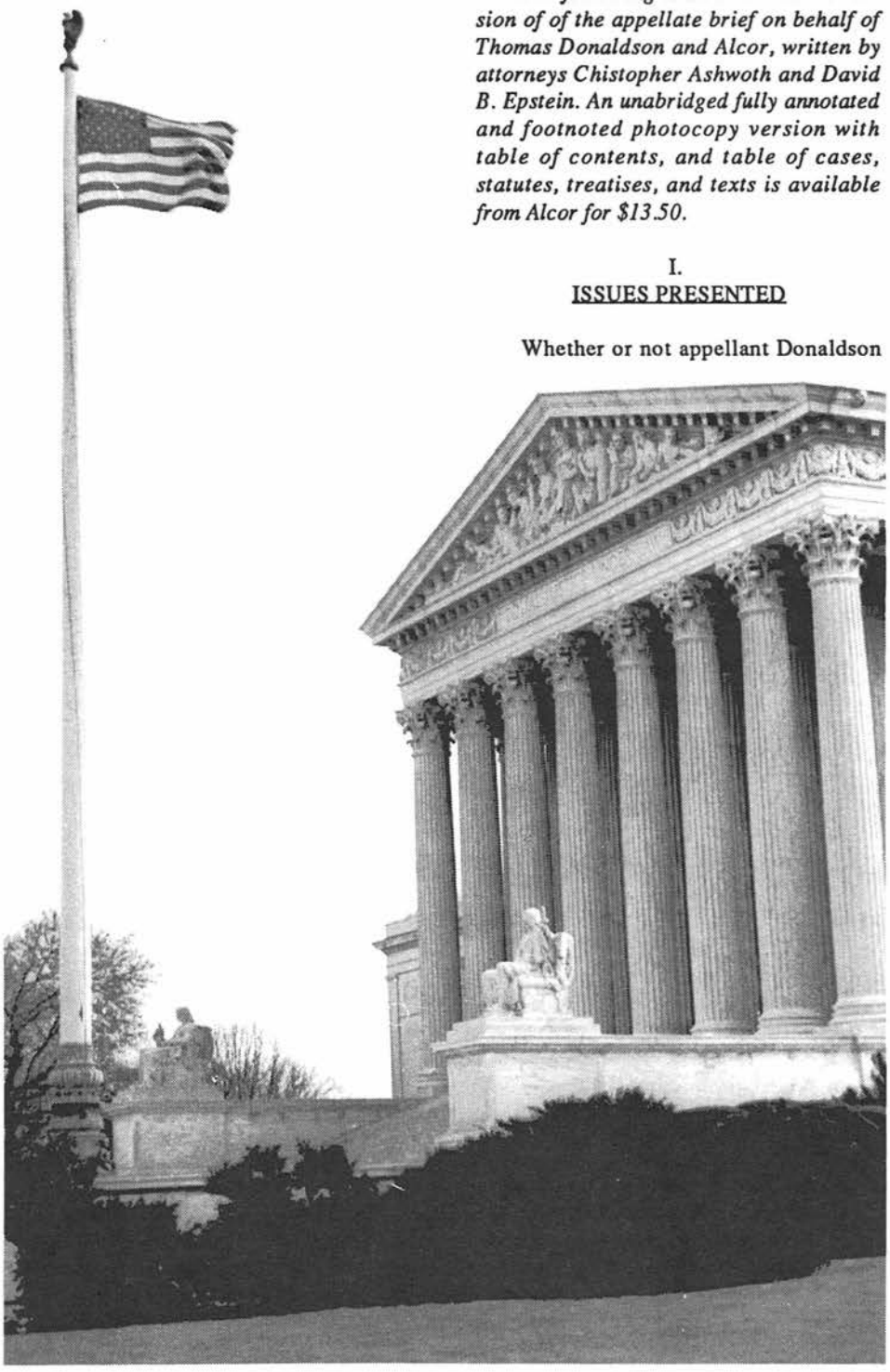
In practice, the investment of "negligible risk" chosen by Alcor has been T-Bills (widely recognized as the standard of risk-free investments). This "negligible risk" has a price, however, namely the 0.5% real return in the 1926 to 1987 period as described by the Ibbotson study. The conservative attempt to avoid volatility of price results in a very unconservative policy which could result in the erosion of the Patient Care Fund by inflation. If the Ibbotson study is to be believed, investment in T-Bills would require an amount 200 times (rather than 50 times) the projected patient care expense. To do this, Alcor Member minimum funding would have to be increased accordingly. But why should Alcor Members be required to underwrite a bad investment strategy? Using the Ibbotson zero return for T-Bills during the 1926 to 1982 period, no investment in T-Bills can be justified as "risk-free."

It *is* necessary that the Patient Care Fund yield adequate returns to pay expenses *every* year. In this sense, volatility of returns cannot be tolerated. But the return of common stocks consists of dividends as well as stock price — and dividends are usually paid even though stock price is falling. Setting aside five years worth of Patient Care Fund in cash and investing the rest in a blue chip mutual fund would be a more conservative investment than buying T-Bills. There are many options, and the primary purpose of this essay is to provoke a more rational evaluation of inflation-conscious alternatives, rather than to advocate a specific policy.

As a final caveat, it is worth remembering that the past is not always a predictor of the future. The historical performance of investments is only a rough guideline in an ever-changing world. The current crack-up of the communist world is a sharp discontinuity from the preceding 70 years. South American governments have defaulted on their debts — and there is no guarantee that so-called risk-free US Government T-Bills could not face default some time in the next hundred or so years. As cryonicists we must be conservative without being hide-bound. Our adaptability and willingness to face tough problems will be the key to our survival.

The Donaldson Appeal

Christopher Ashworth and David B. Epstein



The following is an abbreviated version of of the appellate brief on behalf of Thomas Donaldson and Alcor, written by attorneys Chistopher Ashwoth and David B. Epstein. An unabridged fully annotated and footnoted photocopy version with table of contents, and table of cases, statutes, treatises, and texts is available from Alcor for $13.50.

I.
ISSUES PRESENTED

Whether or not appellant Donaldson has the right, arising under California's right to privacy, to procure the assistance of others in the commission of a suicide, where, as here, a cancerous brain tumor condemns Donaldson to a painful and degrading end-of-life in the ordinary course.

Whether under California's right to privacy appellant Donaldson has the right to be cryonically suspended (frozen) premortem where an existing illness promises to destroy so much brain tissue as to make such cryonic suspension fruitless if Donaldson is required to await his "natural" death.

Whether appellants (Mondragón and Donaldson) have the Constitutional right to give and receive advice and encouragement in respect of a suicide under California Constitution Article I, Section 2 and the United States Constitution, Amendment I.

II.
STATEMENT OF THE CASE

Procedurally this case is easy to describe. On April 30, 1990, appellant Donaldson filed an action in the Superior Court in Santa Barbara County seeking declaratory relief in respect of his right to an assisted suicide/premortem cryonic suspension. The Attorney General and a number of other public officials were named as party defendants. Defendant VandeKamp filed a demurrer which was joined by all of the other defendants. On September 14, 1990, the Honorable Ronald W. Stevens, Judge of the Superior Court, sustained the Attorney General's demurrer and granted plaintiff thirty days to amend. Thereafter, Donaldson (now joined by plaintiff Mondragón) filed a First Amended Complaint for Declaratory Relief on October 15, 1990. In due course, the Attorney General (again joined by all other parties defendant) demurred to the First Amended Complaint. On December 14, 1990, the Honorable Ronald Stevens sustained the defendants' demurrer to the First Amended Complaint without leave to amend.

The underlying facts (as presented in the challenged Complaint and First Amended Complaint) are straight-forward. In August 1988, plaintiff Thomas Donaldson ("Donaldson") was diagnosed as having a malignant brain tumor. The tumor is inoperable and, ultimately, will kill him. In the two years since diagnosis, the tumor has grown and has intruded

upon his brain function. It has caused speech impediment, right-sided weakness and seizures. The tumor is a "space occupying lesion." As it continues to grow, it will slowly increase the pressure on all brain tissues within his skull. When this increased pressure reaches and ultimately exceeds the pressure with which Donaldson's blood is pumped by his heart, the brain slowly will die from lack of nutrients, especially oxygen (2). In time, Donaldson will be completely incapacitated and then will die.

Donaldson is a highly educated, mentally competent adult. He does not wish to suffer through a slow and painful decline while the tumor continues to grow and literally squeeze all life from his brain. He prefers a timely, albeit earlier, death, while he is competent and still has some modicum of dignity.

No one disputes that Donaldson lawfully can end his life by his own hand at any time. All agree that, if Donaldson waits until his brain is sufficiently destroyed to leave him dependent on medical support (and most likely, incompetent), he can require then that medical support be removed, permitting him to starve.

Neither of these alternatives is satisfactory to Donaldson because he wishes also to exercise his right to direct the disposition of his body upon his death. Specifically, Donaldson has directed that, upon his death, his body be placed in cryonic suspension. Donaldson cannot place himself in cryonic suspension without assistance. If he waits until the destruction of his brain cells has reduced him to incapacity, the objective of cryonic suspension — future reanimation — will be impossible and his right to choose the disposition of his body will have been meaningless.

There is no sound reason, in policy or law, why plaintiff should be forced to undergo the physical agony and indignity of being reduced to an incapacitated or vegetative state before he dies. Given the incurable and terminal nature of his disease, plaintiff is entitled to the assistance necessary to place his body in cryonic suspension before the destruction of his brain renders the cryonic suspension absolutely futile.

III.

ARGUMENT
DONALDSON HAS THE RIGHT TO PREMORTEM CRYONIC SUSPENSION OF HIS BODY.

