Cryonics

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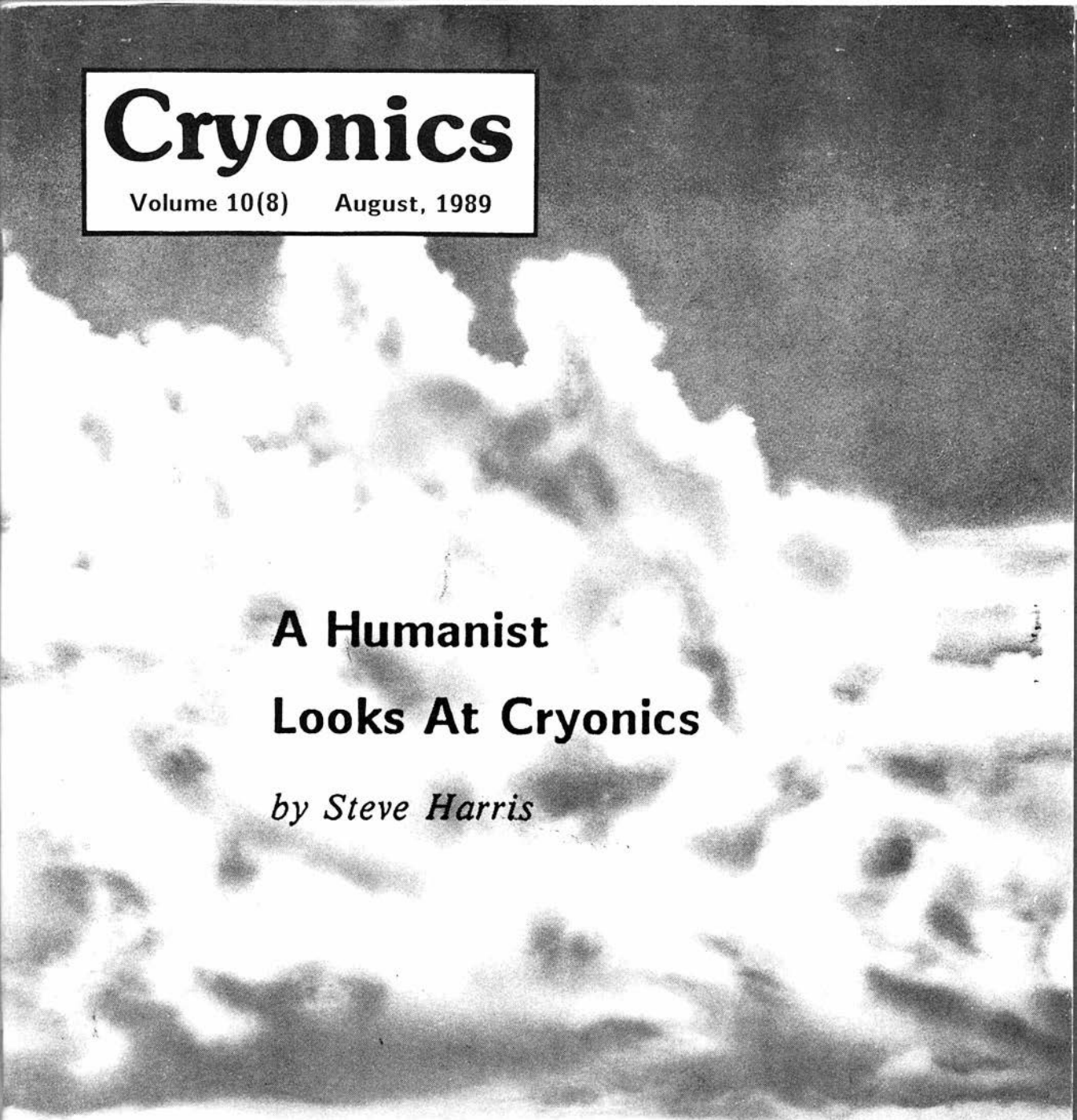

A Humanist Looks At Cryonics

by Steve Harris

CRYONICS ▪ Volume 10(8) ▪ August, 1989 ▪ Issue 109

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EDITORIAL MATTERS

We don't often solicit money for other people or organizations. There are plenty of good reasons for this. For one, we think what we are doing is one of the most important things in the world (in fact, the most important thing!) and we need all the money we can get! Cryonics has miserable enough assets compared to the magnitude of the task at hand.

But every once in a while something comes along that makes us break all the rules. Elsewhere in this issue is a brief article by Steve Harris soliciting money to prevent a research catastrophe. Since Steve is asking for the money and since it is in large part his research and since he is a modest man, he was not able to say what needed to be said about the importance of this work. But I have no such limitations, so I will speak my piece and urge you to do what you can.

But first a little background. As many of you will no doubt be painfully aware the government of the United States, in the form of the *National Institute on Aging*, doesn't really want people to live *longer* lives (see box below). Rather, they want to get rid of all the things that cause people be diseased and yet still have them die right on schedule. I suppose that's fine, except that they're spending your money and my money on such nonsense. If you ask me they shouldn't be spending anybody's money on anything, but then, you didn't ask me. The point is, the NIA has a history of not funding **interventive** approaches to aging, as almost any interventive gerontologist will tell you (I know, I've talked with many of them!). Maybe one reason for this is that there is altogether too much chance that one of them might actually work. (Can you imagine what would happen to Social Security if people actually started to live to be 120!)

Well, the work that Steve and Roy Walford are conducting is precisely that: good interventive gerontological work designed to answer questions about the life extending benefits of simple chemicals like Coenzyme Q_{10} which you can buy from your local health food store.

The project currently underway at UCLA will go a long way towards answering that and a number of other very interesting questions which could translate to longer lives, perhaps much longer lives, for me and you **right now**. If this were some study conducted by people without a track history and without the kind of background that Dr. Harris and Dr. Walford have, I wouldn't be wasting this time or this space telling you about it. But the fact is, Roy Walford's lab at the UCLA medical center is without question the best place in the world for this kind of research.

In fact, Walford's **control** mice, on average, live longer than they do in any other

The Mission of the National Institute on Aging

The Congressional charter creating the NIA in 1974 authorized study of the aging process, but when justifying this spoke in terms of alleviating "the problems of old age by extending the healthy middle years of life." Indeed, the NIA's founding director, Dr. Robert N. Butler, emphasized the study of human "biologic, social, and psychologic" factors with the idea of intervening "so that life is better in the later years." Not a word was said about extending maximum life span or slowing the basic aging process. Instead, social factors and "life cycle" study were emphasized, as well as the need for more study of "thanatology." The above phrases in quotation marks are from Butler's article, *Mission of the NIA*, in the *Journal of the American Geriatrics Society*, 25, 97-103 (March 1977).

The NIA only receives 3% of the National Institutes of Health (NIH) budget and yet almost everyone dies of the disease it was chartered to study! By way of comparison the National Cancer Institute (NCI) receives 25% of the NIH budget. It is estimated that if all forms of cancer were cured tomorrow the increase in average life expectancy would be less than three years!

laboratory in the world. That kind of record is a testimonial to the excellent care given the animals. And that kind of care is critical to evaluating the utility of life extension interventions. Often, life span extension is reported in animals when what is really happening is that the animals being treated are in fact being protected against substandard diet and living conditions rather than the direct effects of aging. As someone who has cared for experimental animals (including rodents) I can attest to the difficulty of doing what Walford has achieved.

Harris and Walford are halfway along in their study -- halfway towards getting some hard answers about nutrients and drugs which some of us are taking to *supposedly* extend our lives and which many others of us *would* take if we knew better whether or not they would work.

As close as these researchers are, they stand in jeopardy of losing this information and having to terminate the project. Every day that goes by is literally a hand-to-mouth (or, if you prefer, paw-to-mouth) situation. If funding isn't obtained within a very short period of time (weeks!) the animals will be sacrificed and the study will end. And we will all be worse off.

I am doing something unprecedented in the pages of *Cryonics*. I am asking you to contribute money to a gerontology project. In fact, to a gerontology project not even sponsored or run by Alcor. I am asking this because; a) I believe the experimental design of the study is excellent, b) the conditions under which the study is being carried out are excellent, c) the competence and intellectual integrity of the researchers involved with the project are impeccable, and d) the loss the data from this study would be a real loss to us all, each and every one of us.

Read Steve's article. Sponsor a starving mouse. And just maybe save your own life in the process.

-- Mike Darwin

JUST THE FAX

Do you carry a set of your suspension paperwork with you when you travel? What if you run into trouble in an out-of-the-way spot like Truth or Consequences, New Mexico or Tupelo, Mississippi? Or, for that matter, what if you run into trouble *anywhere*? How long it will take your Alcor suspension paperwork to get where it needs to go in an emergency. This has been a troubling question on the minds of the Alcor staff for several years now. A couple of serious emergencies where document transmission would have been a real help have served to bring home the message that we need a way to rapidly and efficiently move printed communications across the country and across the world.

We now have it.

On Friday, July 28th, Alcor acquired a *Minoltafax 261*. The Minoltafax is a top quality, high capacity fax machine with a document feeder capable of accepting 30 originals at a time. Virtually all hospitals now have fax machines, as do most lawyer's offices, and many physician's offices as well. At the touch of a finger we now have the capability to almost instantly transmit medical records, suspension paperwork, and other critical documents anywhere in the world where there is another fax machine.

Conversely, if you need to get documents to us in a hurry you can now just give us the fax. How? By calling Alcor's fax #, which is:

(714) 736-6917

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Donations to Life Extension Experiment Solicited! (Or, you too can support a starving mouse, right here in America)

by Steven B. Harris, M.D.

I'm a gerontologist, and when people ask me socially what I do for a living, I tell them that I spend a lot of time trying to keep laboratory mice from dying of old age. This is usually good for a laugh, and more importantly it avoids saying that I'm trying to keep *people* from dying of old age -- a response which immediately pushes deep philosophical buttons and gets scowls. Since I'm tired of getting scowled at in social situations, I stick to talking about mice these days. I don't mind if people put two and two together eventually and scowl later when I'm not around.

Readers of this magazine, of course, will immediately understand the import of trying to modify the aging process in laboratory mice. Aging is a complicated process that will

ultimately take complicated fixing, but even so there still may be a few simpler measures one can take to slow it up with lower technology. A well-known example of something that works now to slow aging in laboratory animals is simply to partially starve the animals of calories while giving them good nutrition otherwise. Under this sort of regimen lab animals can live up to 50% longer than they do under the best of usual circumstances. Calorie restriction is not the fountain of youth, but it is on the right track. There may be other simple steps on that road as well.

How do we look for these other simple steps? One approach is to look for life-extending drugs. In the past, experimenters have fed various substances to lab rats and found modest life extensions, but these experiments have up to now all had certain problems. One was that they used short-lived strains of rats or mice, and so gains in lifespan seemed not so much clearly attributable to modified aging as they were to fixing whatever was wrong with that particular strain in the first place. Another difficulty was that few of these experiments found extension in the *maximum* life span of the animals, and maximum lifespan is the indicator which is universally held to be the best index of aging.

Looking over all of the experiments which have found increases in natural lifespan in laboratory animals over the years, only two experiments really stand out in which maximum lifespan has been increased in a way which seemed clearly attributable to the substance given. One of these experiments uses an antioxidant called 2-mercaptoethanol, and the other a naturally occurring substance called Coenzyme Q_{10}. Both studies report increases in maximum lifespan, but neither had been repeated by other scientists.

This was the situation two years ago when Dr. Roy Walford and I decided to test several anti-aging compounds in our experimental mouse colony at UCLA. In looking at possible compounds we settled on an anti-radiation drug called WR-2721, which looked to be the most successful anti free-radical agent available, and which was a relative of 2-mercaptoethanol. We also decided to test Coenzyme Q_{10} by putting it in the animal feed, since it had only been given by injection in the experiment in which it had a reported effect. Both of these drugs were to be tested both alone and in combination with caloric restriction to see if any effects were additive. At the beginning of the study, three hundred mice were begun on various feeding regimens.

As of this writing these experiments have been running for 18 months at UCLA, and the groups of animals are doing well. The long-lived strains of mice used at UCLA die of old age in three years or longer, and thus the experiments will need to run at least for another 18 months before we begin to see results.

