Cryonics

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EDITORIAL MATTERS

Since occupying the new facility, it seems that no matter what we do, we can't get CRYONICS back on its regular schedule (being mailed out on or before the 17th of the month). This month is no exception.

On the morning of June 8th a 29-year-old ALCOR member with a long history of hemophilia and AIDS was placed into suspension. The broad outlines of this issue of CRYONICS were already in place by that date, and we will not try to cover the suspension in any detail here. More detailed coverage will appear next month.

Suffice it to say that things went smoothly and that this patient entered suspension under better circumstances than anyone to date that we know about. For the first time we were able to meet what we call "Smith's Criterion" of not converting more that 60% of the patient's brain water to ice. This was possible by virtue of the fact that we were able to introduce 3.80 Molar glycerol (approximately 33% glycerol by weight) into the patient's brain. To our knowledge this is the most successful cryoprotective perfusion of a suspension patient's brain achieved so far.

As we go to press with this issue the patient is still being slowly cooled to liquid nitrogen temperature and is currently at -190°C.

Next month we will bring you additional details. This patient's case history is an interesting one and pointed up new legal and technical insights which are well worth sharing.

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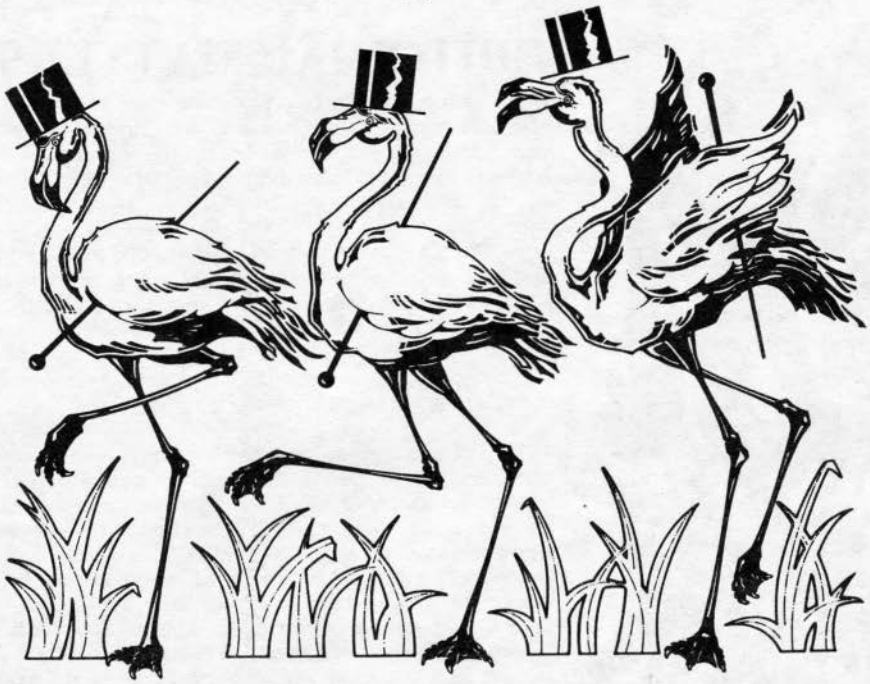
GRAND OPENING WEEKEND!

"Cryonics, airplanes and beautiful women! You really know how to get a man to come to California!"

--Curtis Henderson, cryonics pioneer, commenting on the ALCOR Open House Weekend.

On Memorial Day weekend, ALCOR formally opened and dedicated its new facilities. In last month's CRYONICS those of you who were not able to attend at least got a peek at the new building in the form of a photographic tour. We hope that gave you some idea of what we've got; nevertheless, all we can say is **"You shouldda been here!"** Saul Kent maintains that the Grand Opening was the



biggest, best attended single event in cryonics history. During the course of the weekend, over 80 people toured the facility! And that's with virtually no promotion outside the cryonics community (under 200 invitations were sent out!). More surprising still is the fact that so many people attended the weekend out here in "the sticks". Riverside is over 60 miles from downtown Los Angeles, and the Riverside-San Bernardino area, despite being the fastest growing area in the United States, is regarded by many local Angelenos as "way out" (we only wish **more** of them regarded it as such -- construction in our area is proceeding at such a pace as to be unbelievable!)

What Was It Like?