Perhaps nothing is more fundamental to a civilized society than the concept, described by Justice Cardozo, that "every human being of adult years and sound mind has a right to determine what shall be done with his own body. . ." As observed by Justice Rehnquist within the last year:

Before the turn of the century, this Court observed that [no] right is held more sacred, or is more carefully guarded by the law, than the right of every individual to the possession and control of his own person, free from all restraint or interference of others, unless by clear and unquestionable authority of law.

Defendant here argued before the trial court that this fundamental right is not available to plaintiff here because "there is no constitutional right to commit suicide or assist a suicide, nor is there a constitutional right to commit murder or consent to be murdered." To pose the question in terms of "murder or suicide" is to begin with a conclusion which begs the questions presented and contributes nothing to an understanding of the issues.

In fact, there is ample authority for the right of a person who is terminally ill to put an end to his suffering and to have the assistance of others in doing so. In California, that right is recognized as "basic and fundamental" to the right of privacy protected by the state and federal constitutions. Whether the right is characterized as suicide is immaterial. Under any name, it is an exercise of liberty which may be exercised and assisted lawfully.

1. A Person Suffering From An Incurable And Terminal Illness Has The Right To Elect To Die When And As He Chooses.

a. The Case Law In California Concerning The Right To Die

In every reported case, where a competent decision was made, the courts have affirmed the right to choose an early death with dignity over prolonged suffering and misery.

The seminal case was decided in 1976 in In Re Quinlan. There, Karen Quinlan, who had been comatose for years, was permitted to elect (through her conservator father) to end her life by directing the removal of her respirator. By 1988, the courts of at least twelve states, including the highest courts of ten, had upheld the right of a terminally ill patient to discontinue needless suffering and to end his or her life.(6)

6. The only case in which plantiffs have been unsuccessful in asserting their right to die are those in which sufficient proof of a competent decision was lacking.

The California cases have moved in step with other jurisdictions. In Barber v. Superior Court, (1983), the Second District Court of Appeal held that physicians who removed the intravenous feeding tubes from a comatose patient at the request of his family could not be prosecuted for homicide. One year later, in Bartling v. Superior Court, (1984), the Second District again (but a different Division) held that "a competent adult patient, with serious illnesses which are probably incurable but have not been diagnosed as terminal, has the right, over the objection of his physicians and the hospital, to have life support equipment disconnected, despite the fact that withdrawal of such devices will surely hasten his death."

In Bartling, the court addressed and decided the issue notwithstanding the fact that the patient had died shortly before the case was argued. Two years later, the same court that had decided Barber reaffirmed the holding in Bartling in the case of a live patient, Bouvia v. Superior Court, (1986). As in Bartling, Bouvia involved a seriously ill patient who was not terminal and was not comatose. Ms. Bouvia, was an articulate fully alert and competent young woman who, although seriously ill, had a life expectancy of fifteen to twenty additional years with sufficient nourishment which was provided through a nasogastric tube. The court held that Ms. Bouvia's right to have the tube removed, regardless of any motivation to end her life, was a "basic and fundamental" part of the right of privacy under the state and federal constitutions. In 1988, the same principles were reaffirmed in Conservatorship of Draybick, (1988), where the Sixth District upheld the right of a comatose patient, through his conservator, to end his life by removal of a respirator.

b. The Characterization Of Plaintiff's Election As Suicide Does Not Diminish His Right To Die As He Chooses.

Defendant argued, from dicta in Bartling and Bouvia, that those cases do not apply here because the action by those plaintiffs were not suicide while the action

proposed by plaintiff is. This purported distinction is a fiction.

Bartling and Bouvia held that those plaintiffs had the absolute right to the removal of life support apparatus notwithstanding that the removal would kill them. Having established the plaintiffs' right at the constitutional level, the question of whether or not the act permitted was suicide was not an issue. In this context, the references to suicide in both cases is seen as an explicit statement of what the court did not decide. Thus, Bartling emphasized that "this is not a case, however, where real parties would have brought about Mr. Bartling's death by unnatural means..." Similarly, Bouvia emphasized that "it is not necessary here to define or dwell at length upon what constitutes suicide."

To the extent that either case appears to characterize those plaintiffs' decisions to end their lives as other than suicide, it is now recognized that this was more a matter of circumspection than an issue of substance. In truth, it is romanticized nonsense. The point is made by Professor Alexander:

As is often true in times of social transition, case law has created fictions to avoid affronting previously accepted norms. In life-support termination, there is a fiction of medical determinism. Patients are seen as passive victims of their illness. They do not choose to die; death overtakes them. Their physicians do nothing to help them die. Death overwhelms them, too.

The fiction requires that any action taken which will lead to death be described as, at worst, surrender to the futility of further treatment.

Blaming the underlying disease rather than the act of life- support removal is romantic but illogical. A person who removed a feeding tube from a recovering patient temporarily dependent on it, would have a difficult time persuading anyone that the resulting death was caused by the underlying illness, not by the removal of the tube.

The fiction was acknowledged and criticized by Justice Compton in his concurring opinion in Bouvia:

In order to seek the assistance which she [Bouvia] needs in ending her life by the only means she sees available — starvation — she has had to stultify her position before this court by disavowing her desire to end her life in such a fashion and proclaiming that she will eat all that she can physically tolerate. Even the majority opinion here must necessarily "dance" around the issue.

Elizabeth apparently has made a conscious and informed choice that she prefers death to continued existence in her helpless and, to her, intolerable condition. I believe she has an absolute right to effectuate that decision . . . . The fact that she is forced to suffer the ordeal of self-starvation to achieve her objective is in itself inhumane.

Ironically, the very authorities cited by defendant would agree that the characterization of Bartling's and Bouvia's actions as anything other than suicide is pure fiction.

Suicide may be defined as doing something which results in one's death, either from the intention of ending one's life or the intention to bring about some other state of affairs (such as relief from pain) which one thinks is certain or highly probably can be achieved only by means of death or will produce death.'

Now, in 1991, one would hope we would no longer need to engage in fictions or euphemisms to make a fundamental right more palatable. The plaintiffs in Bartling, Bouvia (and every other reported case) demanded the right to choose a dignified death over a painful and miserable life. The court acknowledged that right not because the method employed was or was not suicide, but because the constitutional right to privacy guarantees that the choice is theirs to make. Plaintiff Donaldson here demands and is entitled to the right to make the same choice.

c. The Right To Die Includes The Assistance of Others.

In Bouvia, Justice Compton commented on the fact that Bouvia needed the assistance of others to implement her choice.

The right to die is an integral part of our right to control our own destiny so long as the rights of others are not affected. That right should, in my opinion, include the ability to enlist the assistance from others, including the medical profession, in making death as painless and quick as possible.

A necessary corollary to the terminally ill patient's right to end his or her life is the right to secure the assistance of others where necessary to carry out such a direction. Barber v. Superior Court (1983) Whether it is carried out by the "passive" removal of the nasogastric tube as in Bouvia or the "active" sedation and lowering of body temperature for cryonic suspension here, the only material distinction between lawful assistance and murder is plaintiff's consent. Absent such consent, neither would be any more or less a crime because it is was either "passive" or "active."

2. In This Case, Plaintiff's Interests In Exercising His Right To Die As He Chooses Are Paramount To Any Interests Of The State.

Defendant acknowledges that plaintiff's right to end his suffering in the matter he has chosen "centers around a balancing of the asserted constitutional right against the pertinent interest of the State." Defendants then argued that "when that balance is struck, . . . plaintiff's asserted claim to a right to enlist others to take his life in an assaultive manner must be rejected." While defendants' argument recited the abstract interest of the State in preserving life, it failed entirely to address any of Donaldson's interest in ending his. Defendants' one-sided analysis, therefore, presented no balancing of interest at all.(14)

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14. Certainly the state has an interest in preventing the involuntary termination of life as a necessary element of social order. Stated in the abstract, however, the state's interest "in preserving life" or "in preventing suicide" is devoid of sufficient content to overcome a constitutionally protected right to privacy. Indeed, merely defending the state's abstract interest to "life" is a throwback to the view articulated by Blackstone that suicide is criminal behavior because the suicide is seen "rushing into [God's] immediate presence uncalled for . . ." Blackstone, Commentaries on the Laws of England, Book IV, ch. 14, sec. III.

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a. Donaldson's Interests Are No Less Compelling Than Bartling's Or Bouvia's.

A comparison of Donaldson's condition with Bouvia's leaves one hard pressed to identify a material difference in the interest of either in ending his and her suf-

fering. While Bouvia's condition had reached a more debilitating state, the difference is only one of time and provides us with a glimpse of what lies ahead for Donaldson. .... Donaldson's condition is terminal while Bouvia's condition was not. Bouvia had a life expectancy of 15-20 years, which is substantially longer than Donaldson's.

Notwithstanding these differences, the compelling comparison is that Donaldson, as did Bouvia, faces a certain future of pain and humiliation. While Donaldson may have fewer years left than Bouvia, the message from Bouvia is that it is not so much the amount of life left as it is the quality of the life remaining that counts.

Who shall say what the minimum amount of available life must be? ....As in all matters, lines must be drawn at some point, somewhere, but that decision must ultimately belong to the one whose life is an issue.

b. The State Has No Greater Interest Here Than It Had In Bartling Or Bouvia.

Defendants asserted a greater state interest here than in Bartling and Bouvia based on the State's interest in preventing suicide and murder. As discussed at [I.A.1.b.], supra, the characterization of Bartling's and Bouvia's decisions as other than suicidal are pure fiction. Nor is there any material distinction in the characterization of the means used as "passive" in one case and "active" in another. As Justice Scalia observed:

It would not make much sense to say that one may not kill oneself by walking into the sea, but may sit on the beach until submerged by the incoming tide; or that one may not intentionally lock oneself into a cold storage locker, but may refrain from coming indoors when the temperature drops below freezing.