The problem now (and the reason for this solicitation) is that these experiments have run into funding difficulties. The National Institute on Aging has never been enthusiastic about funding experiments of this sort, and funds to do the experiment have been coming from a number of other projects in which money has now become tight. In fact, the project now faces termination without additional funds. ($1.00 per mouse per week, with a population of 300 mice, or about $15,000 per year.) Thus, Alcor members now have an opportunity to make a difference in formal aging research by directly supporting an interesting gerontological project which is having a difficult time staying afloat. It would indeed be a pity if this study had to be terminated in the middle of things, for a great deal of valuable information will be lost.

Coenzyme Q_{10}, for instance, is taken as a tonic and a heart medicine by 10% of the population of Japan, and is also available as a food supplement in the U.S. It has anticancer, antioxidant, and immunostimulant properties, yet almost nothing is known of

its long-term effects. Your donation will help us find out.

Contributions to the UCLA antioxidant aging experiment can be sent directly to UCLA (contact me, care of the Dept. of Pathology, Center for the Health Sciences, UCLA, Los Angeles, 90024 for instructions). We can't promise to send you a photo of the mouse you are supporting, but you will get our sincere thanks, a chance to find out if something you can buy in a health food store is likely to be good for you or not, and (yet again) a chance to take a little swing at the Grim Reaper on behalf of mankind.

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WELCOME ABOARD

Effective the 15th of July, 1989 Carlos Mondragón, Alcor's president, resigned from his position as a senior credit analyst at Heller Financial, where he had been employed for the past 2½ years. The following day, Carlos put in his first full (paid) day as president of Alcor, ending a frustrating and grueling schedule of trying to hold down two full-time jobs (only one of which was paid!).

Alcor President Carlos Mondragón

Carlos' presence in the facility brings to *four* the number of people working full time at Alcor. What will we do with all those people, you may ask? Well, we're planning to offer major upgrades in the quality and reliability of services we offer (see the articles on high impulse CPR and the forthcoming article on national training sessions) and, most importantly, *research*. The addition of Carlos (and earlier) Arthur McCombs) to the staff has greatly reduced the administrative load on Jerry Leaf, Mike Darwin, and Hugh Hixon. The net effect of this should be more time and energy for research.

Current staff and their annual salaries or hourly compensation are as follows:

Staff Member	Position	Pay
Carlos Mondragón	President, CEO	$33,000
Mike Darwin	Director of Research	18,000
Hugh Hixon	Biochemist/Facility Engineer	16,800
Mike Perry	Patient Caretaker	6,000
Arthur McCombs	Administrator	$7.50/hourly

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MEMBERSHIP STATUS

Alcor now has 132 Suspension Members, 257 Associate Members, and 12 members in suspension.

PRESS

The deluge of Alcor media coverage has continued unabated. The current wave of coverage began with an article in the July 17th issue of *People* magazine. The *People* article covered the Dick Jones case and provided a little background information on cryonics. We give the *People* article about a "C" by general standards and a "B" when comparing it to cryonics press overall. The best things about the article are that it treats cryonics seriously and it focuses on the human aspect of cryonics. It also features a nice picture of a patient transfer from dry ice to liquid nitrogen storage, shot by amateur Alcor photographer Steve Harris.

The *People* article resulted in a barrage of radio interviews which in turn resulted in a barrage of information requests. In the space of 10 days Carlos Mondragón and Mike Darwin did over 15 radio interviews, which resulted in over 70 information requests.

CONTROVERSY

RERUNS WILL KEEP SITCOM WRITER DICK CLAIR ON ICE—INDEFINITELY

Now that the court battle over Dick Clair's will has been settled, his assets are no longer frozen. But he is. Clair's mortal remains are preserved in supercold storage, awaiting the day when now unforeseeable advances in medical knowledge will permit his resurrection. If everything goes according to plan, Clair, who died last December, has not entered the Big Sleep, but merely the Long Nap.

An Emmy-winning TV comedy writer and co-creator of such major-league sitcoms as *Mama's Family*, *It's a Living* and *The Facts of Life*, Clair was 57 when he succumbed to AIDS-related illnesses. He was absolutely determined not to let the grim reaper have the last laugh. "I've always thought death is a bummer," he told an interviewer in 1987. "I remember when my father died I had a fantasy about popping him in the freezer, like an ear of corn. But I let that go."

The idea, however, just wouldn't die.

Alcor research director Mike Darwin checks the temperature in a 9-foot metal cylinder housing two frozen bodies, including that of Clair, above.

The *People* story also led to a 30 minute long appearance on the *Larry King Show* for Alcor member Brenda Peters and Director of Research Mike Darwin. Brenda and Mike were pitted against cryobiologist James Southard of the University of Wisconsin. Southard, as some of readers may recall, is the developer of the revolutionary UW organ preservation solution which has extended storage time for livers removed for transplant from a few hours to over a day. In the opinion of Mike Darwin, Southard is a consummate scientist.

Unfortunately, there was no evidence of this during the show. Southard's argument seemed to consist of simply repeating over and over again "it won't work, we can't do it today, there's no evidence we can do it tomorrow therefore it will never work. . . ." Mike and Brenda were having none of this, and, at one point Mike, with a nicely controlled sense of disgust and frustration said: "the point we've been trying to make for nearly 20 years and which you cryobiologists cannot seem to get through your rather thick skulls is that we are going to be able to *repair* freezing damage. . . ."

Dr. James Southard in 1984

Southard's appearance was also less than appetizing (busy afro and unkempt beard) while Mike and Brenda looked very wholesome. Brenda did a stellar job of defending cryonics from almost every aspect and projected a warm, pleasant, and very human image with a feisty and nicely aggressive edge. All in all the show was a great success and the consensus of just about everyone we've talked to who saw it (cryonicists and noncryonicists alike) was that the Alcorians won hands down. Even

Larry King seemed to sense the BS element in Southard's argument. In fact, King was far more aggressive in "grilling" Southard about his position than either Mike or Brenda. By the end of the show King seemed solidly in the cryonicists' corner. A few hundred more shows like this and maybe we'll really start to convince the world that cryonics should be taken seriously.

There is also a lot of forthcoming press to report on. In the Fall, one of the ratings sweep episodes of *Lifestyles of the Rich and Famous* will feature a 3 to 5 minute long segment on cryonics. The focus will reportedly be on Dick Jones and Timothy Leary (hey, you take press where you can get it!). Another evening magazine-format show called *After Dark*, which premieres in the fall, will cover Alcor too. There has also been a fair amount of overseas press with stories about Alcor in the German, Dutch, and Scandinavian print media and upcoming coverage by Japanese and Soviet television. The net effect of this is that increasingly Alcor is becoming a household word. Just as importantly, when people think of cryonics they are beginning to think of Alcor.

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CRYONICS CONFERENCE IN MICHIGAN

On Friday, October 6th, through Sunday, October 8th, the *Immortalist Society*, of Detroit, Michigan will be sponsoring a cryonics conference at the Southfield Hotel and Conference Center in Southfield, Michigan.

The conference will feature a range of speakers, including H. Jackson Zinn from the American Cryonics Society, Fred and Linda Chamberlain of Lifepact, and Robert Ettinger of the Cryonics Institute. Alcor member Ralph Merkle will also be giving a presentation on nanotechnology and cryonics.

At this time plans are being formulated for an Alcor table at the conference and several Alcor members, including Mike Darwin and Brenda Peters from Alcor Southern California (ASC) and Steve Bridge, Alcor's Midwestern Coordinator are planning on being there.

Registration fees and contact phone numbers and addresses for registration and transportation are as follows:

* * *

For the complete conference: one person, $160.00; couple, $220.00.

Saturday only, one person: with meals, $95.00; no meals, $60.00.

The hotel has reserved a block of sleeping rooms at $55.00/night single, and $65.00/night double. To make reservations, call (313) 557-4800.

Limousine service is available from and to the airport. The telephone number is (313) 941-3252.

If additional information is needed, the cryonics telephone numbers are (313) 547-2316 and 548-9549.

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A MAJOR ADVANCE IN SUSPENSION PATIENT SUPPORT

by Mike Darwin, Director of Research

Introduction

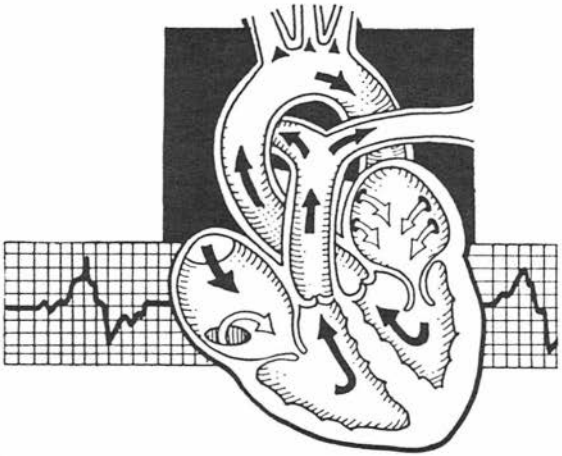
Since the inception of cryonics, closed chest cardiopulmonary resuscitation (CPR) has been used to restore circulation and breathing in suspension patients and minimize injury from lack of blood flow (ischemia). Once blood circulation to tissues ceases, a cascade of injury is set in motion. Some of this injury is of special concern to cryonicists because it results in the breakdown and degradation of brain cell membranes. Most current theories of memory storage posit changes in brain cell membrane structure as the mechanism for encoding memories (i.e., Daniel Alkon's article in the July 1989 *Scientific American*).

While it may be possible to reverse freezing damage in the future by carrying out repairs at subzero temperatures while everything is locked up in the solid state, it may be far more difficult or even impossible to reverse ischemic injury where membrane components have been chopped up into undifferentiatable pieces by ischemia-activated phospholipases.

Thus, avoiding injury from ischemia and from recirculation of blood or perfusate after ischemia (so-called "reperfusion injury") have been very high priorities for Alcor. CPR is of course a way to try to minimize ischemic damage by the simple expedient of reversing ischemia.

Over the past six years Alcor has accumulated a significant amount of data about the effectiveness of CPR in suspension patients. Unfortunately, the indications are that CPR is failing to meet the metabolic needs of most suspension patients. The unpleasant fact is that CPR simply doesn't work very well even under optimum circumstances, where the patient experiences cardiac arrest due solely to heart-related problems in a setting where they receive immediate resuscitation: fewer than 10% of such patients survive and approximately half have serious neurological deficits (P. Troiano, et al, *Resuscitation* 17, 91-98 (1989))!.

Some of the reasons for this are that suspension patients are often suffering from atherosclerotic disease, primary or secondary pulmonary disease (metastatic cancer of the lungs, pulmonary edema, emphysema, etc.), and shock secondary to bacterial infections (very common in AIDS patients).



A review of resuscitation literature and Alcor's own unique clinical experience have served to expand our understanding of the limits of CPR administered in cryonic suspension. Even under fairly optimum clinical conditions, where an otherwise healthy individual has experienced sudden cardiac arrest, direct measurement of mean arterial pressure (MAP) during *closed chest* CPR has demonstrated MAPs significantly below those known to be compatible with current criteria for cerebral viability (McDonald, J. *Annal. Emerg. Med.* 11, 292-295, 1982). Evaluation of cerebral blood flows

RESULTS OF RESUSCITATION

Despite the advent of cardiopulmonary resuscitation (CPR), 400,000 to 600,000 persons die every year in the United States from sudden cardiac arrest.

CPR was first described in medical literature in 1960. Since then it has become standard therapy delivered by emergency medical personnel and informed bystanders.

Among the general population, its success, defined as the patient leaving the hospital alive, has been reported as high as 30%, but generally it was about 10%.

Among the elderly and some extremely ill persons (such as those with pneumonia or kidney failure), studies show the success rate of CPR is almost nil.

A study published today in the Annals of Internal Medicine considered 503 patients age 70 or older who received CPR. Results of the study:

- Initial survivors—112 (22%)
- Survivors discharged from hospital, only two of whom had cardiac arrests outside the hospital—19 (3.8%)
- Survivors with no physical or mental damage—9 (1.8%)
- Survivors severely demented or totally dependent—2 (0.4%)

Successful resuscitation attempts on elderly patients are extremely rare if:

- The cardiac arrest occurred outside a hospital . . .
- or the patient had several acute or chronic health problems . . .
- or the resuscitation attempt lasted more than 5 minutes.

The elderly, and anyone else who feels strongly about what kind of medical procedures should be used on them, are advised to take steps in advance of illness to assure their wishes will be met.

A free booklet on such issues, "Tomorrow's Choices," is available in single copies from the American Assn. of Retired Persons, Fulfillment, 1909 K St. NW, Washington, D.C. 20049.