The Grand Opening went unbelievably well. What was it like? Well, to start with let's tell you what it wasn't like. There were no long speeches and no terrible cafeteria style hors d' oeuvres. Mike Darwin held each speaker's remarks to 15 minutes or less, asked them to keep remarks upbeat and informal, and threatened most with immediate suspension if they strayed from these instructions. Amazingly, even Mike complied with his own guidelines! Dr. Timothy Leary led the way with some positive words about life extension and the importance of cryonics and the new facility thereto. He was followed by Fred Chamberlain, one of the co-founders of ALCOR (along with partner Linda Chamberlain) who gave a little thumbnail sketch of the history of the organization with particular emphasis on its origins. Fred spoke on how ALCOR grew out of his and Linda's dissatisfactions with the Cryonics

Dr. Timothy Leary

Society of California and how it was their insistence on the importance of honesty, accountability, and the existence of good physical facilities for suspending members that led to the birth of ALCOR. Fred closed his talk by looking at the new structure around him and noting that nothing had changed in that regard. ALCOR is still motivated by the same values that created it in 1972.

Fred Chamberlain

It was impressive to hear Fred speak in this way -- it is not often that the founder of an organization, a long away from the "helm", returns to speak with praise about its progress and management and moreover, to indicate that it was still right on the course charted for it on the day of its incorporation.

After Fred, Mike Darwin spoke. His remarks were in the way of thanking all those who made the facility possible and in pointing up the long way yet to go. He emphasized ALCOR's tremendous responsibility to its still active members, as well as to those already in suspension. And he emphasized that if ALCOR was to continue to succeed it would need to grow, a responsibility that rests squarely on the shoulders of the individual members. More than anything else **they** are the most powerful tool for growth and change that ALCOR has.

Conversations: Keith Henson and Steve Harris (shirt).

Saul Kent closed the "formal" part of the day with a few remarks about the history of cryonics starting from his early involvement as a founder of the Cryonics Society of New York. As Saul said, compared to facilities then, there simply is no comparison.

But the weekend was hardly about the hour or so of speeches at the Dedication. It was mostly about the hundreds of hours of other conversation. And boy, was there plenty of that. The weekend sizzled with discussion on just about every topic you can imagine. A brief rundown of topics discussed which we overheard would go something like this: Mercy Freezing, space colonization, sex, cryonics and the law, cryonics and medicine, nanotechnology, artificial

Conversations: Left to right, Arel Lucas (back to camera), Steve Harris (laughing), Virginia George, Hugh Hixon, Keith Henson, David London.

intelligence, gourmet cooking, generalizing Ackerman's Function to a real variable (what's Ackerman's Function?; for that matter what's a real variable?) military history, the Cryonics Institute and ALCOR, cryonics and sex....

Part of the parking problem at Saul Kent's

Much of the socializing was held at Saul Kent's spacious home, which is located a few miles from the facility in a spectacular semirural setting. Saul's 2,000 square-foot residence features a rustic bridge over a moat which leads to a truly impressive entertainment complex consisting of a pool, jacuzzi, and fire-breathing conversation pit. In the evening folks drifted out from the food and festivities to soak in the jacuzzi and huddle in the cool California night air around the roaring gas flames in the conversation pit.

The Food! The Food!

And the food, we almost forgot the food! As a reporter from the LA READER remarked: "I haven't been to a party like this where there was more than enough to eat for everyone and **nothing** ran out since I was a little kid." And that brings us to the people who deserve the real credit for the weekend. ALL OF THE WEEKEND'S CULINARY AND ENTERTAINMENT EVENTS WERE ENGINEERED BY THREE INCREDIBLY HARD WORKING AND CONSCIENTIOUS PEOPLE:

Brenda Combest
Marce Johnson
JoAnn Martin

Listen folks, there are no words to describe what these three people pulled off. The food was astoundingly good and bottomless in supply. Courtesy of Brenda Combest, we were treated to fresh baked muffins in the morning (literally the **best** we've ever tasted), casseroles, salads, and side dishes which seemed to have materialized right out of **Better Homes and Gardens.** JoAnn Martin, as hostess of the Kent/Martin household, did an incredible job with decoration. The place was fairly strewn with fresh flowers and her culinary contributions were as delectable as her floral ones. Nor must we overlook the very substantial help provided by midwestern ALCOR newcomer Angalee Shepherd who flew out from Indiana to attend the festivities and pitched in a generous hand to help affairs run smoothly!