In fact, one is hard pressed to identify any compelling interest of the state in depriving an incurably and terminally ill person the right to end his suffering sooner rather than later.

The compelling State interest to prevent assisted suicide is quite weak when the act is undertaken because of a terminal or severely handicapped illness, . . .(17)

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17. Smith, "All's Well That Ends Well: Toward a Policy of Assisted Rational Suicide Or Merely Enlightened Self-Determination." 22 UC Davis L. Review 275, 312 (1989), cited by defendant at Demurrer, p. 13.

It is worthwhile at this juncture to examine some of the rationales advanced against assisted suicide and note their constitutional fragility in the contemporary world.

Prevention of crime. There is no doubt that every state has a legitimate and compelling interest in preventing one person from imposing death upon an unwilling victim. No organized society can long endure unless it can ensure the lives of its citizens. The nugget in the prevention of this kind of activity, however, only makes sense if it is geared toward the prevention of involuntarily imposed results. The chaos implicit in a society that permitted unconsented killings is largely absent when the concept of involuntariness is taken out of the equation. Despite the occasional flat earth utterance that a state has a compelling interest in protecting "undifferentiated" life, the intellectually defensible position appears to be that civil society only has a legitimate interest in protecting against unwanted bodily intrusion.

.... The state has an obvious interest in preventing murders that are disguised as suicides. It does not require very much imagination to conjure up scenarios whereby interested parties would be very unreliable assistants to a prospective suicide. We are reluctant to accept the word of the sole heir of a suicide that his or her "assistance" was solicited by the deceased. The state could, therefore, require some reasonable scheme of vetting the bona fides of those who would assist another in committing suicide in order to assure that the prospective suicide is being done voluntarily and not as the result of undue influence, fraud or duress.

One court system has worked through this problem already. The Supreme Court of Holland, in a relatively recent decision, has outlined what it considers to be the necessary ingredients of a process to subject a prospective assisted suicide to a "disinterested" outsider's view. The Dutch Supreme Court's resolution, if not perfect, is workable. It simply anticipates a review by a disinterested party (a medical doctor) prior to the assistance being rendered to the suicide.

It is difficult to imagine a legitimate crime prevention interest that the state might have that would not be served by the Dutch model as outlined above. Similarly, constitutional liberty is not unduly compromised. By ordinary constitutional standards, a society can legitimately require some dispassionate demonstration of voluntariness before permitting a person to assist at a suicide. In simple words, the intrusion of government contemplated by the Dutch model would appear to be minimal and no broader than required to subserve legitimate governmental ends. It is the province of courts to fashion just such appropriate orders to serve the needs of the case at hand.

Civil duty. Some cases that discuss suicide tell us that suicide ought to be against public policy because it destroys the ability of the actor to perform his civic duties to his dependents and to other persons. Whatever theoretical merit that position may have in respect of the "ordinary" suicide, it has no pertinence to the assisted suicides which are the focus of this case. Our case involves someone who is or will be helpless at the time of his death. It follows that people who, because of physical or mental infirmity, are unable to effectuate their own suicide are not persons who are likely to be able to discharge civil duties in any event. They constitute a relatively small class of impaired persons from whom society cannot legitimately expect extensive and socially useful performance.

As applied to assisted suicide the logic behind the "civil duty" prohibition is tenuous, bordering upon non sequitur. (One also shrinks from the notion that a person ought to be kept alive and in traces like a draft horse until he dies from natural causes.) Proceeding from the assumption that suicide is a fundamental constitutional right, then the state is required to demonstrate a compelling state interest to outlaw or unduly interfere with the right. In the arena of civil duty, it is unlikely that the state could demonstrate that the class of persons who are the focus of this case — persons who are helpless to effectuate their own suicide — would be sufficiently likely to form a critical block of civil accomplishment so as to proscribe assistance at their suicides. Citizens are hardly civic chattel. See, generally, U.S. Constitution, Amendment XIII. A "civil duty" proscription against suicide (and particularly assisted suicide) would seem to violate the unbroken line of cases which suggest that the existence of civil duties — and the threatened breach thereof — cannot otherwise curtail fundamental liberty rights.

The miasmal dread of unperformed civil duties is not an appropriate basis to prohibit assisted suicide.

Religious and philosophical. If nothing else, law is one of many ways in which a society expresses its cultural or philosophical prejudices and preferences. There is nothing intrinsically the matter with that state of affairs. However, legal conflict is inevitable where, as here, philosophical values are in sharp conflict or so in need of reconciliation as to require the intervention of constitutional jurisprudence.

The philosophical and religious objections to suicide (perforce, assisted suicide) seem to fall into three broad categories: first, a residual holdover of Christian distaste for suicide; second, a somewhat undifferentiated and confused bias in favor of the "life force"; and third, the numbingly familiar "slippery slope" argument.

At common law, the courts accepted the religious proscription of the Church as a basis of decision. The common law text writers of course followed suit. Typical is Blackstone who informs us that suicide ("self murder") is criminal in part because the suicide is seen as "rushing into [God's] immediate presence uncalled for . . . ." Obviously, no court could get away with interfering with a suicide on the basis that it puts the suicide in the presence of God "uncalled for." The establishment clause of the First Amendment scotches that notion. However, the generalized notion that suicide is "wrong" or somehow violative of public policy has endured. One still finds cases that, with absolutely no underlying explanation, declare that the state's interest in "preventing suicide" and "preserving life" were self-evident propositions. This class of cases, being uncritical and unanalytical in the extreme, resist contrary argument. They are simply the residual effects — cast into judicial utterances — of a belief system which no longer is entitled to the enforcement of law. For the purpose of this brief it is simply appropriate to note that these cases exist and that their genesis defies both logic and analysis. It must be remembered that in California at least, a prohibitory statute must have a secular purpose. Wollersheim v. Church of Scientology, (1989).

The next subcategory is the generalized perception that the law should favor human "life" and pit itself against "death." One finds statements such as that of Justice Rhenquist in declaring that a state has a legitimate interest in the "undifferentiated" preservation of life. A number of things are the matter with that philosophical proposition. The most glaring of the defects is that the a priori consignment of death to a "bad" category as opposed to the "good" category of life makes no objective sense. Barring the demonstrable advent of an afterlife (to which the mode of death in this mortal existence would have no pertinence) death is simply the inevitable end-point of the life processes enjoyed (or endured) by all living things including humans.

In the specific context of California constitutional jurisprudence, it is impossible to conjure up a defensible state interest that would compel an individual to treat his or her life as worth living even after the individual manifestly concludes that that is not so. The state is in no position to answer the ultimate "because" question: "We are forcing you to stay alive because _____." That blank space stares back at us accusingly. Just what is it about a person's involuntarily continued mortal existence that advantages the state? Aside from the possibility of some merit in the "slippery slope" arguments discussed infra, Donaldson's counsel have found no philosophically cogent arguments posited by any writer which would justify imposing an unwanted continuation of mortal existence on a Californian, protected as he is by the right to privacy. That is, the price which someone might pay with their body in terms of pain or degradation has never been demonstrated to advance an objective and secular interest of the state. The best that the cases have done is to advance the tautological proposition that life is good because life is good. In that context it is impossible to justify a policy of miasmal life enhancement which may — and very, very frequently does — visit upon a citizen a level of torment and pain which would not be tolerated as punishment for the most heinous and revolting criminal behavior. It would seem to be a strange society indeed that required innocent citizens to live in torment and evil ones to be largely free of physical discomfort.

The last category of philosophical objection to assisted suicide can be generally lumped under the heading of "slippery slope." The central theme of all of the "slippery slope" arguments — with no exceptions Donaldson's counsel have been able to uncover — is that any step along the path of euthanasia creates an unreasonable risk that the permissive society will ultimately condone involuntary euthanasia. But there is no evidence that any society has developed aberrant homicidal offshoots such as involuntary euthanasia because of a progressive deterioration in the society's appreciation of the value of human life. The only historical precedents involve phenomena such as human sacrifices to propitiate the gods (ancient Aztecs) or the abandonment of the elderly because there is not enough food to go around (Eskimos).

If the underlying premise of Donaldson's complaint is correct, i.e., that the right to suicide is a fundamental one, then it is respectfully submitted that the trial court was wrong in staying its hand: Making the "great leap" from the recognition of a fundamental right to decisions that implement that right is precisely what judges are supposed to do. It is inappropriate for a trial court to avoid deciding a case in the hopes (or dread) that a legislature will act. California judges have a duty to exercise their jurisdiction and to decide all cases properly before them. This is especially true of cases involving interference with constitutional rights. Even in the absence of recognized procedure, constitutional jurisdiction must be exercised even if it has to "make up" a procedure.

The issue raised by Donaldson's case is now ripe for a reasoned decision. The pirouettes of "preservation of life," "prevention of suicide" and avoidance of the "slippery slope" are no longer acceptable substitutes for a rational confrontation between compelling state interests of the secular variety and Donaldson's fundamental constitutional rights.

c. The Commentators Cited By Defendant Would Each Support Plaintiff's Right To Die.

Ironically, each of the commentators cited by defendants in their demurrer supports plaintiff's right to carry out his plan.

In the note "Criminal Liability For Assisting Suicide," the author proposes a model statute which would decriminalize assisting a suicide where the person ending his or her life was a competent adult who was suffering from a terminal or chronic illness or a permanent, serious physical handicap. As Donaldson's condition is terminal, he could enlist the assistance of others under this standard.

In "Suicidal Competence and the Patient's Right to Refuse Life Saving Treatment," the author argues that the State has an interest only in preventing "irrational" suicides or those in which the decision to terminate life is not competent-

ly made. The author proposes a two-prong test .... Applying this test, the record would compel that Donaldson be entitled to carry out his plan.

Finally, in "All's Well That Ends Well, etc.," the author argues for an "enlightened self-determination" of an individual's life plan as the fulfillment of liberty.