SOURCE: Annals of Internal Medicine, Aug. 1, 1989.

achieved in *healthy* dogs given CPR following induced ventricular fibrillation has demonstrated cerebral cortical blood flows which are only 19% of those observed prior to cardiac arrest and the initiation of closed chest CPR (by contrast, in the same study open chest CPR was demonstrated to provide cerebral blood flows which were *67% of control*; Tatsura, A., et al. *Resuscitation* **12**, 147-154, 1984).

The typical cryonic suspension patient to whom cardiopulmonary support can be applied is, with few exceptions, almost by definition one who has experienced a long agonal course in a medical setting. The patient thus suffers a "chronic death" as a result of a systemic illness which has impacted a variety of organ systems.

Such a patient is *not* simply suffering from cardiac and respiratory arrest, but rather has a variety of underlying conditions which have *caused* cardiopulmonary arrest. The true proximate cause of cardiac arrest is thus likely to be any one or more of the following: shock due to dehydration or hypoxia as a result of pulmonary edema, acutely low blood sugar due to starvation or liver failure, sepsis with associated shock, hemorrhage due to tumor or stress related gastric ulcer disease, etc.

In short, Alcor is presented with a patient who is often wasted, suffering from the failure of a variety of organ systems, and is anything but "otherwise healthy". CPR will be even less effective in such a patient.

Alcor's clinical experience has borne this out. Evaluations of blood pH, glucose, and serum enzyme levels* in several patients transported using CPR has demonstrated marked acidosis in spite of buffer administration (pH 6.9-7.0 vs. a normal of 7.4) very low blood glucose, (19-25 mg/dL vs. a normal of 70 - 110 mg/dL) and elevated serum levels of tissue enzymes such as LDH, CPK, SGOT, and SGPT. Low pH and blood glucose are indicative of poor perfusion. Elevated serum LDH, CPK, SGOT, and SGPT levels are associated with degradation of cell membranes or actual cell lysis. All these are presumably as a result of ischemia/hypoxia secondary to inadequate blood flow and oxygenation during HLR transport.

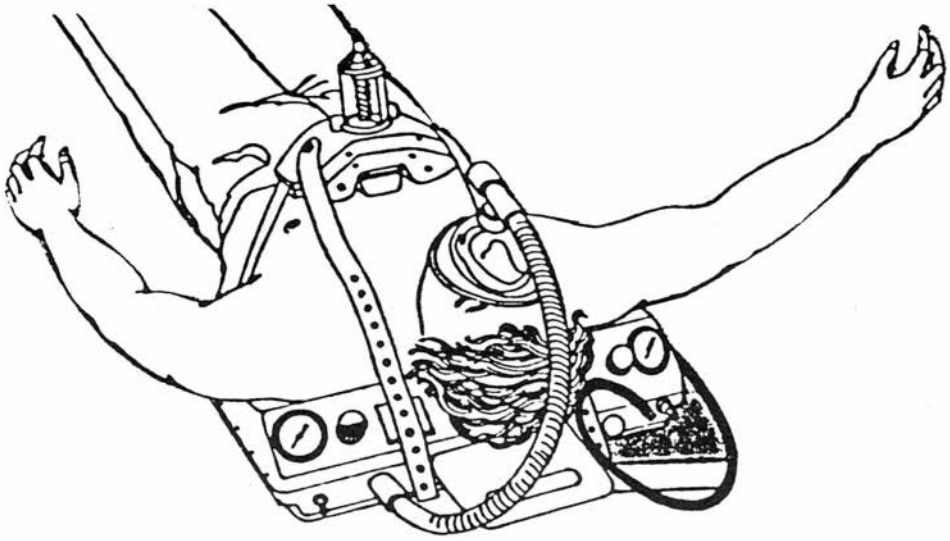
* It should be noted that tissue-specific enzyme levels can be used as markers for ischemic injury only where pre-existing disease has not elevated them: for instance, someone who experiences cardiac arrest a day after a heart attack can be expected to have very high CPK levels before the start of legal death. Similarly, someone with liver disease may be expected to have elevated hepatic enzyme levels.

Consider the case of Alcor patient A-1165: At the start of cardiopulmonary support during transport her serum CPK level was 94 IU, well within a normal range of 0 to 350. By the end of transport her CPK had risen to 2069. Release of CPK is an indicator of injury to the integrity of muscle and/or brain cell membranes. Similarly, her serum SGOT level, which is an indicator of liver injury, went from a slightly elevated pre-cardiac arrest level of 35 U/L (5-31 U/L is normal) to 1040 U/L at near the end of HLR support.

The Utility of CPR

All of the foregoing raises the question: "Then of what use is CPR?" While CPR may not be delivering adequate blood flow or oxygenation over the time course of transport in most patients, it is delivering *some flow*. As a consequence CPR has been useful to provide some metabolic support (which will hopefully become more effective as hypothermia is induced). More importantly, CPR speeds induction of hypothermia by increasing the effectiveness of external cooling, distributes medications which will hopefully mitigate ischemic (and reperfusion) injury, and distributes anticoagulants which prevent blood clotting, which would seriously interfere with the distribution of cryoprotective agents during subsequent perfusion.

CPR is used in suspension patients because it can be objectively demonstrated by evaluation of markers for injury (such as serum levels of tissue-specific enzymes) and by clinical signs (such as the integrity of the capillary bed during subsequent cryoprotective perfusion and the absence of clotting) that patients supported in this way are in better condition than those who are not. By way of example Alcor patient A-1108, who received no cardiopulmonary support or medications but was simply cooled after legal death, arrived with post-transport CPK levels of greater than 5000! What's more, high CPK levels (in the range of 2000 to 3000) persisted in the venous perfusate throughout cryoprotective perfusion!



Undesirable Complications

Because CPR during cryonics operations is carried out for a period of *hours* rather than the clinical norm of 15 to 30 minutes, we have encountered complications not documented in the medical literature which further reduce the effectiveness of CPR. Two of these signs, representing serious complications, have been repeatedly experienced during suspension operations by Alcor: fulminating pulmonary edema, as indicated by a frothy pink pulmonary exudate seen in the endotracheal tube; and massive gastric hemorrhage as indicated by the leakage of blood/stomach contents from the mouth or gastric tube of the EGTA during resuscitation.

Pulmonary edema may be a pre-existing condition in the patient. However, regardless of whether some degree of pulmonary edema preceded transport, pulmonary edema occurs frequently and with rapid onset (<30 minutes) of closed chest CPR. The reason for this is that while normal pulmonary arterial pressure is no more than 30 mmHg, closed chest CPR results in high intrathoracic pressures, with intracardiac pressures generated on the downstroke being equal in all four chambers of the heart and well over the normal pulmonary arterial pressure. The combination of low cardiac output and high pulmonary artery pressure is a recipe for pulmonary edema. Research has documented the *rapid* development of pulmonary edema and resultant poor gas exchange in humans receiving closed chest CPR (Ornato, et al., *Crit. Care Med.*, **11**, 79-82 (1983)). One study which examined 2228 unsuccessfully resuscitated cases of prehospital cardiac arrest documented a 46% incidence of pulmonary edema at autopsy (Nagel, E.L., et al., *Crit. Care Med.*, **9**, 424 (1981)).

Gastric hemorrhage during cardiopulmonary support has been noted as soon as an hour after the start of CPR on two occasions in patients without known pre-existing ulcer disease. Several possible causes for this bleeding have been put forward:

1) Injury to the gastric mucosa may occur during the agonal period when the patient is hypoxic and in shock. Patients experiencing chronic death may have been remain in a state of deep shock for hours, resulting in greatly reduced or absent blood flow to the digestive tract and limbs. Interruption of normal flow blood to the stomach will reduce the pH buffering and osmotic regulation of the gastric mucosa normally provided by the blood flowing though it. Hypoperfusion of the gastric mucosa probably also results in decreased secretion of protective mucous and prostaglandins,

further increasing mucosal vulnerability to erosion by gastric contents.

Much of the insult to the gastric mucosa may thus result from events occurring *before* the declaration of legal death.

2) Inadequate blood flow during CPR (*after* legal death), combined with massive anticoagulation secondary to heparin administration may initiate erosion of the gastric mucosa and precipitate hemorrhage or exacerbate injury which is already present.

Data from previous suspensions has also indicated that blood glucose becomes very low during sustained CPR. This probably occurs as a direct result of the ineffectiveness of CPR in meeting the patient's metabolic demands (ischemia). Under normal circumstances the liver and pancreas regulate the concentration of blood glucose. Low blood glucose during CPR is most likely as a result of ischemia: hepatic ischemia resulting in failed glucose production and regulation, and systemic ischemia resulting in rapid consumption of available glucose by anerobic metabolism. Regardless of the cause, the observed blood glucose levels in the 19 to 25 mg/dL range are cause for serious concern.

Considering the Options

As can be seen from the foregoing, what is needed is some way to provide better support for patients than CPR can give. Alcor has explored two ways of doing this. One way is to use open chest CPR, wherein direct access to the heart is gained in a quick field surgery procedure and the heart is directly squeezed by the operator's hand. This kind of cardiopulmonary support gives excellent cardiac output, but suffers from a number of drawbacks.

First of all there is the problem of operator skill. Open chest CPR requires a considerable level of operator skill and the ability to open the chest surgically. This is clearly not going to be a very practical alternative for Coordinators in the field, or even for ASC rescue personnel since they will have little opportunity to practice the technique and keep their skills fresh. Secondly, hospitals will not generally allow an invasive surgical procedure such as an emergency thoracotomy to be performed in their facilities. This means a delay until the patient can be transported to a mortuary. Finally, there is the

problem of operator fatigue. It takes *hours* to cool a suspension patient to 10°-15°C, where CPR can be safely discontinued. That's why we don't perform closed chest massage by hand, but rather use a machine. Thus, open chest CPR does not seem a very viable alternative for field use and, since we have no intention of having patients experience legal death in our facility for the foreseeable future, it does not seem very appropriate for in-house use either.

The second alternative is ECMO support: direct connection of the patient's circulatory system to a portable blood pump/oxygenator. Unfortunately, this approach requires an expensive set of equipment and skilled personnel, and suffers from the drawback that typically the hospital or nursing home will not permit the surgery necessary to connect the unit to the patient to take place on its premises. This means more delays (typically an hour or two), during which manual CPR must be underway.

Alcor has tried to minimize the likely damage from the inadequate support provided by closed chest CPR by speeding cooling with the portable ice bath (PIB, or Pizer tank) and by the aggressive use of medications such as potassium chloride and barbiturates to drop the patient's metabolic requirements (particularly brain metabolic requirements).

A Major Advance

Nevertheless, what is needed is a way to provide better circulatory support using noninvasive and "low technology" means. We think we've found it. Recent work in closed chest CPR has focused on developing ways to compress the heart differentially so that it behaves more like it does when it is beating spontaneously. One leading manufacturer of heart-lung resuscitator equipment in particular has spent a fair amount of time and money developing computer simulations of the chest and evaluating the effects of applying mechanical "shock waves" that will "couple" selectively with the ventricles of the heart. They appear to have succeeded with the development of a new kind of CPR called *high impulse CPR*. By controlling the wave form of the shock wave (producing a square wave rather the typical saw-toothed wave of conventional closed chest CPR) they have been able to raise the mean arterial pressure during CPR from 43 mmHg with conventional closed chest CPR to over 80 mmHg with high impulse CPR. We have seen the clinical data and are very impressed with it.

Obviously, high impulse CPR requires a machine to carry out since the shape of the wave must be tightly controlled and the initial force applied to the chest is in the range of 200 pounds! Such machines are now in the final phases of clinical trials and are expected to be approved by the FDA for general release within a year or two.

Since Alcor would not be using the device for "resuscitation" and since the device would only be used on legally dead patients (i.e., "cadavers") we are allowed to purchase the units before their release. As of this writing we have ordered one of the new, $5000 high impulse heart-lung resuscitators (HLRs) and expect to take delivery of the unit by no later than the end of August.

Another Alternative

An alternative to high impulse CPR is simultaneous compression-ventilation CPR (SCV-CPR). SCV-CPR is very effective at delivering good cerebral blood flows (although not quite as good as high impulse CPR) but it never was deployed clinically because it greatly compromises cardiac blood flows. In a normal resuscitation situation, the objective is to *restart* the patient's heart as quickly as possible. The single best correlate of being

able to achieve cardiac resuscitation is how good your cardiac blood flows are. If the heart muscle isn't getting any blood it won't start beating. So, even though SCV-CPR delivers good brain blood flows, the actual survival rate for people treated with this modality is *lower* (although those that do survive have dramatically less neurological injury).