Henderson Arrives

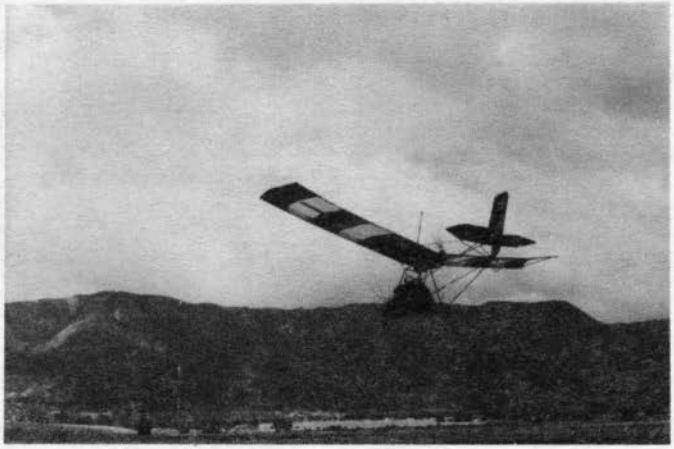
Talking old times: Curtis Henderson and Mike Darwin at Skylark Field, Lake Elsinore.

Perhaps one of the most satisfying things about the Grand Opening weekend was the presence of one of **the** Pioneering Fathers of Practical Cryonics at the gathering. Curtis Henderson actually climbed onto an iron bird and flew out from Long Island for the long weekend. Years and years ago he had told a gangly, 17-year-old Mike Darwin "You kids are the future of this thing. It's really all up to you..." As Mike later remarked, "Very, very few things in life have given me the satisfaction I felt in seeing Curtis Henderson wander around a 5,000 square foot, million-dollar plus cryonics facility with eyes as big as saucers. He was a tremendous inspiration to me when I was a kid. Not because of flash, hype, or showmanship, but rather because of his gritty determination and his heroic and unflinching willingness to confront any situation honestly and get on with dealing with it. His efforts with CSNY were not directly successful, but he was relentless in communicating to me and a certain budding young cryobiologist that **our** efforts **could be** successful and that even if they weren't, "we damn well had to try anyway."

The weekend had other surprises too; a representative, or perhaps we should say visitor, from the Cryonics Institute was present in the form of Pat Heller, CI's treasurer. Pat took in the sights and entered into much lively conversation -- admittedly having to endure a thousand and one questions about what's going on behind the "ice curtain" in Michigan. Pat seemed to enjoy himself and was even kind enough to respond to a plea for phones! We mentioned during the weekend that we were extremely short on extension phones. The new facility has 12 separate ground floor rooms and several "work stations" on the second floor, each of which have two separate phone lines. When the phone rings, it's often a mad dash from room to room to find a phone (have you priced a phone system lately?!). A few **days** after Pat left California we received a mysterious box from Michigan containing a veritable cornucopia of phones. All we can say is, THANKS PAT!

Pat was by no means the only out-of-stater to attend the Grand Opening weekend. We had folks from New Jersey, New York, Indiana, Florida, and even a Canadian in the person of Brian Wowk. Another Canadian, Doug Quinn, flew down to spend several days at ALCOR after the Grand Opening. All in all it was an exciting and well attended weekend.

Wax Wings?

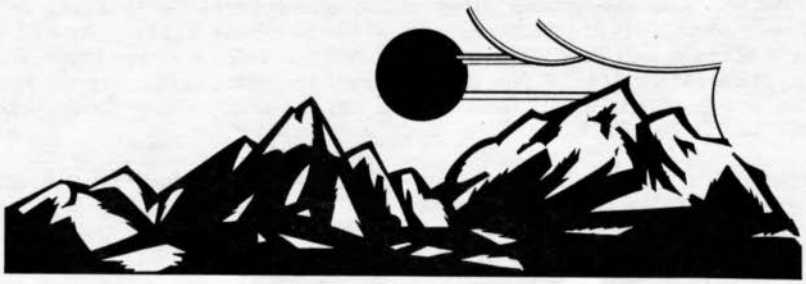


Look ma, no risk; or, what's this compared to cryonics.