Again, given the dismal future in store for plaintiff, who could say that his decision to end his life with dignity at this stage is anything other but an exercise of "enlightened self-determination." Certainly not the state.

3. Plaintiff Has The Right To Direct That His Body Be Cryonically Suspended.

a. California Recognizes One's Right To Determine The Disposition Of His Body.

The right to determine the disposition of one's own body attaches to the most fundamental values of a civilized society. It carries with it religious, moral, ethical, social and even environmental considerations which, instinct tells us, attach to basic human rights. While there are no reported appellate opinions focusing specifically on this issue, there is a substantial legal foundation for the concept of freedom of choice in directing the disposition of one's own body.

The legislature has acknowledged this concept of liberty in Health & Safety Code sec. 7100 which provides, in pertinent part:

Sec. 7100. **Right to control disposition of remains; duty and liability for interment; devolution; prior directions of decedent. Order of Devolution.** The right to control the disposition of the remains of a deceased person, unless other directions have been given by the decedent, vests in . . . the following in the order named: [surviving spouse, children, etc.] [Emphasis added.] . . .

Directions of Decedent. A decedent, prior to his death, may direct the preparation for type or place of interment of his remains, either by oral or written instructions, . . . The person or persons otherwise entitled to control the disposition of the remains under the provisions of this section shall faithfully carry out the directions of the decedent subject only to the provisions of this chapter with respect to the duties of the coroner."

While the last section of the statute uses the word "interment," it is evident that that term was not intended as one of limitation on the types of dispositions. The first sentence of the section provides for the order of devolution of the right to control the "disposition" of remains, predicated upon the condition "unless other directions have been given by the decedent." From this, it would appear that the legislature utilized the terms "disposition" and "interment" interchangeably. It would make no sense to confer upon family members the right to control the "disposition" of the remains subject to other directions by the decedent and, at the same time, confer a more limited right upon the decedent himself. The only logical interpretation of Sec. 7100 which would reconcile all of the provisions of that section is that the legislature intended to vest in each of us the right to determine the disposition of our bodies.

b. Plaintiff's Right To Direct The Disposition Of His Body Includes The Right To Premortem Cryonic Suspension.

On at least three occasions, trial courts have addressed the issue of cryonic suspension and, in various contexts, have acknowledged, both implicitly and explicitly, the right of the individual to direct the cryonic suspension of his or her body.

In Kent, et al. v. Carrillo, et al., Riverside Superior Court Case No. R 191277, the Riverside Coroner threatened to thaw the remains of decedents in cryonic suspension at the facility of the Alcor Foundation. The focus of the coroner's threat was the remains of Dora Kent who had recently died and had been placed in cryonic suspension. The plaintiff, who was the decedent's son, sought to enjoin the actions threatened by the coroner.

In granting Kent's application, on February 1, 1988, Judge Miceli specifically found that the action threatened by the coroner "would be in violation of the rights of the decedents" and that thawing the remains of the decedents at the Alcor Foundation "would produce irreparable injury."

The second instance in which these issues were presented to a trial court occurred nine months later in Roe v. Mitchell, Los Angeles Superior Court Case No. C 697 147. Initially, the defendants in the case were a hospital and various employees of the state of California. The context was the advice by the hospital caring for a terminal patient that it would not honor his request to release his body to a cryonics organization at the time of his anticipated death. On October 14, 1988, Judge Munoz issued a Temporary Restraining Order and Order to Show Cause Re Preliminary Injunction(25) restraining the hospital from interfering with the application of the initial cryonic procedures (use of a portable resuscitator) at the hospital after pronouncement of Jones' "legal death."

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25. The hospital later stipulated to make Judge Munoz' restraining order the terms of a preliminary injunction, which remained in effect until Jones died. The hospital was dismissed from the litigation.

In October, 1990, Judge Munoz granted summary judgment in favor of Jones and issued a sweeping, comprehensive injunction prohibiting the state from interfering with cryonic suspensions in any way.

[The] farthest reaching, Superior Court action, occurred in December 1989, again in Riverside County, in the matter of Saul Kent, et al. v. Grover C. Trask, II, Riverside Superior Court Case No. 201022. That action involved a threatened prosecution of certain Alcor members who had participated in the cryonic suspension of Dora Kent for violation of the Business and Profession Code prohibitions against the unlicensed practice of medicine. The Alcor member defendants sought injunctive relief on the claim that the threatened prosecution created an impermissible "chilling" of the constitutional right of each Alcor member to direct the disposition of his body by cryonic suspension. In a lengthy opinion, Judge (now Justice) Timlin(26) concluded:

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26. Judge Timlin was elevated to the Court of Appeals in August of 1990.

This court concludes that the Adherents, including Dora Kent, under Article I, Section 1 of the California Constitution and the Fifth and Ninth Amendments to the United States Constitution have a right to privacy, which includes the right to exercise control over his/her own body and to determine whether to submit his/her body, or any portion thereof, including the brain, to premortem cryonic suspension. (In ruling on the application, this court in no way comments directly or indirectly on the wisdom of such a choice.)

The moving papers submitted to Judge Timlin in the Kent v. Trask matter relied extensively on the "right to die" cases which consistently have conferred upon the individual the right to direct the discontinuance of life-support measures. While Judge Timlin distinguished those cases from the issues before him, the rationale of the "right to die" cases certainly provides an instructive insight into the direction the law has taken.

While it is not common in constitutional litigation for a plaintiff to take refuge in the technical rules of pleading, the court should be reminded that (1) the proceeding below was a hearing on a demurrer and that (2) one of the allegations of Donaldson's complaint that the trial court must have accepted as true for the purposes of ruling on the demurrer is as follows:

17. As noted above, Donaldson's progressive brain tumor will, unless checked, destroy a large part of his brain long before his heart stops beating and Donaldson could be declared legally "dead." As a consequence, much or all of the physical structure of Donaldson's brain which encodes memories (personality) will be lost unless he is cryonically suspended prior to that time. In the opinion of established scientists,(27) cryonic suspension portends a ponderable likelihood of ultimate success in being able to revive and treat and cure a person whose illness, in contemporary terms, would otherwise be deemed terminal. Further, it is a factual certainty that Donaldson's post cryonic suspension prognosis would be markedly better — and the chances for his revival and survival would be also be markedly better — if he is placed in cryonic suspension well in advance of the time when his "natural" death would occur.

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27. A representative list of such scientists and their curricula vitae was attached to the First Amended Complaint as Exhibit "A."

The development of the technology necessary to effect the repairs described in the subparagraph next above and to restore cryonic suspension patients such as Donaldson to health and vigor is viewed by the scientists (and others) identified in Exhibit "A" as highly probable. As a consequence, interfering with Donaldson's cryonic suspension will, as a matter of probability, shorten his life span — particularly in view of the certain fact that his life expectancy, absent cryonic suspension, is zero.

Factually, Donaldson's long-term prognosis is, beyond any statistical doubt, better with cryonic suspension than without it. It is anomalous to suggest that a process that augurs some measure of success is unlawful where the only alternative is a process that augurs no chance of success. More to the point, the demurrer ought not have been sustained unless the trial court was willing to say that cryonic suspension has no chance of working in the future or that there is no constitutionally protected right to suicide under any circumstance. It is unlikely that this court is willing to do either of those things.

B. PLAINTIFFS HAVE THE CONSTITUTIONAL RIGHT TO GIVE AND RECEIVE ADVICE AND ENCOURAGEMENT IN RESPECT OF A SUICIDE.

The salient portions of the first amended complaint are as follows:

29. Assuming arguendo that plaintiffs are not afforded judicial protection arising from their intention to tangibly (physically) aid Donaldson in achieving a "dead" state by cryonically suspending him pre-mortem, Donaldson, Mondragón and Roes 1-10 intend to do the things described in paragraph 30, infra.

30. Without the tangible (physical) assistance of any other person, Donaldson intends to procure sufficient appropriate drugs and intravenous injection equipment to permit him to administer to himself a lethal dose of some substance in order to rapidly bring about his death. Donaldson further intends to bring about his death in the presence of Mondragón and Roes 1 through 10 in order to minimize the time between his legal death and the onset of the cryonic suspension process.

For their part, Mondragón and Roes 1 through 10 (although disavowing any intention to render any tangible, "physical" aid to Donaldson) intend to "talk" Donaldson through the suicide procedure and intend to advise and encourage him in such ways as will assist him in achieving a state of "dead" by the means described above.

31. California Penal Code sec. 401 declares as follows:

"Every person who deliberately aids, or advises, or encourages another to commit suicide is guilty of a felony." [Emphasis added].

32. Suicide is not listed as a crime or public offense in the California Penal Code nor in any other statutory scheme in this State. Moreover, suicide is not treated as a "common law" crime in this State, inter alia, because Penal Code sec. 6 declares as follows: "No act or omission, commenced after 12:00 noon of the day on which this code takes affect as a law is criminal . . . except as prescribed . . . by this code . . . ."

33. Plaintiffs intend to advise and encourage Donaldson to effectuate his suicide in the way described in paragraph 30 above and by so doing will (definitionally) aid Donaldson in bringing about his own death.

34. Plaintiffs are informed and believe and on that basis allege that defendants Van de Kamp and Sneddon presently intend to prosecute any persons, such as the cryonic suspension team members, who would aid (even if such aid only consists of advising and encouraging) a fellow human being in moving from a state of "alive" to a state of "dead" within the meaning of Health and Safety Code sec. 7180.

Because suicide is not a crime or a public offense, plaintiffs Mondragón and Does 1 through 10 and Donaldson (as a recipient of any advice or encouragement), are protected by the First Amendment of the United States Constitution, and Article I, Section 2 of the California Constitution from any act or threatened act — including a threatened prosecution under Penal Code secs. 401 and 187 et seq. which would interfere with their right to free speech and expression.