However, for cryonics purposes it is much better to have good brain blood flows and compromised cardiac blood flows than the reverse. High impulse CPR seems to offer *both* good cardiac and brain blood flows. Unfortunately, Alcor cannot afford to purchase and deploy three high impulse heart-lung resuscitators (cost = $15,000!).

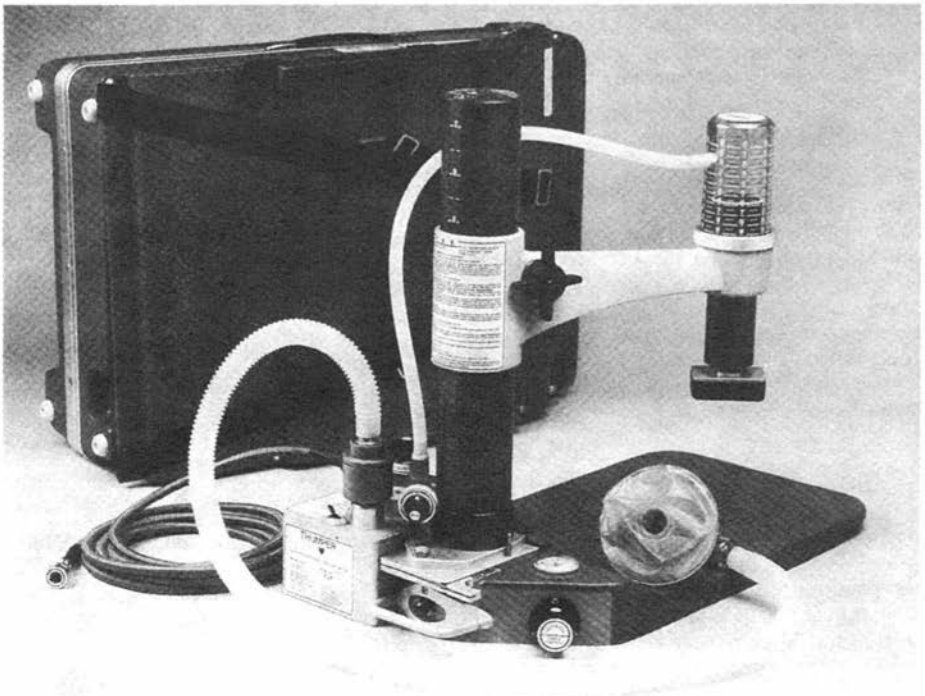
An alternative is to send three of our existing HLR's in for conversion to SCV-CPR at a cost about $2,200 per machine. These can then be placed in the field with Coordinators and used for "first response" in the event of an unanticipated emergency. The high impulse machine which will be kept at ASC can then be used locally in Southern California, for remote standby elsewhere in the U.S., or for shipment to a local Coordinator for use in a situation where a patient is likely to become ischemic in the immediate future.

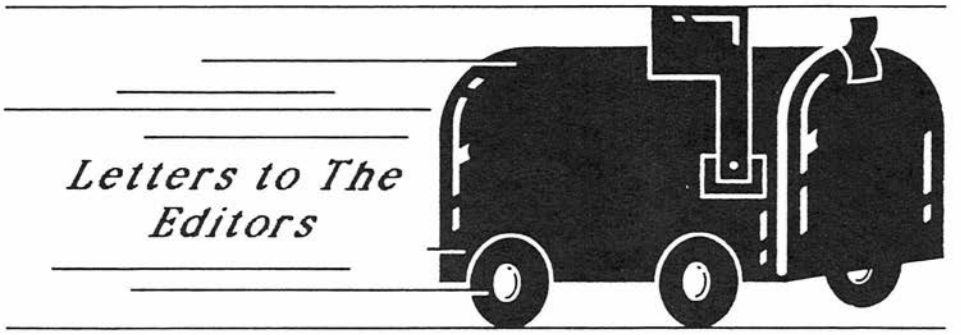
We have shipped two of our regular HLRs in for conversion to SCV-CPR and expect to have the third shipped within a few weeks. Within 6 to 8 weeks all three of the units should be back in our hands having been converted to SCV-CPR.

Conclusion

We think that the use of high impulse CPR and SCV-CPR represents a real advance in care of Alcor suspension patients. Both methods of CPR offer the promise of far better cardiopulmonary support and thus of less ischemic injury.

Alcor is the only cryonics organization to offer such support.





Dear Editors:

We often read letters to the editor, and articles in "Cryonics" criticizing various people and/or policies in the cryonics movement; and we need this input. But, we hardly ever see articles mentioning the advancements, contributions and sacrifices made by the Alcor Board and Staff members.

Having been informed and somewhat involved in the recent difficulties, I have been compelled to look objectively and subjectively at just what has happened in the last several years. In doing this I have come to the sincere conclusion that we Alcorians are very fortunate to belong to an organization with such an exceptional board of directors and staff.

I hope that people in the cryonics movement have come to the conclusion that the directors and staff of Alcor handled the recent Dora Kent crisis as well as possible. We all know that we champion a misunderstood and unpopular philosophy as far as our relationship to the masses is concerned. There was no doubt that attacks would come and there is no doubt in my mind that there are more in the works. With this in mind, I for one, am grateful that we have such top quality people representing us.

A lot has happened since Dr. Bedford was frozen in 1967. And, despite several near catastrophes, he eventually found his way to Alcor. At least, in 1989, it can be said that the first man to be frozen stands a reasonable chance of achieving his dreams.

There is no question that the Dora Kent matter turned latent problems into present concerns. Theses are problems that we would have had to deal with sooner or later, (along with the other critical problems on the horizon.) With these concerns on my mind, it makes me feel confident to know that we have such high caliber people on the board and staff to face those future problems.

I guess what I'm trying to say in this round about way is "Thank You" to the board and staff of Alcor, and to those other members who have also sacrificed and helped in so many ways. I am proud to be a member of Alcor and to be affiliated and friends with so many other Alcorians.

Sincerely,
David S. Pizer
Phoenix, AZ

* * *

Dear Cryonics:

I could go on and on, as I did in my first draft for this letter, but I won't. It is as silly to think that we need to understand the universe in its totality to build a robot that can get a cup of coffee, as it is to think that some guy in a lab coat is going to shout, "Eureka!", and all our problems will be gone the next day.

Donaldson is right, we don't know how the brain works, and we don't know the physical basis of individual variations in mental aptitudes, but this ignorance cuts both ways. I don't know that increasing intelligence wouldn't require such radical alterations in my nervous system as to totally obliterate my present identity. Donaldson, on the other hand, doesn't know that it isn't as simple as 'just' inserting new neurons between the old ones. Opening my head and pouring some more in.

Sure, I want (when it becomes possible) to radically alter my body and brain, to become something more than and other than human. "All" Thomas Donaldson wants, it seems, is to become immortal. I put it to you that while continual replacement of nerve and other cells, and advanced medical technology, are enough to provide you with eternal youth, they won't do squat if you get run over by a truck and the tires smear your brain across the pavement like a grease spot. Accidents happen, and I want to be able to survive them. Does this put me beyond the pale?

From Donaldson's writings, here and elsewhere, I have gotten the impression that he has some sort of free-floating objection to radical improvements in the human organism. Maybe it's because his area of study is one where the tools may change but the object of study is pretty much static. Whereas technologists, apocalyptic or no, are used to the idea that the idea that the object of study is mutable, subject to abrupt, radical change. Get used to it; biology is becoming technology.

Brett Paul Bellmore
Capac, MI

* * *

To the Editors:

In the June issue, Steven B. Harris attempts to explain everything in terms of "relativism" as opposed to "fundamentalism". Both of these disciplines, I believe, if carried to the extreme are oversimplifications of scientific phenomena and of scientific logic.

The oversimplification and distortion of logic is evident in the paragraphs on "GESTATION". Harris states that "To call a fertilized ovum a "baby" would be akin to calling a cornerstone and a set of blueprints a "building". . . ." Now to my knowledge, a "blueprint" if left to its own devices never grows into a building (and neither does a cornerstone) whereas the "genetic material" after fertilization does grow into a human being, so that this is not a valid comparison.

There are smooth and continuous processes, as well as transforming processes, between conception and birth. I agree with Harris when he states that "there are times when line drawing is both unnecessary and unfair." I believe however that you can draw a line between a blueprint and a building and that you cannot draw a line between life beginning at conception and the rest of the individual's life. Also let me state that the best definition of "viability" is that "a preborn human is viable from the moment of conception and remains so unless his or her life is cut short by disease or abortion."

In other words, we are all viable unless we die of disease or are killed.

Sincerely,
Sidney Sament, M.D.
Visalia, CA

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The Editors:

I was interested by "Will Cryonics Work", in the May issue of "Cryonics". It certainly makes the relative sizes of hurdles to be overcome clearer. But Steve Harris seems to be rather pessimistic about the changes of nanotechnology being safe. His best estimate for it being non-catastrophic is 50%, and he only gives the world a one-fifth chance of survival in his worst estimate.

One of the main bits of evidence he cites for this is that there seems to be no other civilization in the known universe. At first sight it is indeed worrying that we seem to be alone. However, extrapolating from a sample of one is a dangerous thing to do. Richard Feynman once summed this up during a lecture.

"On the way to the hall this evening," he said, "I noticed a car with number plate EWK 758. Isn't that amazing, of all the cars in America, I saw the only one marked EWK 758!".

Obviously we observe that our planet has fairly intelligent life on it, but the lack of contact from other life does not allow us to make any kind of serious estimate of the stability of technological civilizations. The definite conclusion we can come to is that there is not intelligent life near us. (Or, as Mike Perry suggests, it's out there but hiding. Vastly further advanced life forms watching us from perfectly hidden vantage points in the sky, or underground, or thanks to their powerful nano-technology, from within our own brains, is the kind of thought that makes us B-movie fans wake sweating in the night, too scared even to run for the hills. But more from *Paranoids Anonymous* later.)

The three choices of explanation as to why we seem to be alone are:

1) The odds of us ever having come about in the first place are just so tiny that we really are alone;

2) Civilizations have arisen a lot but keep collapsing;

3) They're out there but we can't see them.

From our sample of one we can only speculate wildly about which of these possibilities has higher probability. There is, I believe, another explanation which intrinsically avoids the problem of not knowing the odds involved.

The solution stems from a trend that seems to be appearing in current physics. I can't pretend to be able to do the maths of it, but the likes of Stephen Hawking can handle the equations and is rather into the kind of physics that leads to the "Basement Universe" point of view.

It seems that on an incredibly fine level, down below the murky depths of Heisenberg's uncertainty limit, almost anything can happen, and probably does. The most unlikely things go on, some of which would seem to violate our laws up here in the sunlight, but

physicists tell us that what the eye doesn't see, the heart doesn't grieve over. All sorts of particles, some quite massive, pop into existence, and then wink out. These quantum may-flies don't cause us any problems because they all appear and disappear so fast and on such a fine level. (Some of the things going on below the Heisenberg level are so small that nanotechnology would look like vast hissing and clanking iron works of some Victorian juggernaut in comparison.) From our level the universe seems smooth and continuous.

Not only can there be these flitting insects, but, the physicists tell us, as long as the average appearance of the universe stays the same from our point of view, then leviathans can also lurk in the depths.

Bits of the universe can pinch themselves off and expand to form completely new ones. It is said that this causes no violation of conservation of energy because of a great concept called "negative energy" which comes into existence with the new universes, so that their total energy/matter level is zero. Negative energy sounded about as likely as depleted dilithium crystals to me when I first heard of it, But I understand that quite respectable physicists take it seriously. The upshot is that these new universes could not only form, but could also become quite as large as ours.

Most people who are supporters of cryonics are of the opinion that whatever occurs naturally, can be done by human endeavor, but better. This is one of the arguments of pro-nanotechnologists; all biology uses naturally occurring nanotechnology, so with a bit of thought we can improve on systems which after all arose by accident. Thus if new universes arise by accident, then we will one day be able to make new ones for ourselves. This provides an answer to the problem of what a cryonicist might do if he survives until the end of time and the big crunch is about to happen. Just pop down into the basement and run up a brave new world.

This has to be the ultimate piece of wishful thinking. It has the strength that it only requires the sums to add up the right way, which, I am told, they seem to be doing.

If universes can come about on their own, and when intelligent life gets the knack of doing it, a brand new universe will be the sort of thing that no home should be without, and one single universe will spawn a host of others.