"But wait! What about the Ultralight Rides on Monday??" you ask. Well, 12 hardy souls braved the blustery (and chilly) California wind to soar like eagles. **And it was worth it, too!** One at a time we were carried aloft over Lake Elsinore in the gossamer-appearing aircraft. A number of people remarked that this affair looked like a pretty suspicious operation: a cryonics organization undertaking to send its members up in an aircraft of wire and fabric? As one wag remarked: "These things make wax wings look substantial." As we gently pointed out BEFORE the flights, chances are the insurance company wouldn't pay off if the member was "killed" (many policies expressly exclude "experimental" aircraft as a covered cause of mortality) and you'd end up getting a free freeze from ALCOR (and yes, ALCOR would do just that!).

As it was, no hassles with the insurance companies were necessary. Pilot Bruce Knoll is an expert who's been piloting ultralights for 12 years without a single accident or loss of life or limb, and Memorial Day was no different. Everyone who wanted one got a trip to the clouds, and Mike Darwin, who went last, got more than a trip to the clouds -- he got to take a sample home -- it was beginning to spit rain as he descended onto the lake shore.

It was a great weekend. Let's do it again!



THE CRYONICS BULLETIN BOARD IS BORN!

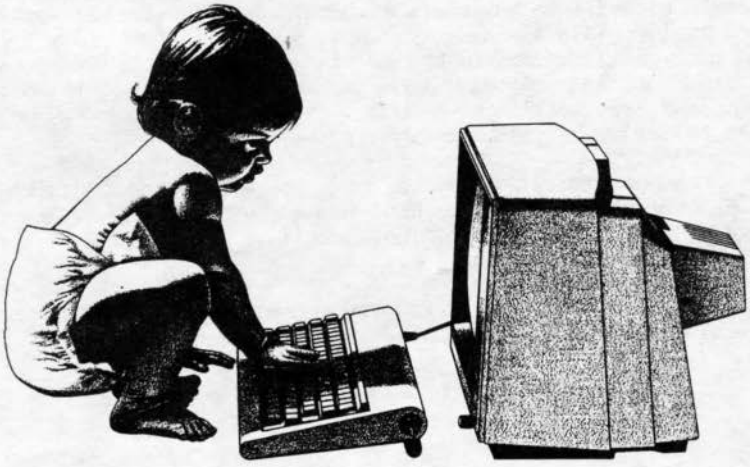
In November of 1986 we ran article entitled "Cryolink?" discussing Thomas Donaldson's idea of creating a cryonics and immortality computer bulletin board. A few months later we announced that we were carting some computer equipment up to Thomas' house in Sunnyvale, CA, and that's the last most of you heard about the project. Thomas probably wishes that was the last he heard about it too. But this was not the case. A "fairly simple" project (as usual) turned into a fairly complicated one: A project characterized by cranky equipment, an unscrupulous (indeed downright dishonest) software merchant (who has $400 of ALCOR's money!) and a host of other should-have-been-but-wasn't's. It ain't been easy folks. But the story has a happy ending.

Donaldson Persists

Through it all, Thomas and fellow Northern California Suspension Member Roger Gregory just kept pounding away at it. Eric Geislinger and Jane Talisman sent funds to help cover the costs of the project and the progress kept coming -- sometimes slowly, sometimes in leaps and bounds.

The result is that the cryonics community now has a computer bulletin board. It has been up and running for several weeks now, and despite the fact that only half a dozen or so people know it exists, it is already getting a good little workout.

Before the cryonics bulletin board (CBB) was delivered, I had only the vaguest idea about what such a thing could do, not remotely appreciating how powerful a tool for communication it could be. Believe me, I'm now a believer. With the CBB we interact in all sorts of interesting ways -- and I can see already that some of the discussions which are going to take shape on it will be fine copy for CRYONICS (with permission of the writers, of course!)



It is really exciting to hear the phone just begin to ring, hear the computer grab the call and see someone uploading an article or grabbing a set of suspension paperwork off the hard disk. This is a really powerful tool, and a very quickly addictive one. Already I can see myself saying "how did we ever get along without this thing!"

Spreading The Excitement

We are opening the CBB to all of you — to anyone who has a computer and a modem. Following this article is another brief article about the CBB by Thomas Donaldson, along with instructions on how to use it. Support staff will be available on a semi-regular basis to answer questions if you run into trouble (just call us on the ALCOR number at 714-736-1703). We'll do our best to get you debugged and on-line if you're having difficulty.