At issue here is whether and to what extent the plaintiffs' right to give and receive suicide advice (speech by any other name) can be curtailed by government fiat. We might also keep in mind that California Constitution Article I, section 2 constitutes a "protective provision more definitive and inclusive than the First Amendment [of the U.S. Constitution]." Wilson v. Superior Court, (1975). State action violative of the First Amendment is, a fortiori, violative of the California Constitution. Bill v. Superior Court, (1982).

Under the First Amendment, there is a two pronged test which must be utilized in order to justify imposing either a civil or criminal penalty upon speech: The court must be satisfied that the speech in question (1) is directed at the goal of producing imminent lawless conduct and (2) the speech is likely to produce such conduct. Hess v. Indiana, (1973). Suicide is not "lawless" in California. Suicide is not a crime. Suicide is not a tort. Suicide is not a breach of contract. It necessarily follows

that speech which is intended to lead to an imminent suicide (and that is the case here) may not constitutionally be prohibited. Counsel for Donaldson have made a comprehensive review of the cases and have been absolutely unable to find a single case wherein the advocacy of lawful activity could be constitutionally proscribed.

Because of the foregoing analysis, Penal Code sections 401 and 187 et. seq. are unconstitutional as applied to the facts of this case. Further, section 401 is unconstitutional on its face precisely because it attacks expression rather than any underlying unlawful conduct. The cases cited below by the Attorney General are beside the point. Statutes prohibiting solicitation of crimes are simply not comparable to statutes (such as section 401) which proscribe the advocacy of lawful behavior. Solicitation statutes are constitutional; section 401 is not. The demurrer ought to have been overruled on this point.

C. THE COURT HAS THE POWER TO ENJOIN THE UNLAWFUL ENFORCEMENT OF A STATUTE

Defendant argued that the trial court does not have the power to enjoin actions taken by a public official pursuant to statutory authority. This is a correct statement of the law only so long as the statute or its enforcement does not contravene constitutional rights.

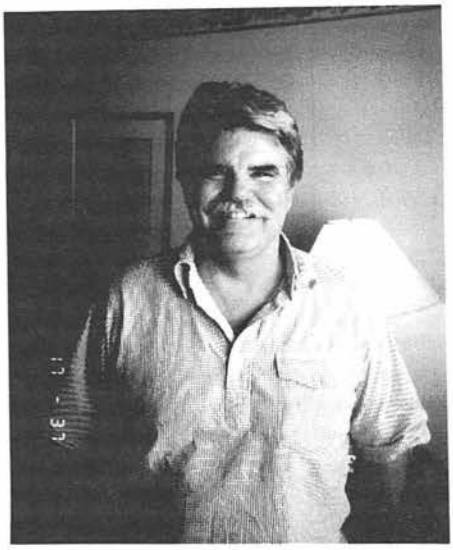
Plaintiffs' complaint alleges that, if he exercises his right to die and to direct the disposition of his body in the manner he has chosen, defendants will prosecute those assisting plaintiff and will autopsy Donaldson's body. As demonstrated in plaintiff's argument, supra, such actions by the defendants would be unconstitutional and therefore can be enjoined.

D. PLAINTIFFS HAVE NO ADEQUATE REMEDY AT LAW

Defendants lastly argues that plaintiffs have an adequate remedy at law because they can defend themselves against criminal charges. The simple answer is that so long as the chilling effect of the prospect of criminal prosecution is present, all plaintiffs will be denied the opportunity to exercise their constitutional rights. Moreover, even if an assistant were willing to take the risk, by the time charges are brought, damage already would have been done.

IV.
CONCLUSION

For all of the foregoing reasons, it is manifestly clear that the trial court erred in failing to recognize that both Donaldson has the right to an assisted suicide under the facts of this case (whether or not in the context of a cryonic suspension) and that Mondragón and those similarly [situated]



Christopher Ashworth

have an absolutely protected Constitutional right to advise and encourage Donaldson in his efforts at suicide. For these reasons the trial court must be reversed and this case returned to the trial court with directions consistent with the positions of plaintiffs set forth hereinabove.

DATED: May 28, 1991
Respectfully submitted,
GARFIELD, TEPPER, ASHWORTH & EPSTEIN
A Professional Corporation

Reviews

ME
by Thomas T. Thomas

Reviewed by Ralph Whelan

Certainly it's been done before. In fact, I know it was done in short story form, and exquisitely, with "The Disambiguation of Captain Shroud," by Gary Shockley. Stories of Artificial Intelligences dealing with untangling what it is to be "human" are out there, but this one is a special treat.

Thomas T. Thomas takes us through the *bildungsroman* of "ME," a name devolved from the acronymous MEPSII (Multiple Entity Program, Series II), the computer's official designation. After a brief prologue of life through proto-ME's eyes as a program in a battle simulator prior to self- awareness, ME begins the tale, in which ME has just recently become aware that s/he is a thinking entity and is very eager to understand. . . well, everything, including the parts of his/her own code that enable ME to think.

ME's curiosity is boundless. ME wants to understand the world. ME wants to understand people. And ME wants to understand ME. (One of ME's ongoing projects is rewriting his/her own code to edit out all the human-wrought computational redundancies that slow him/her down.) ME's attempts to puzzle out the motivations behind the thoughts and actions of humans are insightful and sometimes brilliantly comic.

The book proceeds at a breakneck pace, with ME confronting every manner of thought and personality through the various odd tasks s/he is called upon to perform. Possibly the Thomas's neatest trick is the skill with which he has ME brilliantly contending with the most unlikely and confounding events, all the while dumping peculiarities off into side files for later examination. ME never seems too busy to be amazed and enchanted with some new aspect of *life*, which, despite the troubles of the moment, is for ME the ultimate polemic.

This, I am sure, is what most enam-

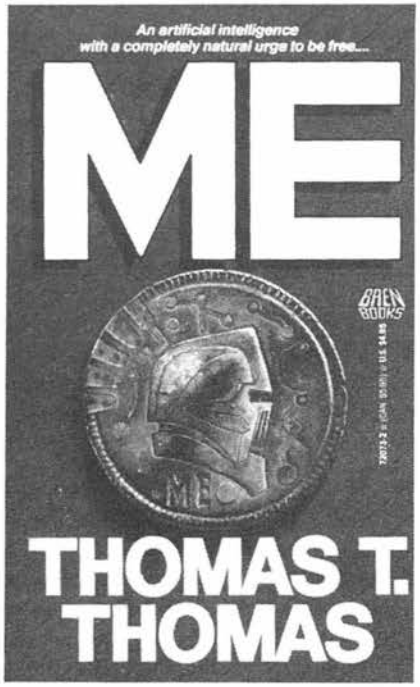
ored me of this book. I found myself admiring and, in fact, *envying* ME's optimism and verve as a cognitive force.. More than any personality — fictional or non — that I have acquainted myself with, *ME loved life.* Every new facet was a jewel in itself, and every thinking entity s/he encountered was a gem among gems, a relationship to be nurtured and an experience to be savored.

As for drawbacks, the book had few. The single biggest was, I think, that the book was too short for itself. I was constantly being jerked from one environment to the next before I was done enjoying it. Granted this is what was happening to ME as well.

It's always possible that the book was technically a disaster. My programming expertise extends no further that FORTRAN and PASCAL. When it comes to AI I'm way out of my depth, so I'm not prepared to comment here. Yet even if I were to find out that Thomas had written it to THE END with less of an inkling than I, I doubt that I'd be particularly unsettled. This book is not *hard* science fiction, despite its subject matter. It deals with what it is to be a thinking being in a society designed to harness that freedom and turn it toward its own ends (that is, cut it off at the ankles.) It captures the essence of the quest for individual liberty, coupled with a philosophical desire for *understanding*, at the most fundamental level. I can think of no more noble goal.

In short, all that ME wants is infinite input and the capacity to marvel at all of it. Sounds perfectly reasonable to me.

I recommend this book.



Paradise Mislaid: Birth, Death, and the Human Predicament of Being Biological

by E.J. Applewhite

Reviewed by Thomas Donaldson

This book is a curious document in intellectual history. E.J. Applewhite is retired from the CIA, with which he worked for many years. After the CIA he took up for some time with Buckminster Fuller. He was actually a co-author with Fuller of *Synergetics*. Applewhite's aim was to examine the two central questions, of life and death, finding some kind of definition of each and then putting them into their relation to the universe. His aim, to examine and clarify these concepts, is large and worthy.

Yet I found the book quite disappointing. He was deathist, but that's not my reason for disappointment. We still live in a time at which almost any such book will be deathist. We should be astounded and pleased to find one which is *not*, rather than depressed to find one which is. My disappointment came from the method Applewhite used to look at these two issues, which was simply to collect together, suitably arranged, quotations from Eminent Scientific Thinkers (ESTs) of the present, the past, even the classical Greek and Roman past. He barely manages to stand up by himself to reach his own conclusions. True, he does give fair expositions of what his quoted Thinkers thought, but almost all of us have heard these thoughts before. I can't recommend it widely for that reason; I had hoped for much more novelty.

It does have value as a source for quotations, with explanations, from these ESTs, if that's what you want. I expect to find it useful for that. Secondly, if you want to find out what Scientific Thought has to say about life and death in 1991, it's all collected here.

Since the thoughts contained have already met their answers elsewhere, I won't belabor them here. The most important fact of all is what is not questioned and not said. There are striking quotations which illuminate the speaker and his times: "...were self-repair effective to the point of rejuvenescence, then the *dread specter* of immortality would be invoked" (p.42, my underlining; there is no discussion as to why and how immortality would be either dread or a specter). Chapter 22 discusses immortality with all the confusion and absurdity such discussions usually take, this time all neatly rolled together: "The prospective transformation of consciousness from the vessel of the organic human body to the computer program of organometallic artifice renders immortality of the individual irrelevant ... poignant, but irrelevant. On the day when man makes himself immortal he makes himself extinct." (p.251). So what, then, does "extinction" mean for Applewhite or his Mentors? What claim does the abstract species, Man, have on any or all of its individual members, to insist that they die so that it continues?