So why does everyone have the idea that we live in the only one? The odds of us living in the "first-ever" universe to have come into existence must be staggeringly small. The chances of our being in a naturally-occurring one may be pretty low too. After all, what else would a race of beings that had complete knowledge of everything, and complete power, do but start new universes and watch them?

This is where we get back to the safety of nanotechnology and where all the aliens have gone. The options on aliens were: they never were; they blew themselves up (or grey goo-ed themselves), or they're about, but hiding. We now have a new option, similar to option three, but on a far grander scale. They exist, but not in our universe. However, they can probably come and go as they please. They could well be, by our terms, a creator; omniscient and omnipotent, but totally indifferent. God may exist, but the afterlife might not. Perhaps we are lucky and the being that created our universe has a streak of sentimentality and put some nanomachines into our world which track down sentience and translate it to some immortal coil upon deanimation.

What if it has a sadistic streak? Here we are back with Paranoids Anonymous. I just hope that the fact that I can think these things, and communicate them to others means that my mind is not being monitored or such thoughts would have been expunged. Mind you,

a sadistic creature would have more fun by letting us think we were free from persecution until the last moment. . . .

I feel this is important because even Mike Perry's optimistic article on the likelihood of the success of cryonics finished by saying that we could not decide as to why we could see no aliens. So let us hope for the best. If universes can be manufactured, then there is no need for us to hope for the best. It just doesn't matter how likely or unlikely it is for intelligent, technology-wielding life to form. If it's very unlikely, then we are alone. In this universe, if life gets to technology easily then it doesn't matter if it keeps killing itself, because somewhere, in some universe, it will get to complete control, and then it will produce more life and even more universes willy-nilly. The created universes are all nicely set up for life to evolve. Aliens don't have to hide from us because we can't look into their universes. Perhaps we should be looking for thought-recording nano-devices in our brains.

The question may be asked, why, then, did we not evolve closer to the start of the universe? Well, there are so many possible answers to this that it's hard to start. We may be of no more importance than a child's ant farm. Perhaps the kid didn't read the instructions properly and we took longer to grow than we should have, or perhaps something interesting was going on in a friend's universe, and they were betting on the outcome. (The Greek gods did that a lot.) At the far side of our universe there may be the shattered remains of a civilization that reached the peak of culture, but that the kid got bored with, destroyed, and then came over here to watch us apes try to become time-lords.

It does not really matter what the odds of any of this are, as long as they are above zero. Even if there turns out to be some rule of physics that only a couple of universes can exist after the first one, then the odds are only 1/3rd that we are in the first universe.

Theoretical physics seems to be going in the direction of there being huge numbers of universes, so we just can't be in the first one; which sidesteps the question of where have all the aliens gone, but begs rather a lot more questions, some of which are rather scary to ask, let alone even to start thinking of answers.

To borrow a phrase,

Good night, and may your god go with you.

Garret Smyth
London, U.K.

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THE APOCALYPSE, TECHNOLOGY AND HUMAN PROBLEMS

By Max T. O'Connor

I found myself largely in agreement with Thomas Donaldson's "The Apocalypse Has Been Called Off" in *Cryonics* #107 (June, 1989), though I would like to present a view differing in some respects from his, though more in emphasis than direction.

The first point I have to dispute is Thomas' contention that "Science ultimately stems from Christianity". I find this a bizarre assertion, not only historically but philosophically and psychologically. Science developed in non-Christian cultures such as the Ancient Greeks and the Egyptians. However, even if science had developed only in the

predominantly Christian areas, this would show only correlation and not causation. I suggest that the confluence of Christianity and scientific development is explained by the fact that "the" scientific method was invented (or discovered) in the mostly Christian region and then spread by cultural and economic ties which existed to a much lesser extent across the Christian and non-Christian areas. In so far as it provided some part of the common culture that facilitated the spread of the scientific method, Christianity helped science, but this hardly makes Christianity the progenitor of science.

On the contrary Christianity (as well as other religions) has commonly been an enemy of science. This can be blindingly obvious, as in the case of Martin Luther with his rabid denunciations of reason. Science doesn't work well in the absence of reason, in case this has escaped some people! Science and technology were powerfully hindered through the hideous years of the Middle Ages, when Christianity was a force of entropy, telling people that Earthly life was about suffering, that to enjoy was evil and to suffer good, and that we should not try to improve our lot in life, for to do so would be prideful. Science flourishes in an atmosphere of trust in reason, where people feel that intelligence is properly used to combat the evils of existence and to improve their lives.

More recently, in the nineteenth century, advances in anaesthesia were delayed and denounced by Christians who claimed the pain of childbirth, for instance, to be God's intended punishment for the temptation of Adam. And in the present we see Christians trying to stop the use of technology for making lives better by increasing control over having babies, or research into genetics with the prospect of making alterations in ourselves and our progeny which could mean improvements in both physical, cognitive, and emotional performance and well-being. However, Christians aren't *inevitably* opposed to science, as the large number of individuals who are both Christians and scientists attests. Indeed, an important step towards a formulation of good scientific method was taken by Francis Bacon, though his scientific methodology owed nothing to his religion.

To the extent to which such individuals can be both Christian and scientist, they are dividing up their cognition so as not to let one way of thinking question the other. Reason tends to subvert faith (belief in things for which one has very little or no evidence), and faith tends to undermine reason. That one can be both a scientist and a Christian no more shows them to be mutually compatible than the occurrence in a person of both mean and pleasant actions shows that meanness ultimately stems from pleasantness. An excellent discussion of the incompatibility of Christianity and science and rationality can be found in George Smith's classic *Atheism: The Case Against God*, published by Prometheus Books.

Thomas performs a valuable service in reminding us of previous declarations that paradise was just around the corner thanks to some new technology. Clearly technology will not automatically solve all of our problems for us, since it can just allow us to create new and more interesting problems to replace old ones. I fully endorse Thomas when he tells us that "Technology is usually a necessary *but not a sufficient* part of any solution to our problems. We must participate, not distantly, but *up real close*". However, though we can have no certainty about the shape of the future, I suspect the truth will be somewhere between the apocalyptic vision and Thomas's 'business-as-usual-except-more-interesting-and-complicated' view.

In the coming decades and beyond, our growing capacity for self-understanding and self-modification will radically change the ground rules for human (or rather post-human) existence. Eventually we can expect the branches of neuroscience to present us with a complete picture of cognitive functioning. We can expect to have a genetics and a nanotechnology capable of changing us to order. Yes, on the way to our goal of self-expansion and perfection we will have to experiment and we will make mistakes. Despite

side-tracks we will come to modify ourselves so as to address the enduring problems of human existence.

One of the most pervasive and frightening tendencies of we humans is to lose our tempers, think short term, and to deal with others by violence and force in an attempt to make reality as we want it. As we make alterations to the workings of our brains (or into whatever we may transfer our pattern-identities), we will be able to reduce or remove tendencies to stupidity and violence (which go together) and will become more capable of peaceful cooperation and co-existence. Instead of trying to to solve our problems by killing or stealing from the other fellow, we will look more carefully at our situation, at long-term factors (especially in a world of the undying), at human psychology, and at game and decision theory. The result will be a human or post-human society in which conflicts are resolved peacefully and with maximum efficiency instead of violence and destruction.

A major reason why technological advances in the past have failed to bring a new age is that our intelligence has not increased very much, and certainly not in line with our power. My reason for long-term extreme optimism is that this may reasonably be expected to change. Once we control not only nature -- external reality -- but also our own intelligence and our own emotions, desires and drives, we can break the cycle of more-technology-with-more-problems. The process has already begun, if only in an embryonic form. The complex interconnected societies and economies produced by modern technology have begun to pull us away from the barbaric methods of the past. Far more people to a much higher degree are finding violence unacceptable as a means, though too many continue to believe it necessary because of their own ignorance and short-sightedness, both of which are driven by unruly passions like envy, greed, fear and hate.

The Apocalypse (or, more appropriately, the Singularity) may not come. It depends on the choices each of us will make. Technology may be used for the increasing of human intelligence and beneficial self-modification, or it may be put to the use of primitive urges and the stupidity that lingers in us from our evolutionary history with our consequent destruction or purgatory. The choice is up to us. I suggest that an optimism that tells us that a scientific singularity, a technological Apocalypse is possible and should be pursued is more likely to push us in that direction than a focus on the gloomy possibilities and the sinfulness of Man.

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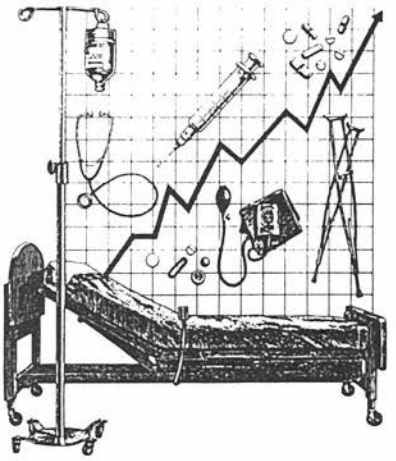
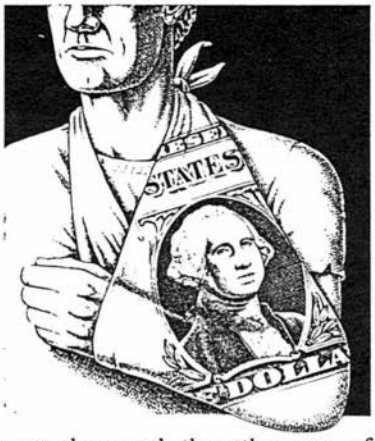
THE ECONOMICS OF CRYONICS

by Thomas Donaldson



For years a special debate, sometimes angry and sometimes calm, has persisted within cryonics. The issue debated isn't scientific. Instead it concerns the desirability of nonprofit versus commercial corporations to carry out and oversee cryonic suspension.

Right now, of course, all cryonics organizations have a nonprofit component. The only organization associated with a profit-making company does so as an overseer: the supplier of services is profitmaking but the buyer is not. Even this degree of involvement with commercial economics has caused debate among cryonicists. It turns out that this issue has not only arisen



many times before, but that it's endemic in health care (of which cryonics is a part, although a radical part). Should hospitals be profit-making corporations? Should ambulance companies? Cryonicists aren't the only ones to have thought about these problems.

Recently in *Science* (**244**, 541-546 (1989)) an economist at the University of Wisconsin, Burton A. Weisbrod, has written a review of work within economics directed precisely at this issue. Since he's the Director of the Center for Health Economics and Law there, he may know something about the issue.

Since so many cryonicists are libertarians, I will make several essential points before discussing the issue at hand. We are not discussing government versus private corporations, but instead two different forms of private corporation, one of which does not distribute profits to its members and the other one of which does. Nor are we discussing whether or not price and money should determine economic behavior. They do anyway. The issue is one of economic structures, how to measure their efficiency, and the results of attempts to do this measurement.

Economists got interested in this issue after one author, Richard Titmuss, wrote a book, *The Gift Relationship* (1971), about the use and trade of human blood. Blood in the U.S. was usually sold. Often it was poor quality, infected with hepatitis and other nasties. In the U.K., however, blood could only be donated, and donated blood had a markedly higher quality. Economically, just why was this? After thought, it turns out that blood is far from the only commodity where this issue arises. In fact, *the sale of used cars* (Well, well, what do you know! There are laws, processes, and economics even with Tricky Dicky.) suffers from exactly the same economic problem.