Keeping It Going

The CBB needs a number of things. First of all it needs a name. Originally it was going to be called Cryolink, but this name got stolen for our emergency communications system. That leaves the CBB nameless. You can change that. Log on and let us know what you think it should be called.

The second point to make about keeping the CBB going is that the only reason it's going now is because of the generosity of Thomas Donaldson, Jerry Leaf, Eric Geislinger, and Jane Talisman. Jerry volunteered the use of the Cryovita phone line during evening hours for use by the CBB. This situation can be tolerated for awhile, but ultimately, CBB will probably need a dedicated line of its own. Contributions toward that end would be greatly appreciated — as would contributions to help defray the costs of setting the whole thing up. Thomas Donaldson has spent hundreds of dollars of his own money on the system, and ALCOR is in the hole to the tune of $400 for software that we were scandalously misled into buying (and which didn't do what it was advertised to do!). We could really use help. What we want you to do is to try out the CBB, and send us a contribution in the amount you think it's worth to you to help cover our setup and operating costs (Jerry Leaf, Roger Gregory, Thomas Donaldson, and Eric Geislinger and Jane Talisman are exempt from this plea — you folks have already paid your "users fee"!).

Beyond a name for it and money to operate it we need you to USE the CBB. This is a powerful tool for increased interaction among members and for growth. Tell people about the CBB and encourage them to use it as a tool to become educated about cryonics.

Finally, ALCOR's thanks to all the above who made the CBB a reality. May it download and upload forever!

CRYONICS ON-LINE--HOW TO USE IT

by Thomas Donaldson

After much time (most of which was spent looking for source code which could be fixed to run on the Toshiba T-300) we have a cryonics bulletin board system working.

Since the advent of small computers, the world has found itself yet another way to communicate, the (computer) bulletin board system (or BBS for short). A BBS is simply a computer linked to a phone line so that other computers (and the people controlling them!) can call it up by phone and pass information back and forth.

This lets us do many things. We can now accept submissions for CRYONICS by telephone. (Up to now, we had to RETYPE articles, letters, and other material for CRYONICS whenever you sent it to us on paper). We are placing the entire set of papers for signing up, and many old articles from CRYONICS, onto the BBS so that anyone can call up and read them. You won't have to wait for us to send you our suspension forms: you can copy them over into your own computer and fill them out at once.

More than that, cryonicists can now carry on discussions about topics important to them. The BBS has provision for electronic mail: you can write a short letter and post it on the BBS. You can address the letter to EVERYONE or to particular people. This is different from phoning somebody because the receiver doesn't have to be on line at the same time as your call. Furthermore, you can make your letter **public**, to everyone, so that everyone receives it (that's hard to do with a phone). We expect to hold conferences on the BBS about many topics.

Here is a short description of how to use it.

The Cryonics BBS will normally only accept calls at 1200 baud (for the present). If you absolutely must contact us at 300 baud, arrange with us beforehand and we will set

up our computer for you to do so. (For those who may not be familiar with communications between computers, 300 baud is about 30 characters a second. 1200 baud is about 120 characters a second. These numbers tell how fast information is transmitted over a phone line.)

To connect to the Cryonics BBS, you need a computer, a modem (a device that links your computer to a telephone line), and a communications program. Your communications program should tell you how to dial up another computer (what you do depends on the program you have). The Cryonics BBS number is (714) 734-0139. Set your modem to 1200 baud before you call. (We are borrowing the Cryovita Laboratories line, so the BBS is only running from 3 P.M. to 6 A.M., Pacific Standard Time. Outside those hours, a human will answer.)

Once you're connected, you will be asked to provide your name, a password, and a bit of information about your computer. You must then APPLY (the A command in the Main Menu) before you can access files or send/receive messages. The BBS will tell you what you need to know after that.

To send a computer message, you can use the E command from the BBS Main Menu. To receive a message, use the R command. Messages can be a maximum of 24 lines. If you want to send a longer message, use the F command to send and receive files.

When you leave the BBS, you'll have an opportunity to leave a short message to us about any problems or questions you have had. As with most new programs, YOU MAY FIND PROBLEMS. Please leave a message for us if you do. In particular, we'd like to know if anything was unclear or not explained, or if anything went wrong. We're also interested in your thoughts on possible improvements.