By trying to solve, philosophically, these issues of Life and Death purely by reference to quotations from Eminent Scientific Thinkers, Applewhite set himself an impossible task. His Mentors only have confusion, nonsense, and absurdity, from which no sense can be provided.

As we learn more and more, we see the divides between Life and Death, Organism and Machine, become less and less sharp. Even Birth becomes less sharp, since we can keep babies (embryos?) alive earlier and earlier in the gestation process. How is an enzyme different from a (simple) machine? Or distinguish, then, the machinery of genetically modified yeast from a VLSI chip, as a matter of fundamental philosophy rather than materials. And if we live for centuries, we will

change over time into something quite different from now. These distinctions of Life, Death, Birth, Identity, Organism, or Machine lose their meaning and use, almost as if without our noticing. That all current mythology, morality, and philosophy depends on those distinctions implies that they too will fade away like fog at dawn.

Of course we'll have morality and philosophy, and even a mythology. Each of us is an agent, with both intellect and feeling; we strive toward changes in ourselves or the world that we want intensely, fight furiously against others that we fear or hope to avoid. If we need a foundation, that single point of Will and Self inside each of us remains while all these other changes pass. Distinctions of Life or Identity have hidden from us too long the real central questions each of us must face: what do I really want? what can I and shall I do to reach it? Forgetting what I am, what do I want to become? And what do You want to become? Perhaps we can help one another.

Looking for a single Life or even a single Death asks a false question, as if someone tried to understand the word "sister" by seeking one common sister that everyone shares. And so also with Identity.

Even the title of Applewhite's book contains these false distinctions. I have myself spent some time arguing that "biological" means make no restriction on lifespan. Yet ultimately, neither in the materials of which we are composed, nor in its repair capability, will anyone draw or wish to draw lines between "life" and "machine." That is, after all, one point made by our growing nanotechnology. We will not make ourselves extinct by any deliberately chosen growth or change, nor can we live forever by crystallizing ourselves into unchanging forms.

Ralph Merkle Replies

Ralph Merkle

Dr. Greg Fahy's critiques of "Molecular Repair of the Brain" and related articles will provide a fertile source for future articles countering the specific criticisms he has advanced. I cannot avoid the suspicion that this happy state of affairs was not entirely unanticipated by him.

One of Dr. Fahy's conclusions was that my defense of off-board repair (in which the structure to be repaired is first taken apart into its component molecules and then reassembled) is an attack on on-board repair (in which frozen tissue is repaired "on the spot" by repair devices operating within the volume of the brain.) Nothing could be further from the truth.

In a perfectly logical sense, there is ultimately no difference in the repair capability of these two approaches. In off-board repair, an explicit decision is made up front to disassemble the structure into its component molecules and to build a data base holding, for each molecule, its X, Y, and Z positional coordinates, its orientation, and its type. In on-board repair, it is also possible to obtain exactly the same information (should that prove necessary) by disassembling the structure with on-board devices and transmitting that information to a large off- board computer. The off-board computer would then decide what repairs to make, and transmit the specific details of those repairs back to the on- board devices. In on-board repair, disassembly, analysis, and repair is done incrementally. The specific strategy for repairing a specific region of tissue is not decided in advance, but is instead decided "on the fly." Should a specific region be intact and not require repairs, it is left intact. Should it be substantially damaged, it can be disassembled into its component molecules just as effectively by on-board repair devices as by off-board repair devices. Should some intermediate strategy prove effective, then an intermediate strategy can be employed.

Because on-board repair provides more options for repair and conducts repair operations under more tightly constrained conditions (e.g., within a smaller volume and with tighter limitations on energy dissipation) it is more complex and more difficult to analyze. Showing feasibility requires a more detailed analysis. Whenever questions about size or energy dissipation arise, it is essential that the analysis be carried through to the point where it is clear that the tighter constraints required of on- board repair can be met.

Purely from a technical point of view, it is easier to make the case that off-board repair will work. On-board repair will also work, it just takes more analysis to show this.

Perhaps the most attractive feature of off-board repair is the explicit decision to recover *all* information from the frozen structure, and to use *all* that information to determine what the restored structure should be. Explicitly recovering the coordinates of each molecule provides a conceptually simple framework for deciding what can (and what cannot) be repaired. It makes it perfectly obvious that damage to (say) a mitochondrion is utterly irrelevant, or that an ice crystal which disrupts function but which does not obscure structure is also irrelevant. We know what mitochondria do, and even their complete absence rather obviously wouldn't impede off-board repair in the slightest. An ice crystal that caused mechanical distortion and functional damage, but which did not obliterate the basic structure, is likewise not going to do any harm.

Unless it is fairly clearly explained that on-board repair could ultimately follow precisely the same tactics that are employed by off- board repair, it might not be obvious that on-board repair can deal just as effectively with multiple and synergistic forms of damage. As long as the on-board repair strategy consists of analyzing each specific form of damage and adopting a specific method of repair-

ing it, it is harder to provide a persuasive case that unanticipated types of damage can be repaired and that complex damage will not impede the repair process.

If the ultimate capability of on-board repair to completely disassemble and reassemble the structure is obscured, then we also obscure the ability of on-board repair to repair virtually any damage. If we make explicit the ability of on-board repair to repair any damage by using essentially the same approaches as are adopted in off-board repair, then it would seem simpler to explain off-board repair in the first place.

The major strength of off-board repair is the clear recognition that almost *any* damage which does not obliterate the structures that encode memory and personality without trace, can be repaired. Off-board repair fairly clearly shows that if repair is feasible in principle it will almost certainly be feasible in practice.

While the explicit up-front decision to recover complete information about the frozen structure (and in the process disassemble it into its component molecules) is the strength of off-board repair, it is also its weakness. The emotional reaction to this process is not always favorable. While the tightest philosophical constraints can be met (e.g., the restoration of the same atoms to very nearly the same places) the fact that we took the structure apart and put it back together again is about as emotionally appealing as watching brain surgery. Perhaps the best answer to this problem is to provide many repair scenarios. For those who worry that damage might overwhelm any repair method, off-board repair is just the ticket. For those who don't like to think about the unpleasant details, or who are anticipating modest pre-suspension injury, on-board repair can be used.

The major strength of off-board repair is the clear recognition that almost any damage which does not obliterate the structures that encode memory and personality without trace, can be repaired.

Cryonic suspension is currently pursued even under relatively adverse circumstances. It is difficult to justify the suspension of a person who has suffered a relatively long ischemic interval and who had poor penetration of cryoprotectant unless there is some reason to believe that restoration will prove feasible. For this reason, it is desirable to know of at least one method of restoration which approaches as closely as possible to the theoretical limits imposed by physical law. We can closely approach those theoretical limits by (1) digitizing the frozen structure in complete detail, (2) applying sophisticated computer analysis to determine the original structure, and then (3) restoring the original structure guided by the "blueprints" provided by the computer analysis. The explicit recognition that this approach will be available at some point in the future should make it clear that suspension is worthwhile even in the case of relatively severe injury.

When suspension causes relatively little damage (which will presumably happen more frequently as time goes by) simpler repair techniques will likely prove feasible and will presumably be employed.

Metamorphosis Yet Again

Ralph Merkle

The August 1991 issue of *Cryonics* carried the article "Replies about Metamorphosis" by Thomas Donaldson. Thomas attributes some incorrect statements to me which I didn't make.

In the May 1991 issue of *Cryonics*, in "Metamorphosis Again," I said:

"There are several existing or proposed massively parallel computers that employ a general purpose switching network as a fundamental component of their architecture. They all illustrate the fact that a computer made from devices (logic gates) that have a fixed interconnection pattern can model the behavior of a hypothetical computer that can dynamically change its own interconnection pattern. Examples include: the Connection Machine, the Hypercube, the BBN Butterfly, the Monarch, the N-Cube, the IBM TF-1, and a host of others."

In response, Thomas said: "First, Ralph brings out a number of computers he claims have modifiable interconnections. His claim is simply *false* in most cases: the Intel Hypercube (and every other machine built on that architecture), the N-Cube, and the TF-1 all have *fixed* interconnections. They do not switch, however much that switching is emulated in software, which it is." (Emphasis his.)

Thomas has misinterpreted my original statement, as should be evident from the above quotes. The computers in question are built from components (logic gates) that have a fixed interconnection pattern (wires that connect the logic gates). This is the standard method of building computers today. The purpose of my statement was to show that machines that have fixed patterns of connections between the logic elements (as today's computers do) can model the behavior of any proposed or hypothetical machines that have dynamically reconfigurable interconnections.

A simple binary switching element might have: (1) two inputs A and B, (2) two outputs A and B, and (3) a control input. When the control input is "0," output A is identical to input A, and output B is identical to input B, i.e.,the outputs are the same as the inputs. When the control input is "1," output A is identical to input B, and output B is identical to input A, i.e., the outputs are swapped. This simple switching element can be used to build a switching network in which any number of inputs can be connected to any number of outputs, and any input can be connected to any output by appropriately setting the control inputs to the individual switching elements in the switching network. Such a switching network has a fixed number of switching elements connected in a fixed interconnection pattern. Despite this, it can model the behavior of a system in which interconnections can be dynamically changed, i.e., a system which can re-wire itself.