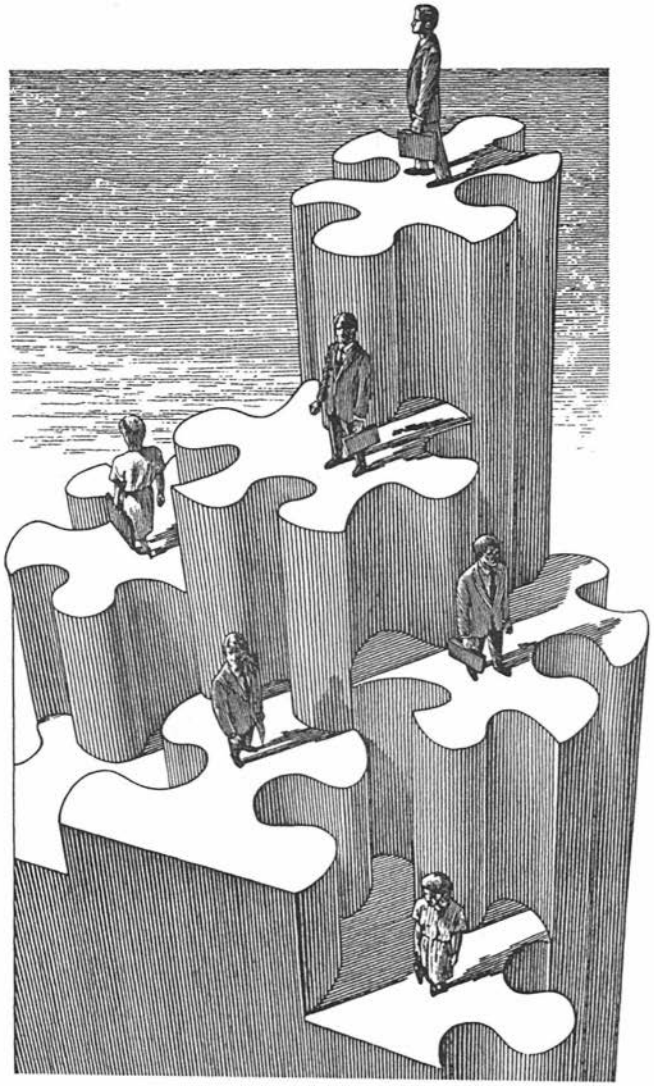
The problem in both cases is that the *seller* will always know significantly more about the product than the *buyer*. If sellers know much more than buyers, *and* they will gain personally from the sale, they have every reason to skimp on quality. Those who don't skimp on quality will be undersold by others who do. Over time this means that dishonest, close to fraudulent, sellers will drive out the honest ones, and similarly with bad products. Continued long enough, the whole market can disappear.

In his article Weisbrod discusses several attempts to actually measure the difference between nonprofit and commercial. He also points out (easy to measure!) statistics showing that the number of nonprofits has grown tremendously in the U.S. economy over the last 20 years. As for measurement, most attempts were in health care, by the Institute of Medicine of the National Academy of Sciences (US). In terms of *access*: nonprofit hospitals provide relatively more care to the indigent, at least 50% more in some states. Nonprofits also had longer waiting lists (suggesting that they used waiting lists instead of price to limit service given per day). Profitmaking hospitals also had higher prices. In terms of *quality*: explicit measurements of quality, such as certification of the staff, mortality rates, and evaluations by doctors in the community, suggest that profitmaking hospitals can provide care of equal quality to nonprofitmaking ones. To be fair, though, we need more than the spotty data available. However, nonprofit nursing homes turned out to provide far better care than commercial homes.

Some people in cryonics would say that these results more than ever not only explain, but also justify, why it is that one of the leading cryonics organizations (Oh, alright, I mean Alcor) provides a level of care significantly better than that of the others. An

objective observer would have to raise the issue of other cryonics organizations (nonprofit!) and *their* level of care here, too, though. I don't believe the difference can be easily resolved simply by having a nonprofit organization to oversee suspensions. The essential problem is that there is currently no way to objectively measure the quality of a suspension. It seems hard, for instance, to measure it by the death rates of patients. Patient testimonials are also hard to obtain. Opinion of the medical community, again, seems an unsafe measure. A nonprofit caretaker has no better way to measure this quality than an individual.

The observation that a market can actually disappear because of this process is also very interesting for cryonicists. Since we have at least two nonprofits in cryonics, I feel safe that we won't see a disappearance of the market. But how many times has the public, first, thought that we were (profitmaking) businesses, and second, thought that we were extremely shady? Indeed, that we were worse than used car salesmen? We are not just trying to work against ignorance. We can often deal very simply with ignorance by providing information. What we are working against is *suspicion*, which is far harder to deal with. We can give someone all kinds of information, up to and including testimonials from the Pope. It won't matter if he doesn't believe us. One clear insight from this article is that, in a confused way, the public has learned about the economic relation I am describing and deeply distrusts anyone selling such goods.



I also feel, though, that the present state of health economics is far too slight to merit using these ideas as a sole means of choosing between one organizational form and another. Results are just too infirm. Continued work in economics and health, though, may give us much firmer results on how this difference works in other areas of medicine. Just like used cars and Tricky Dicky, differences between cryonics organizations may show laws and regularity rather than simply being the results of individual taste.

MANY ARE COLD BUT FEW ARE FROZEN: A HUMANIST LOOKS AT CRYONICS

by Steven B. Harris

"Some people want to achieve immortality through their works or their descendants; I want to achieve immortality through not dying."

-- Woody Allen

Introduction

In contrast to the novelty book of a few years past which promised 101 things that could be done with a dead cat, it is doubtful that there are 101 things that can be done with a dead Humanist. Notwithstanding this, there is always one more choice in this difficult matter than most people think, and that last novel option is the subject of this essay.

This essay does not address sea burial, cremation, anatomical donation, or nontheistic funeral services. Instead, the subject is *cryonics*, which is the practice of freezing human bodies in the hope of one day (in the far future) being able to revive these persons and restore them to health and youth. Strange and unworkable as this idea might at first appear, cryonics is nevertheless practiced today by several groups of (otherwise) quite rational people in the United States.

Cryonics is both a practice and a philosophy, and both aspects of it are potentially of interest to secular humanists ("Humanists"). The philosophy of cryonics, as it turns out, is in some ways merely an extension of familiar Humanistic premises. Both cryonics and Humanism are based on physical materialism. And like Humanism, cryonics looks toward mankind rather than a deity for "salvation."

At the same time, there are differences between the two philosophies which make for interesting contrasts. Humanists, for instance, tend to hold a very social view of the role and value of the individual (more on this later). In contrast, those who practice

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cryonics ("cryonicists") are strong individualists. In addition, while both Humanists and cryonicists place considerable faith in human nature, cryonicists possess a faith in human technical progress which the average person (including the average Humanist) might consider to be far-fetched.

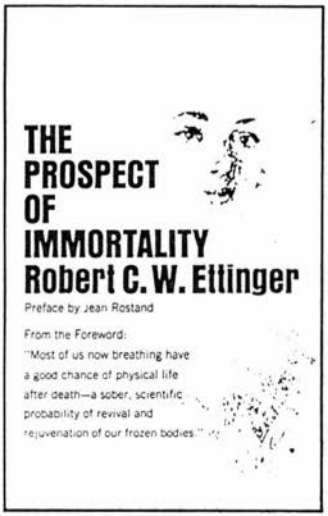
On the practical side, the practice of cryonics may hold a certain allure for the individual non-theist or Humanist who wants to believe it might be possible to cheat death, but who can't quite make himself believe in mysticism in order to go about it. Yet here again, moral and practical differences arise. Is there any real possibility of success in cryonics? Or is it just another comforting dream of the sort that Humanists have already bravely forsaken? And even if it *might* work, should it be practiced by "good" Humanists anyway? What is the role and/or "value" of death itself in the philosophy of Humanism?

This essay is intended as an introduction to cryonics for the Humanist. The discussion is offered first in the spirit of simple description, as cryonics appears to be something genuinely new and interesting in the way of applied human philosophy. More than that, however, a discussion of cryonics, with its separation of the themes of immortality and theism, promises to offer some insight into the always difficult question of what it means to be a Humanist.

I. Cryonics and Materialism

Origins

The word *cryonics*, now in most dictionaries, is a very specific term referring to the freezing of people, and was coined only in 1965. The first thing to know about the word is that it is not to be confused with the more staid (and much more respectable) scientific discipline of *cryogenics*, which is simply the study of the physics of cold temperatures.



The history of cryonics, as the etymology implies, is rather short. Although the basic idea of suspended animation in fiction is at least several centuries old (remember Rip Van Winkle), the idea of a human being preserved into the far future specifically by *freezing* was first introduced in a 1930's science fiction story by Neil R. Jones*. It was not until 1964 that a Michigan physics teacher named Robert C.W. Ettinger published a book called *The Prospect of Immortality* (Doubleday), in which he seriously suggested that freezing people for the future might be a sensible thing to do in real life.

Specifically, Ettinger argued that cryogenics and medical technology were advanced enough already to do the "front end" (freezing) part of the cryonics preservation

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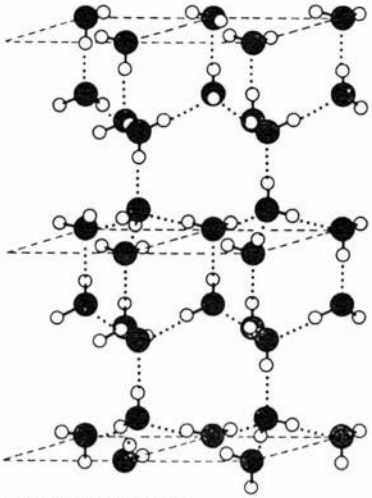
* Jones' *The Jameson Satellite* was published ca. 1931, in *Amazing Stories*. As reported in *Cryonics*, **10(2)**, 25 (Feb, 1989), Dr. Ralph S. Willard also suggested this, as reported in *Time*, Aug 19, 1935, pp 26-27. Steve Harris was unaware of Willard's work at the time he wrote this article. In any event, Prof. Ettinger's proposal marks the beginning of cryonics because of its scope and consequences. --Eds.

procedure, and that the ability to do this relatively simple procedure was all that was required to make cryonics practical now. We could start immediately, said Ettinger, and let the really difficult part (thawing and revival) be taken care of by more knowledgeable people, later. Much later.

Some Materialist Philosophy



The idea of cryonics takes considerable getting used to, but Ettinger's outlook on nature was in many ways similar to that of the modern secular humanist. In fact, the most difficult premise of cryonics is *philosophical materialism*, a belief that most Humanists already take more or less for granted. Simply stated, Ettinger believed that human beings are made of physical materials, and nothing else. In other words, a human being was to be seen as a collection of atoms, with no extra metaphysical, supernatural, or "ghostly" ingredients.

This is an idea whose ramifications deserve attention, and before we move on to discuss Ettinger's specific arguments for the practice of cryonics, it will be well to pause for a closer look at the philosophy of *materialism* as it applies to biology and the question of human identity. Later, we will examine the practical applications of those views.

A Pattern Of Atoms

A human being, in the materialist stance taken by Ettinger, is essentially a *pattern*. In this view, although a human being is certainly the collection of atoms that make up the body, the *essence* of the person is to be found in the *information* recorded by the *arrangement* of the atoms. Thus, a person is not to be confused with the materials composing his or her body, any more than (for instance) Melville's novel *Moby Dick* is to be confused with the paper and ink which make up any particular copy of the work.

The difference between material and information can be illustrated by extending the book analogy: just as the essential identity of *Moby Dick* does not change if one tears pages out of a particular copy of the work, and replaces them one by one with photocopies, so the essential identity of a human does not change when the body picks up and discards atoms in the day-to-day process of metabolism. Our materials (atoms) change every day, but we still remain us. We would even remain us if *every one* of our atoms was replaced, as long as the replacement was done sufficiently carefully. We are the information, not the materials. We are *information beings*.

We Are Our Brains

Once the initial premise has been granted, it seems obvious that some of the information in a human body is likely to be more important for identity than the rest of it. A person who has lost a limb, for instance, or has a transplanted heart, is still the same person. It is the information in the brain that is crucial. The DNA in most of our cells contains the information to make identical twins of us, perhaps, but it is the brain that contains the information which makes each of us unique.

In the materialist view, the "essential identity" of individuals -- that which makes them who they are -- mostly involves the interplay of mental factors such as memories, degree of intelligence, and basic personality and belief systems. Mental identity factors are in turn defined by the physical structure of the brain -- that is, by how the atoms of the brain are arranged.* Thus, to the materialist, we *are* our brains, and would continue to be (essentially) ourselves even if all parts of our bodies but our brains could be replaced with transplanted parts from someone else.

What is Life?

The "mechanistic" view of life demanded by materialism has other implications sometimes not considered by those who accept it. One of these is that there is no "magic" about life itself. Mechanists do not believe in the old philosophy of "vitalism," in which "life" is some combination of ordinary matter *plus* some irreducible metaphysical "spark." Instead, mechanists see living organisms as incredibly complex machines.

Mechanists like to point out that this view of life has experimental support. Like machines, certain living organisms can be "stopped" by putting them into full suspended animation (by freezing or by dehydration). Later, the organism can be revived at the scientist's leisure. Many different cells and tissues can be frozen in liquid nitrogen at hundreds of degrees below zero, and even stored in liquid helium at nearly absolute zero. In the frozen state near absolute zero, there is no metabolism. The machine has stopped: life has stopped. Recently, it has been demonstrated that certain tissues can even be freeze-dried without damage, and stored at room temperature on a shelf, inert.