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BIOSTASIS AND BRITISH CRYONICS

In the November 1986 issue of CRYONICS, we reported on the formation of a British cryonics group. The group, known as **Mizar, Limited**, is closely patterned on ALCOR and is, for suspension purposes, a part of ALCOR. Mizar has begun producing a newsletter (now bimonthly) called **BIOSTASIS.** We have received several issues of **BIOSTASIS** and we are **impressed.** The last issue, a 19-pager which was put out in April, contains a number of quality articles. In fact, we thought so much of one of them that we've reprinted it in this issue of CRYONICS. We plan to continue to bring you the best of **BIOSTASIS** in coming months. But we would also urge you to think about subscribing. The British cryonicists could use the support -- and more importantly (to most of you anyway) you will probably benefit from the information. **BIOSTASIS** is edited by a graduate student in Philosophy and the members of the group are a solidly intellectual lot. The newsletter is full of ideas. The British group is made up of young idealists and the newsletter reflects that.

Our only reservation in urging a subscription is that the current Editor of **BIOSTASIS**, Max O'Connor, will be living and working here in Southern California for the next 3 years. Max is the recipient of a full scholarship in Philosophy at the University of Southern California. It is anticipated that during his stay here in the U.S., Max will have the opportunity to be extensively trained in suspension techniques and gain a better working understanding of "practical

cryonics".

Beyond putting out an interesting newsletter, Mizar has made great strides in deploying the basic ALCOR rescue and stabilization kit which was sent over to them late in 1986. They now have local oxygen and have completed several training sessions on how to use the equipment.

For information on how to subscribe to **BIOSTASIS** write to:

Mizar Limited
54 Union Road
Northhold, Middlesex UB5 6UE
ENGLAND

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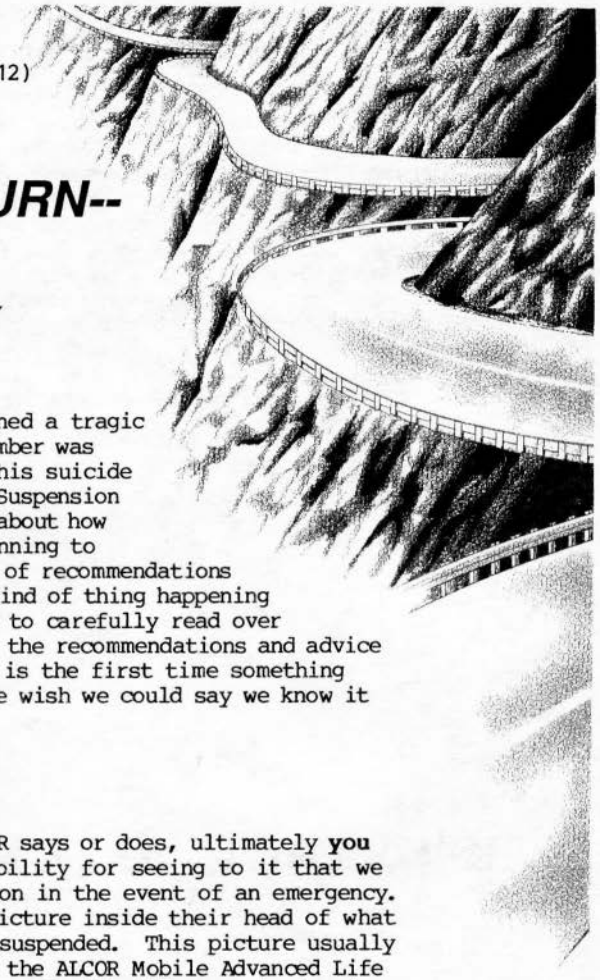
UPGRADE IN ALCOR'S NORTHERN CALIFORNIA RESCUE CAPABILITY

ALCOR continues to add Suspension Members in the Silicon Valley area and recently several of those members began discussing how to more rapidly improve growth as well as emergency responsiveness in the Northern California area. To this end, Suspension Members Keith Henson, Thomas Donaldson, Kathy Woof, and Arel Lucas pitched in and obtained a local beeper. Thomas Donaldson (who has been trained in ALCOR Transport techniques) will be carrying this beeper for the time being, and he may be reached in any emergency by calling the ALCOR Southern California (ASC) number: (714) 736-1703. ASC will then page Donaldson.