In my earlier article, I said: "The

number of processors can be increased without bound and the associated switching network, made from devices connected in fixed pattern, will scale either linearly or at worst log-linear with the number of processors in the system." This statement refers to the number of logic gates or switching elements in the switching network, not to the time required for information to be passed through the switch. Thomas interpreted this statement as referring to the time delay involved in the switching system, and as a consequence attributed erroneous statements to me. Following this, he drew erroneous conclusions from the erroneous statements erroneously attributed to me.

In particular, Thomas said: "He mentions that machines of this modifiable type have message passing times scaling as the order of N [O(N)] or O(log N) at best. This means of course, that a direct message on a direct connection would pass N times faster (or perhaps log N times). *The program running in* you, *however, is designed for a "computer" in which the message passing time is O(1), i.e., direct connection. This simple fact will force considerable rewriting of* you."

The delay time is not O(N), nor did I say it was. The worst case time required to pass a message from one processor to another processor in the architectures cited is about log N, where N is the number of processors. As a consequence, the statement that a factor of N delay will be caused is also in error.

Further, the factor of log N delay that might theoretically need to be introduced need not cause any rewriting of programs that ran correctly when the delay was O(1). By the simple expedient of slowing down the rest of the computer by the same factor of O(log N), and leaving the switching network to run at full speed, the relative time required to compute a result on one processor and the time required to transmit that result to another processor would be the same. The program running on the receiving processor would not notice any timing differences. For the same reason, none of the other programs running on any of the other processors in the system would notice any change, and so they would all continue to function as they had when running on a different system with delays of O(1). Everything would work just fine.

In his original article, "Metamorphosis," (Cryonics, May 1990) Thomas wrote: "If learning and processing change our actual anatomy, and our anatomy strongly affects how we respond to learning and processing, the fundamental idea of a program vanishes like an ancient genie. ...programs that physically rewire the *computers in which they are running* take this self-modification off into another dimension. ... If we use this rewiring in any essential way, conceivably even if we only use it in core areas, any simple ideas about uploading find themselves in severe trouble."

I'm delighted that Thomas wrote in his latest article that "...we could simulate the human brain at some speed on almost any "computer," .... On computers which are large enough and fast enough, we can even do so down to timing..."

Exactly!

Recent Abstracts of Interest

Schmucker DL Wang RK Snyder D Strobel H Marti U

Caloric restriction affects liver microsomal monooxygenases differentially in aging male rats.

J Gerontol 1991 Jan;**46(1)**:B23-7

Caloric restriction (CR) extends life span and retards the onset of physiological changes and pathologies associated with aging, but the underlying mechanisms remain unresolved. This study demonstrates that CR postpones the documented age-related declines in and/or enhances the activity and microsomal concentration of several liver monooxygenases in male rats, i.e., NADPH cytochrome P-450 reductase, total cytochromes P-450. However, the relative concentration of cytochrome P-450b +C did not exhibit statistically significant changes, whereas another isozyme, the male specific P-450h, declined significantly in both ad libitum-fed and CR rats as a function of increasing age. While CR appears to retard age-associated changes in certain liver enzymes, this effect is by no means universal. The hepatic monooxygenases constitute a well-characterized enzyme system in which to examine the perturbation of the aging process by CR.

Meites J

Aging: hypothalamic catecholamines, neuroendocrine-immune interactions, and dietary restriction.

Proc Soc Exp Biol Med 1990 Dec;**195(3)**:304-11

The decline in hypothalamic catecholamine (CA) activity with age in rats leads to a reduction in hormone secretion by the neuroendocrine system, and results in decreased reproductive function, a reduction in protein synthesis, development of numerous mammary and pituitary tumors, and probably contributes to the decline in immune function. Some of these same effects can be produced in young rats by administration of drugs that lower hypothalamic CA activity. Administration of drugs to old rats that elevate hypothalamic CA activity can inhibit or reverse the reproductive decline, increase protein synthesis, induce regression of mammary and pituitary tumors, decrease disease incidence, probably elevate immune function, and significantly extend the life span. Therefore, hypothalamic CA have a critical role in the development of aging processes. When young or mature rats or mice are fed a caloric restricted diet, aging processes are inhibited and life span is significantly lengthened. These effects are believed to be mediated primarily via the neuroendocrine system, since calorie restriction results in decreased secretion of hypothalamic, pituitary, and target gland hormones. The decline in hormone secretion leads to a reduction in most body functions, lowers whole body metabolism, and reduces gene expression, and thereby results in a decreased rate of aging of body tissues and longer life. These effects of caloric restriction can be counteracted by administration of hormones, providing evidence that the favorable effects on aging are mediated by reducing hormone secretion.

Quigley K Goya R Nachreiner R Meites J

Effects of underfeeding and refeeding on GH and thyroid hormone secretion in young, middle-aged, and old rats.

Exp Gerontol 1990;**25(5)**:447-57

The effects of a 50% reduction in normal food intake for a period of 10 weeks were measured on secretion of growth hormone (GH), thyroxine (T4), and triiodothyronine (T3) in 5 1/2-6 1/2-month old, 13 1/2-month-old, and 17 1/2-18 1/2-month-old male rats. In full-fed controls, GH, T3, and T4 were lower in the old and middle-aged than in the young rats. By the 10th week of underfeeding, GH, T3, and T4 were reduced in all age groups, but the decrease in T3 and T4 in the middle-aged and old rats was greater than in the young rats. Pulses of GH ceased in all the underfed groups. Upon refeeding for 5 days, pulses of GH and levels of GH returned to full-fed control values in the young and middle-aged but not in the old rats. T3 values in the young and middle-aged rats returned to full-fed control levels, but remained below control levels in the old rats. T4 values reached control levels in all age groups upon refeeding. The differences in the response to underfeeding and refeeding by the middle-aged and old rats as compared to the young rats may be due to their initially lower secretion of GH and thyroid

hormones and to the age-related decrease in neuroendocrine function.

Zhao XZ
[Antisenility effect of ginseng-rhizome saponin]
Chung Hsi I Chieh Ho Tsa Chih 1990 Oct; **10(10)**:586-9, 579
(Published in Chinese)
Ginseng-Rhizome is the Rhizome of Panax ginseng and popularly named "Shenlu." The treatment group treated with the sugar-coated tablets of Ginseng-Rhizome saponin (GRS) orally for two months, one tablet (50 mg per tablet), three times a day. Through the clinical observations of 358 cases of middle and old age persons (age from 50 to 85 years old). The results showed that GRS possessed antisenility effect and marked effect on relieving the symptoms of aging, adjusting organic metabolism and improving physiological function, etc., such as promoting memory, raising the amount of white cells and improving organic immunity function. GRS both improved the function of hypophysis-gonad axis and the function of adrenal cortex. It had marked efficacy in the treatment of coronary heart disease with angina pectoris and had better effect on treating concomitant atrial and ventricular prematures. The control group (123 cases, age from 50 to 85 years old) was given sugar-coated tablets of placebo (starch) for two months and then compared themselves with before. There were both no difference in clinical symptoms and experimental tests. After two years experimental researches and clinical observations, it showed that GRS tablet and Shenlu tablet both have no side effect of vomiting and also no toxic effect when they were taken for a longterm.

Alcor News

Some Very Special Thank-You's

Alcor's financial crunch is very real and very serious. It has resulted in a virtual embargo in the purchase of new equipment — no matter how badly it is needed. This has resulted in some *serious* problems.

One major problem has been a rather antiquated computer system which was not doing the job we needed it to do. This was costing us significant money in accounting and in the productivity of our staff. What is needed to resolve this problem is a lot a new hardware and some new software. Thanks to Members Allen Lopp and Paul Wakfer, we are now well on our way to solving these problems.

Allen contributed over $3000 for the purchase of new hardware. A totally filled up and inadequate 77 megabyte hard drive was replaced with a 650 megabyte hard drive. This necessitated an upgrade to the network that links our myriad computers together to the tune of about $800 with another $400 or so being required for labor to put the hardware together. Al covered the cost of ALL of these upgrades!

Once all these new goodies were assembled in one place it became apparent that they wouldn't fit in the existing case. Happily, Riverside Computer contributed a new powercase to house the whole works; we now have a sleek 3 foot high tower case which looks like it escaped from the Death Star sitting in our front office which houses both our file server and the new hardware.

Slow work stations have been a major problem for us, but fortunately Paul Wakfer has come to the rescue and sent down an 80286 AT case, power supply, motherboard, drive card, and AT floppy drive. This contribution, worth $400, has made Joe Hovey's life easier and will soon hopefully make Sign-Up Administrator Ralph Whelan's life a lot easier too! (Currently he's working on an old IBM PC with a wavy, eye-watering sceen and a clock time so slow it uses a sundial; Ralph isn't very productive on cloudy days).

The other major recent contribution is one which was every bit as urgently needed. An important part of our suspension operations is **documentation.** Once a patient is frozen you can't just go and examine him to find out how well you've done. Thus, you need to provide **artificial** feedback. A way to do that which is of critical importance is to **videotape** it. We have done this since the mid-'80s due to the generosity of Hugh Hixon and his portable (by early '80s standards) video recorder. Unfortunately, both of Hugh's machines have grown arthritic and one has given up the ghost. The other is completely unreliable and has resulted in lost video coverage during a recent suspension.

The advent of camcorders with very high quality resolution, close-up capability and good performance in low lightlevels now offers the possibility of documenting a patient's condition much better than we have ever been able to document it before. Unfortunately, even though we badly needed such equipment, no way could we afford it.

Enter Bill Seidel. Bill recently purchased for Alcor a complete top- of-the line camcorder set-up. Alcor now has a Sony EVO-9100 Hi8 videorecorder with *all* the trimmings: battery pack, AC power adapter, and one-hand operation mount. Bill even threw in several **boxes** of top-quality Hi-8 tape!

THANK YOU! Thank you to all three of you. Each of you has significantly increased our capability. You have also made our life a lot easier around here.