And yet the machine can be made to run and live again. Freeze-dried tissues can be rehydrated like a backpacker's dinner, after which they return to life. And a number of healthy babies have been born in recent years which developed from embryos which at one time had been frozen to the point of having no metabolism at all.

Materialists and Death

The presumption of materialism, applied to biology, has further interesting consequences. One of these philosophic consequences is that if "life" is viewed as simply the running of a complex machine, then "death" is a word which needs redefinition.

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* It is certainly possible that the identity and personality of a person might be an *electrical* information pattern in the brain, rather than something as mechanical as the way the atoms of the brain are arranged -- but the evidence is against it. Evidence for purely physical storage of identity in the brain comes from cases of both humans and laboratory animals who have survived complete stoppage of measurable brain electrical activity due to cold or drugs, and have subsequently recovered with no loss of long term memory or personality. Further evidence comes from the fact that many people have received heavy currents of electricity through their brains, strong enough to completely over-ride the brain's delicate internal electrical activity, and yet nevertheless have recovered with personality and memory (except recent memory) intact. Thus, although nothing is certain in this area, it seems that only the *expression* of personality is electrical. To use a modern analogy: if the brain is like a computer, then the continuously running computer program we call "the mind" is apparently capable of being "booted up" after a nearly complete stoppage of brain activity. But the true identity of the person lies in the computer hardware (the physical brain) that newly generates the "mind" whenever the physiologic conditions necessary for consciousness are achieved.

Mechanists do not believe in the existence of some "spark," "vital force" or "soul," the departure of which constitutes "death." Nor does the absence of "life" (metabolism) constitute "death," if the word *death* is to retain its familiar connotation of *permanence.* For example, a frozen or dehydrated cell with no metabolism is clearly not "dead," in the usual permanent sense, if it can be brought to "life" on demand. How, then, can a materialist define "death"?

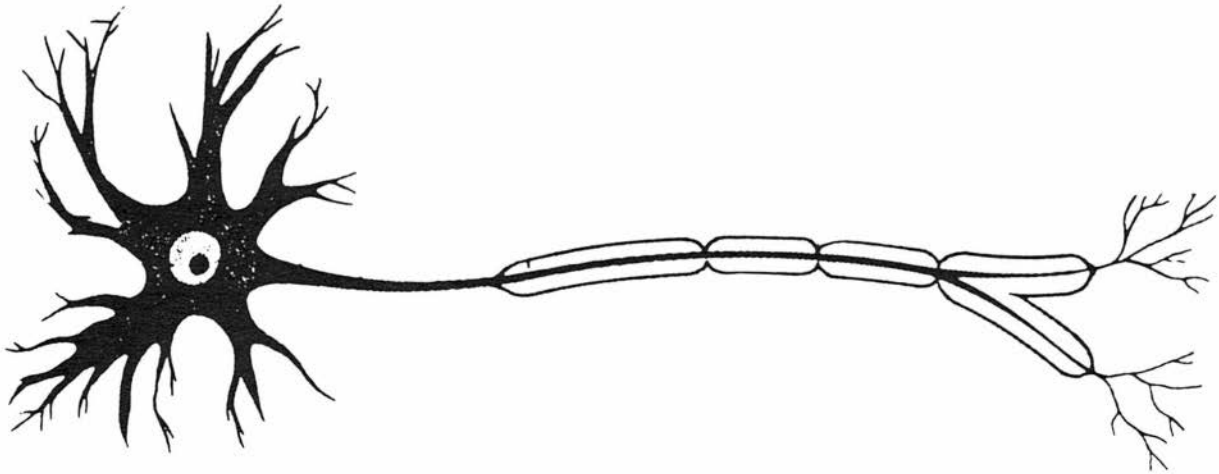
Some materialists have proposed a solution to this semantic problem, which uses one of the concepts already discussed above. If *life* is seen in terms of *information*, as discussed earlier, then *death* may be usefully defined as the permanent loss of that information. In a parallel way, the death of a *person* (destruction of his personal identity) corresponds with loss of the *information in his brain* which specifies *who he is.* Physically, then, this view implies that "materialist death" comes to a person (as an individual) with irretrievable destruction of whatever brain structures specify memory, intelligence, and personality.

The Nitty Gritty About Timing

Now we come to an even more difficult question: If the *death* of a person happens when the essential structural identity information in his brain is destroyed, then at what point in time in the dying process does this loss take place?

The answer is unknown, but there are intriguing and even horrifying possibilities. It is, for instance, entirely possible that "materialist death" of an individual does not happen until many hours after the heartbeat and breathing stop in what doctors call "clinical death." The reason for this possibility is that brain structures, down to the structure of individual brain cells, are known to stay reasonably intact for at least that long after clinical death. Thus, the critical structural information which determines personal identity may well continue to be preserved for a relatively long time.

Neurons (electrically active brain cells) are sometimes said to "die" within a handful of minutes of being without oxygen. This isn't true. Strictly speaking, what happens is that a few minutes without oxygen selectively damages the circulatory system of the brain so that neurons are doomed to disintegrate and be destroyed many hours later as a consequence of loss of circulation. Thus, after a few minutes without oxygen, the brain as a whole passes a point at which it cannot be revived by present techniques -- yet the individual neurons are still fully capable of metabolism for long after the traditional four to six minutes.



There is more: even at the point where individual neurons stop most of their metabolism, it is difficult to say that they are "dead." The problem is that it is generally impossible to tell exactly when any cell "dies," and neurons are no exception. In fact, the very idea that cell "death" is an sudden *event*, rather than a *process*, is a vitalist one in disguise. It brings up the image of a small cellular "ghost" leaving each cell when it goes "permanently" defunct.

Without the kind of supernatural event noted above, it isn't clear how a term like "cell death" is to be defined, except (again) in terms of information. If a cell is a machine, then a term like "cell death" is equivalent in a sense to saying "automobile death." But "death" must carry the idea of permanence, and an automobile cannot be said to be gone beyond any recall or restoration until it is totally melted down and destroyed -- or in other words, until its *information* is gone. So, presumably, with a cell. Or a brain composed of cells. Or a human being.

The Cryonicist's Argument

In the early 1960's, as noted, Robert Ettinger pushed the materialist philosophy to its logical conclusion. Specifically, he argued that what we now term "dead" neurons, might one day be repairable and revivable given the proper science -- just as a badly damaged automobile unfixable in an average home garage might still be reparable if taken to a master mechanic. Thus, Ettinger noted, a "dead" person with reasonably intact neurons (personal identity information still present) might only be as "dead" as the technology of his society was ignorant. Inability to resuscitate, warned Ettinger, should never be held up as conclusive proof that resuscitation was theoretically impossible.

There was, of course, precedent for Ettinger's warning. In the years before electrical cardioversion (electrical shock to the heart) was invented, medical science considered a human being "dead" when his or her heart stopped. With later advances in technology, however, things changed. People in medical states previously classed as "dead," suddenly became "dead" no longer, and this was because new technology had changed the *definitions*, not the condition of the patient. In fact, in certain circumstances a person whose heart had just stopped eventually came to be considered only "very sick."

Now Ettinger was saying that it made no sense to define personal death in terms of "cell death," since it was impossible to tell just when intact cells had died. Cells, he argued, are machines. They either ran or not, but permanent death was certainly not indicated by failure to run. In Ettinger's view, whether cells could be made to run again depended solely upon the repair capacity of the organism, or (perhaps) the repair capacity of the resuscitation technology. Ettinger argued that it was foolish to suppose that ability to resuscitate "dead" cells, or "dead" people, would never progress further than the present state of the art. On the contrary, he surmised that many of the "fresh corpses" autopsied today are (by the standards of the future) only very sick.

This was strong stuff, but for Ettinger the question of exactly when "forever irreversible" death occurred was not moot. For Ettinger argued that a person might be *frozen*, as a desperate measure, in that uncertain time interval between when the doctors of the *present* give up, and when the doctors of the *future* would be forced to give up, if confronted with the identical problem. The freezing process itself, said Ettinger, when carried out properly, might not do so much extra damage that this also would not be repairable. And if identity resides in the physical arrangement of the atoms of the brain, Ettinger noted, that arrangement, and probably the person's identity, is most probably preserved by freezing.

The Promise

That was the scenario Ettinger offered in *The Prospect of Immortality*. Once repaired and revived, a frozen person would have diseases cured and youth restored by the same cellular repair technology used in the revival*. Then, presumably, he or she would embark on the good life in a future world of plenty.

It would, after all, *need* to be a world of plenty to be able to afford luxuries like reviving frozen people. If one woke up at all, it would be to a world of high-tech magic. What was there to lose? The gamble seemed sound.

The Practical Takers

On January 12, 1967 someone decided to try it. A psychology professor named James H. Bedford died of cancer in a Glendale, California nursing home, and per his prior arrangement was frozen in liquid nitrogen at 320 degrees below zero Fahrenheit. *Life* magazine devoted a layout to the procedure, but the fatal Apollo 1 fire some days later shut down that particular edition of the magazine before it had a chance at wide circulation. The result was that cryonics received its major publicity debut not from

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* For more information on the theoretical power of future technological capability, the reader is referred to K. Eric Drexler's *Engines of Creation*, Doubleday, 1986.

Bedford, but from the unaccountably persistent rumor that cartoonist Walt Disney had been secretly frozen after his death in late 1966.*

The history of the first ten years of practical cryonics is a somewhat rocky tale of beginner's mistakes, incompetence, and financial problems. As many as fifty people were frozen during those years. However, keeping them in that state, which required constant tending and infusions of difficult-to-handle liquid nitrogen, proved more difficult. Some of them thawed. A similar fate befell many "suspendees" supported by payments from relatives. After a time the relatives invariably lost interest, suffered financial problems, or died. When the money ran out, entropy took over.

The Modern Cryonics Movement

Today, the census of intact bodies frozen at liquid nitrogen temperatures in the United States stands at eight. One of these is the first cryonaut, James Bedford, who after more than two decades, still reposes peacefully unchanged in liquid nitrogen in a vacuum-insulated steel cylinder in the cryonics laboratory of the Alcor Life Extension Foundation in Riverside, California. An additional few intrepid souls have chosen and followed through with the cheaper alternative of having only their brains or heads frozen after death -- the thought being that presumably any technology able to repair every cell in a body should also be able to grow a new body to house the brain, from the blueprint of the DNA.


How the nonfuneral was arranged

by ROBERT C. W. ETTINGER

* The case of what happened to Disney, interestingly, remains unsolved. Disney's family maintains that he was cremated, and this is almost certainly the case. However, a recent Disney biography, unfortunately unreliable on other factual detail, maintains that Disney is frozen. The source of the persistent rumor is probably Disney's one-time speculation about cryonics, coupled with the curious fact that the Cryonics Society of California happened to hold a news conference to announce its formation on the day Disney died, and the same reporters covered both. And, of course, Disney's profession as an animator has generated a series of awful puns about "reanimation" that no one has been able to resist.

Cryonics organizations, of which there are now three in the country, are growing slowly. Several hundred people (most of them in excellent health) have contracted to undergo at clinical death the rather complicated procedure of freezing. In today's cryonics organizations, arrangements to be frozen at death must be made well in advance, by the person who is to be frozen. Cryonics organizations no longer accept "last minute cases," and as a matter of policy make it a practice not to solicit among the dying.

The logistics of the actual freezing process are difficult. Teams of technicians stand by around the clock, in constant preparedness in case of the legal demise of a member of the cryonics organization. Such teams begin the process of cooling the body as soon as possible after cardiac arrest has occurred and death has been pronounced by a physician. Then, after transportation to a special laboratory and surgical suite, the body is hooked to a heart-lung machine which maintains oxygenation to still-metabolizing tissues, while the blood is drained and chemicals circulated to minimize freezing damage.

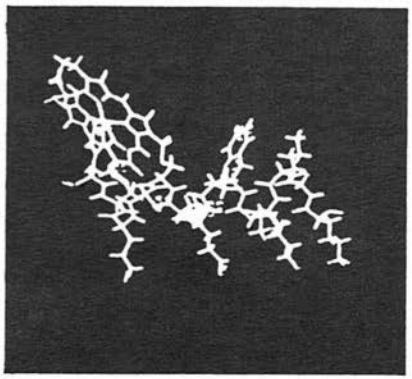
Eventually, every "cryonaut" is cooled to the temperature of liquid nitrogen over several days, and stored in a liquid nitrogen filled vacuum-insulated flask. A fund is then activated which pays for what cemeteries under similar circumstances call "perpetual care." This money usually comes from an extra life insurance policy taken out by the cryonaut, with the cryonics organization listed as beneficiary. No longer is there danger of money drying up when relatives have passed through their grieving period -- for arrangements are no longer made in this fashion.