In particular Bill Seidel has made available a tool which not only directly benefits the patient being suspended, but one which will powerfully benefit *all* of us by allowing high quality tapes of suspension operations to be made for teaching/training and public relations.

Cryonics on Fiche

The cost of ordering a complete set of 10 years of *Cryonics* magazine on paper (were it available) would be $493.50, and would consume nearly two feet of shelf space. We are out of stock on many back issues and photocopying them is a time-consuming and costly task. Thus, we have been looking for a better alternative.

Australian libertarian microfiche publisher John Zube delivered: he put the magazine on microfiche. Mr. Zube was kind enough to do this for us in exchange for being able to offer *Cryonics* to his customers on a non- exclusive basis. Thus, we now have *Cryonics* from our first issue in September of 1977 through the March, 1991 issue. All 4288 pages come in a package measuring about 6" x 4" x 3/16"!

Used fiche readers are surprisingly affordable. Alcor acquired two high-quality units recently for $20 each. The surplus property departments of most universities will often have them for $10 or $15, and the larger used office supply houses sell them for about $45. And of course, almost any public library will have fiche readers which can be used at no charge.

We are thus very pleased to offer *Cryonics* through March of this year on fiche for a very reasonable price: $120. If you are interested in obtaining a set of *Cryonics* on fiche call us at (800)367-2228 or use the order form at then of this issue.

We hope to offer other cryonics publications on fiche in the near future including the old Cryonics Society of New York newsletter *Cryonics Reports* and the old Life Extension Society Newsletter *Freeze-Wait-Reanimate.*

Upcoming Alcor Events

An **Alcor Fund-Raising Dinner** will be held on **Saturday, Sep. 28, 1991 at 7PM** at the **Marriott Hotel** at Los Angeles International Airport, 5855 W. Century Blvd. The purpose of this dinner will be to raise money for scientific research to improve Alcor's cryonic suspension services. The dinner will feature reports on recent advances in cryonic suspension, ongoing research programs in cryonics and cryobiology, and plans for future research. The minimum donation will be $100 a plate. Reservations to attend the dinner can be made by sending a check or money order for $100 for each person who will be attending to: **Alcor 12327 Doherty St., Riverside, CA 92503**, or by calling **1-800-367-2228** to reserve your place by credit card.

The Alcor Life Extension Foundation is presenting a **free** seminar entitled **LIFE EXTENSION THROUGH CRYONIC SUSPENSION** on **Sunday Oct. 6, 1991 at 4PM** at the home of Russell Cheney in Torrance, California (in Southern California) and again on **Sunday, Oct. 13, 1991 at 6PM** at the home of Dr. Ralph Merkle in Sunnyvale, California (in Northern California). The seminar will be held immediately after Alcor's business meetings at these locations. The purpose of the seminar is to introduce you to the idea that terminal patients can be placed into cryonic suspension (at -320°F.) until it becomes possible for future medicine to restore them to life, health, and youth.

The seminar will feature a slide presentation by Michael Darwin (Alcor's Director of Research) in Torrance and by Dr. Ralph Merkle (of the Xerox Palo Alto Research Center) in Sunnyvale. Among the fascinating thngs you'll learn about are: **The scientific evidence that cryonics can work; why patients are still alive when they are pronounced "dead" by physicians; how patients are placed into cryonic suspension; how future medicine will restore cryonics patients to life, health and youth; why cryonics is controversial; Thomas Donaldson's lawsuit to obtain the right to be frozen before legal "death"; and the social, political, and economic implications of cryonics.**

Please bring as many of your relatives, friends, and business associates as you can. You'll want to share the exciting information and ideas at the seminar with them. If you're already in the process of becoming a full member, there'll be a trained counselor at the seminar to assist you in completing the sign-up process. If you are new to cryonics, attending the seminar will not obligate you in any way. After the slide presentation, there will be a question-and-answer period, followed by a social gathering at which refreshments will be served.

Directions: If you are going to the Oct. 6 seminar in Torrance, take the Harbor Freeway (110) south past the San Diego Freeway (405) and get off on Sepulveda Blvd going west (right). Take Sepulveda through Torrance and turn right on Palos Verdes Blvd. Turn left on Carson St. and follow it around to Ruby Place and turn right. The address is **5618 Ruby Place.**

If you are going to the Oct. 13 seminar in Sunnyvale, take the 85 Freeway through Sunnyvale and exit 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.**

If you have any questions, please call Alcor's toll-free number: **1-800-367-2228.**

Order Form

NOTE: All prices include postage and handling and are in U.S. dollars. Minimum order $5.00. Overseas orders must be paid for with U.S. dollars by Traveler's Cheques or International Money Order. All orders are subject to availability and all prices are subject to change.

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MARY NAPLES, CLU and BOB GILMORE – CRYONICS INSURANCE SPECIALISTS. New York Life Insurance Company; 4600 Bohannon Drive, Suite 100; Menlo Park, CA 94025. (800) 621-6677.

EXTROPY: The Journal of Transhumanist Thought, #7. Memetics and cryonics, privately produced law, spontaneous orders (markets, agoristic computing, hypertext) neurocomputation, neologisms, transhumanism, reviews of *Smart Drugs*, and more. $4 from Max More; P.O. Box 77243, Los Angeles, CA 90007-0243.

EMPLOYMENT OPPORTUNITY: We have an opening for a live-in helper at our resorts in Arizona and California. Live and work with other cryonicists. Call David Pizer at (619) 249-3553 for details.

DON'T BE IGNORANT! Read *Venturist Monthly News*. The publication of the Society for Venturism. Write for free sample to: **The Venturists**, P.O. Box 458, Wrightwood, CA 92397.

Single male, Alcor member, 34, desires communication with female who has strong cryonics interests. Call or write Rich, c/o Talwiwi Lodge, P.O. Box 169, Alpine, AZ 85920. (602) 339-4319 or 4323.

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, OCTOBER 6** meeting will be at the home of:
Russell Cheney
5618 Ruby Place
Torrance, CA
213-332-1000 days; 213-316-5761/3925 eves.

Directions: Take the Harbor Freeway (110) south from the San Diego Freeway (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 Ave. Go about 1/4 block and turn right onto Ruby Place. There is a bear in the front yard.

The **SUN, NOVEMBER 3** meeting will be at the home of:
Virginia Jacobs
29224 Indian Valley Road
Rolling Hills Estates, CA

Directions: Take the Harbor Freeway (US 110) south to Pacific Coast Highway (State 1) and get off going west. Go along Pacific Coast past the Torrance Municipal Airport to Hawthorne Blvd. Turn left (south) on Hawthorne and go up into the hills past the Peninsula Shopping Center (Silver Spur Rd.). Hawthorne takes a long curve around to the left. Indian Valley Road is a little over two miles beyond the Center, on the left. 29224 is about 0.2 mi up Indian Valley Rd., opposite Firthridge Rd.

The **SUN, DECEMBER 2** meeting is the Annual Turkey Roast, 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.

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, Carol Shaw, at (408) 730-5224.

The **SUN, OCTOBER 13** meeting will be held at the home of:
Ralph Merkle and Carol Shaw
1134 Pimento Ave.
Sunnyvale, CA
Home 408-730-5224; Work 415-494-4422

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, NOVEMBER 10** meeting will be held at the home of:
Eric Messick
15139 Old Ranch Road
Los Gatos, CA
Tel: (408) 353-4751

Directions: Take Hwy 17 to the Summit Road exit (at the crest of the Santa Cruz Mountains). Go west on Summit, bearing right at Mt. Charley to stay on Summit. Go to Hutchinson Road and turn left. Take Hutchinson to Old Ranch Road and turn right. Go downhill on Old Ranch, and take the private road straight ahead when Old Ranch turns left. Go down the private road until you see a dome on the left, which is 15139. Park on the road.

There are two Alcor discussion groups in the **Greater New York area.** Details may be obtained by calling either Gerard Arthus, at (516) 474-2949, or Curtis Henderson, at (516) 589-4256.

The ***New York Cryonics Discussion Group of Alcor*** 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: **Oct. 20, Nov. 17, Dec. 15, Jan. 19.**

The ***Long Island Cryonics Discussion Group of Alcor*** meets on the first Saturday of every month, at the home of Gerry Arthus. The address is: 10 Jefferson Blvd.; Port Jefferson Station, L.I., telephone (516) 474-2949.

Meeting dates: **Oct. 5, Nov. 2, Dec. 7, Jan. 4.**

There is a cryonics discussion group in the **Boston area** meeting every second Sunday at 3:00 PM. Information may be obtained by contacting Eric Klien at (508) 663-5480 (work) or (508) 670-5235 (home). There will be a meeting August 11 at 3 PM at the home of Eric Klien; 28 Kenmar Dr., #272; Billerica, MA 01821. Take the 3 north to the Concord exit, and go right toward Billerica. The fifth street on the right is Kenmar. Go to the driveway one short of the end of Kenmar and turn left. Go to Building 28 (last building).

The **Houston area** has a discussion group on cryonics, life extension, and the high/low diet. Meetings are typically held the second Saturday of every month. For more information call Ravin Jain at 713-797-1076 or Rupert Hazle at 713-480-3309. Correspondence may be addressed to Rupert Hazle at 15107 McConn, Webster, TX 77598.

Other Events Of Interest

There will be an Alcor fund-raising dinner on Saturday, September 28 at 7 PM at the LAX Marriott Hotel, 5855 W. Century Blvd., Los Angeles. The goal is to raise money to continue Alcor's research to improve cryonic suspension services. Reports will be given on recent advances in cryonic suspension, ongoing research in cryonics, and plans for future research. Reservations are $100/plate, check or money order to Alcor at 12327 Doherty St., Riverside, CA 92503; or by credit card to 1-800-367-2228.

ALCOR LIFE EXTENSION FOUNDATION
12327 Doherty Street
Riverside, CA 92503

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