II. Cryonics and Humanism

Is Cryonics a Religion?

What is the secular humanist to make of all this? Having one's body frozen in the circumstances described above is an act of considerable faith, indeed perhaps faith of a religious magnitude. An interesting observation is that the idea of cryonics does seem to occupy the same space in the mind as does religion (or for that matter, secular humanism), so that people who occupy themselves with several of these philosophies at a time are rare.

There is as much argument in the cryonics movement as to whether cryonics should be considered a "religion," as there is in the Humanist movement over the same question. Cryonics presents a kind of resurrection myth, and certainly the resurrection myth in various forms has been a mainstay of religion for a very long time. We know that Neanderthal man buried his dead with food and tools. We know that many ancient religions had resurrected Gods: Osiris, Tammuz, Dionysus, Adonis, Quetzalcoatl, and so forth, and that the resurrection myth was present in biblical Palestine even before the death of Jesus (Matt. 14:1-12, 16:13-14). Further, we observe that very often when the cryonics-like theme of *technological* resurrection is present in science fiction stories or movies (*Frankenstein*, *The Day the Earth Stool Still*, *E.T.: the Extra-Terrestrial*, *Starman*), it is often accompanied by heavily religious or messianic themes.



And it is true that cryonics indeed offers a seemingly religious menu: the chance of salvation by both works and faith; the prospect of resurrection after death; the hope of functional immortality in a

coming millennium. There are parallels between cryonics and Roman Catholicism, in which the bodies of saints are preserved and venerated. And in a modern, technological way, cryonics mirrors the religious rituals of ancient Egypt in which the body was fanatically preserved and prepared for a long trip through darkness before being reunited with the breath of life.

On the other side of the argument, however, it may be noted that the one necessary and sufficient element of any religion is the promulgation of a unique code of morality, or ethically correct conduct. A specific philosophy of living of this kind is lacking in cryonics, which in general demands of its patrons no more allegiance to a particular ethical code than does (for instance) a modern hospital intensive care unit.

Faith in Humanity

If belief in cryonics is a matter of faith, it is useful to inquire in what ways this faith differs from that of the Humanist. Both Humanists and cryonicists place little or no faith in a deity, and relatively more faith in mankind. It can be fairly said, however, that Humanists are in general more skeptical about the nature of mankind. How is this so?

To begin with, the philosophy of cryonics places nearly unlimited faith in the ultimate technological achievement potential of human beings. Mankind, according to this thinking, will eventually be able to do anything not prohibited by the ground rules of the universe in which we find ourselves. Since these physical laws do not appear at present to prohibit the development of technologies to enable people to be physically rejuvenated at will, cryonicists suspect that not only will this technology eventually come to pass, but that the time frame for development will be in hundreds rather than thousands of years.

Humanists, too, believe (as William Faulkner put it) that mankind will not only endure but also prevail. Yet whether this Humanistic vision of triumph will include the ultimate mastery of all the masterable aspects of the universe is not clear. Most Humanists, at the very least, have probably not thought out how this mastery will impact the age-old problem of mortality. One of the problems is that Mankind seems genetically and culturally conditioned to accept the reality of his present life span, and old habits die hard.

Faith in Human Organizations

The cryonicist's faith in mankind shows up in another place as well. Along with a belief in the potential of technology, cryonicists have a touching faith in the potential of their own organizations. Indeed, some cryonics organizations now are run like small parishes or large families, where most of the members know each other and routinely donate time to the common good. Frozen "members" are treated with particular reverence, since each "animate" member fully expects to wind up in the frozen condition himself by and by.

The Humanist or outsider is likely to view such arrangements with skepticism, making the Parkinsonian observation that small, efficient, personal organizations become large, inefficient, impersonal organizations, eventually. All organizations, even NASA, eventually fall prey to bureaucrats, it seems. The skeptic would argue further that the trust funds of the unprotesting frozen are likely to make tempting targets. If such wealth becomes large enough, it seems likely that the society of the future will find some way to obtain it -- even if the tax laws have to be rewritten.

Faith in the Future

And what about the society of the future? Cryonicists assume, because they have to, that such a society will be rich enough to afford historically interesting luxuries like newly-thawed people. A further assumption is that the transition of the present culture to such an affluent future society will be smooth, without any significant social or economic upheavals. A few cryonicists worry about where one could get liquid nitrogen in the event of a nuclear war, but these are the lunatic fringe. Clearly, one of the first things which a society in trouble will shed is the bodies of its dearly-departed.

And what about other troubles? Long before the time when frozen people can be revived, humanity will have found it necessary to severely control its birthrate. Nor will space migration entirely solve this problem, as some simple exponential calculation will show. Is it likely, one wonders, that a society which no longer entirely welcomes new babies, will want to revive people who have already had a comparatively full life, and now are safely dead?

Practical Concerns, Pros and Cons

Once it has been decided that the potential rewards of cryonics are worth having, the question of whether to invest in the belief is one of playing the odds. Cryonicists are fond of pointing out that however poor the odds of waking up in the future with cryonics, they are infinitely poorer if one is instead cremated. Nevertheless, this sort of thinking is merely an updated version of Pascal's wager, which most Humanists have already rejected.

Pascal, of course, pointed out that the best odds for eternal happiness lay in being theistically religious, since if the religious view was correct there was everything to gain, while at the same time if it was wrong there was little to lose. Humanists have long argued that, even when one had decided to be religious, there was no way of figuring out which of many mutually exclusive religions was the correct one. In addition, Humanists have believed that holding an incorrect religious view *does* cause a great deal of loss during life: These losses include loss of some of the freedom to choose one's own sense of meaning; loss of time, wealth, and energy donated to a worthless religious cause; loss of the freedom to do a number of harmless and enjoyable things without guilt, and so forth.

In a similar vein, if cryonics *doesn't* work, there are losses to be considered. First, there is money: several hundred dollars a year in membership fees while one is alive, *plus* the cost of maintaining an extra thirty-five to one hundred thousand dollar life insurance policy. There is also the social loss of the cryonics care fund money, which would otherwise be available as an estate to one's descendants, or even favorite charities (money that buys liquid nitrogen to keep a worthless old corpse frozen could instead be going to Ethiopia or CODESH). [Council for Democratic and Secular Humanism, of which *Free Inquiry* is the house organ --Ed.]

Second, there is also the always important problem of what the neighbors will think. Here there is real possibility of loss of esteem from nearly everyone: religious folk are likely to view cryonics as a sort of mortuarial tower of Babel ("He who would save his life shall lose it," says Jesus darkly); and there might even be loss of esteem from socially conscious freethinkers -- again because that money could have gone to Ethiopia or CODESH.

Finally, (as though the above were not sufficient), some potential cryonicists may be

tortured by macabre thoughts about the "discomfort" of having to spend a considerable number of centuries frozen into a naked statue of oneself in a giant thermos bottle. Cremation may seem more physically "comforting" (if one has never seen a cremation, that is), and many people (atheists and not) entertain the completely irrational idea of themselves in their coffins, slumbering peacefully on, physically unchanged through the centuries. Even if one does not entertain such illusions personally, one's family may still derive some comfort from them. Why else do coffins have padding?

On the flip side, there are potential gains from involvement in cryonics which are also independent of whether the technique works or not. Chief among these is that cryonics provides a certain amount of comfort for those who do not believe in religion. Some of the sting of death can be removed if there remains a chance, however small, that death is not permanent. Of course, the cynic will comment that freezing a corpse is much like putting leftover food in the refrigerator because one cannot immediately tolerate the waste implied in throwing it away. Even if the food is never rewarmed, it is easier to discard if done in two separate steps. And so it is, perhaps, with a dead loved-one.

A Last Objection: The Ethics of Very Long Life

The question of whether cryonics represents a good gamble on extending one's life, is separate from the question of whether or not the average Humanist would want to participate in it. In what may or may not be sour grapes, many Humanists have seriously questioned whether greatly extended life spans would be a good thing for humanity if they were a reality. Dr. Isaac Asimov, a well known Humanist author and thinker, has argued that it is ultimately a good thing that powerful and inflexible people eventually die and get out of the way of the young. Dr. Asimov has also stated that he would not want to live more than a normal life span, even if that were possible.

Humanism is in many ways a socialistic belief. Many humanists find their sense of meaning in service to the community, and this continues even in death. Humanists, noting that cemeteries cover more acreage than public parks in Maryland, will have themselves cremated in order to give the living a bit more room. Humanists request donations to the National Cancer Institute in lieu of flowers at funerals. Humanists are organ donors for transplantation, and even body donors to medical schools. Thus, many a Humanist is likely to view the act of getting one's corpse expensively frozen as the ultimate narcissism -- a selfishness beyond social redemption.

Conclusion

A Few Premises

The philosophy of materialism, has, as we have seen, practical consequences for those who view their own lives as the ultimate value. In particular, materialism views living organisms as molecular machines, and views "death" as a continuous process in which the machine slowly comes apart over the course of many hours or even days. Cryonicists are a particular breed of materialist who believe that there is a good possibility that the long process of human death may one day be reversed at far later stages than is possible presently. Cryonicists wish this future repair and revival technology for themselves, and have therefore sought a means to deliver themselves "alive" into the hands of the physicians of the far future, with a minimum of damage.

The beliefs of cryonicists are not unscientific, but rather *nonscientific* (i.e., unprovable at present), somewhat like the idea that mankind will one day travel to the

stars. Cryonics is a physical and political philosophy coupled with an educated guess about the characteristics of the future. What makes cryonics unique as an idea is that it involves perhaps the only aspect of the very far future which has direct relevance to the lives of those living today. If revival of frozen people is ever destined to become reality in the future, then the implication is that any medical treatment that will *ever* be developed, may in theory be available to the patient of today.

Questions Raised

It is difficult to know whether to class cryonics as a religion, although its practice does involve a particular philosophy and faith. Although cryonics shares with Humanism a physical philosophy as well as certain faith in mankind, the ideas and values of cryonics seem to contrast with those of Humanists in a number of ways. In particular, the ideas of cryonics seem to highlight some of the difficult questions about the infinite extension of life which both Humanists and the rest of mankind will face in the far future.

If there is a possibility that cryonics will work, might it not be viewed as ethically equivalent to a medical procedure (i.e., the world's longest surgical operation)? In this world of starvation, is it appropriate for a Humanist to spend his/her money to be frozen after death? For that matter, in this world of starvation, is it appropriate for a Humanist to spend money for a heart transplant? A color television? A lipstick?

When radical extensions of the human lifespan become possible, will we want them? Should we have them? If an inexpensive pill were to become available that stopped aging in its tracks, what, for instance, would be the reaction of the average theist? Would it be: "I feel that God's work for me here on Earth is not yet done"? Would the average Humanist's reaction be equivalent, or not? Is the present Humanistic response to death merely a matter of making a virtue of necessity?

The practice of cryonics, with its possibility for a scientific escape from death, offers the opportunity for Humanists to face ultimate questions of the value of death right now. And as the practice becomes more widely known, the debate is surely likely to grow.

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LAST MINUTE CHANGE to avoid meeting on Labor Day weekend.
The SEPTEMBER meeting will be held at the home of:

(SUN, 10 SEP 1988) (SECOND SUNDAY)
Allen Lopp
13354 Veracruz St.
Cerritos, CA

The OCTOBER meeting will be held at the Alcor facility:

(SUN, 1 OCT, 1989)
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There will be a YARD SALE of furniture and things from Dick Jones' house.

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Alcor members in the San Francisco Bay area have formed an Alcor chapter, and 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. Meeting locations can be obtained by calling the chapter's Secretary-Treasurer, Thomas Donaldson, at (408) 732-4234 (home), or at work, (415) 593-3200 (ask for Thomas Donaldson).

The SEPTEMBER meeting will be held at the home of:

(SUN, 10 SEP, 1989)
Leonard Zubkoff
3078 Sulphur Spring Court
San Jose, CA

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The New York Cryonics Discussion Group of Alcor meets on the the third Saturday of each month at 6:30 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.

The meeting dates are as follows:

SEPTEMBER 16 OCTOBER 21 NOVEMBER 18 DECEMBER 16

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Gerard Arthus (516) 273-3201
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