Thomas has also been negotiating with several air ambulance companies and is in the process of arranging for prompt air ambulance transport of patients from Northern to Southern California. Indeed, it may well be possible to move a suspension patient from Sunnvale to Riverside faster than it would be to **drive** a patient from Los Angeles to Riverside during rush-hour traffic! (Along the same lines, Mike Darwin recently negotiated helicopter transporation of patients from L.A. to Riverside to get around just this problem!)

Additionally, it has been decided that discussion/membership meetings will be held in Northern California and the first of these meetings is scheduled for June 11th. For more information on these meetings contact Keith Henson at (408) 978-7616.



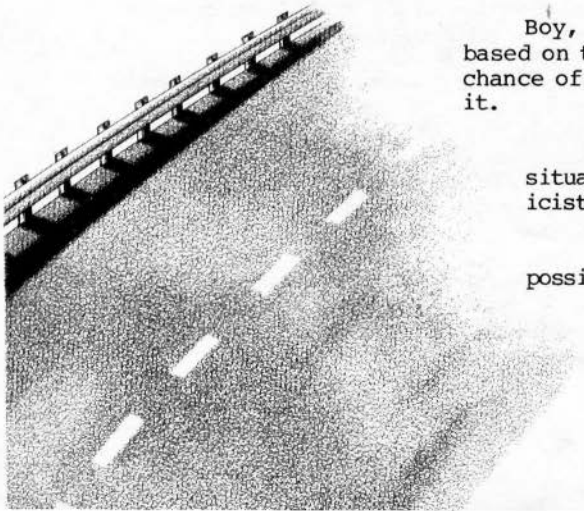
WHEN IT'S YOUR TURN-- WHAT TO DO IN AN EMERGENCY

by Mike Darwin

In last month's CRYONICS we outlined a tragic situation where an ALCOR Suspension Member was cremated by his next of kin following his suicide —even though they were all signed-up Suspension Members themselves. More information about how this situation occurred is slowly beginning to emerge and we have formulated a number of recommendations to help minimize the chances of this kind of thing happening again. We urge each Suspension Member to carefully read over this article, and think about applying the recommendations and advice it offers to your personal life. This is the first time something like this has happened to ALCOR, and we wish we could say we know it would be the last.

The Responsibility Is Yours

First of all, no matter what ALCOR says or does, ultimately **you** have the vast majority of the responsibility for seeing to it that we are notified and are able to take action in the event of an emergency. Everybody walks around with a mental picture inside their head of what it would be like if they needed to be suspended. This picture usually includes things like plenty of notice, the ALCOR Mobile Advanced Life Support System cart at the bedside, Jerry Leaf holding one hand and Mike Darwin holding the other, with the appropriate Bach organ toccata playing softly in the background, and weepy relatives standing around in a **supportive** semicircle.



Boy, have we got news for you: If your plans are based on that model of reality you've got a very good chance of not getting suspended, if and when you need it.

Let's take a look at the three basic situations that are likely to confront the cryonicist in extremis:

1) Slow terminal illness with plenty of possibility for preparation.

2) Slow terminal illness with a long antemortem period of confusion or incompetence rendering the member unable to exert control over his/her affairs.

3) Sudden, unexpected legal death either by natural causes or by violence or accident of some kind.

The first situation is often the best because you have time to plan and tie up "loose ends". It also often provides powerful insights **in advance** of how relatives and friends are going to react when the time comes. There's nothing like a terminal illness with a few close calls before the curtain actually rings down to bring the hogs out to the feeding trough. We here at ALCOR have seen some incredible jockeying for control and for access to money and other resources when the member isn't even dead yet -- or even that "far gone!"

Needless to say, the best piece of advice in a situation like that is to get rid of the offending parties. Eliminate them from positions of responsibility and get good legal advice about how to insulate your estate and your cryonics arrangements from attack after you are no longer able to do so yourself. This is easy advice to give, but often difficult to implement. What if a spouse or parent is hostile and you are depending upon s/he for emotional or physical support? Often there is no good answer to a situation like that.

The other two situations are more to the point of this article, and we can offer you lots of good advice that will improve your chances incredibly in an emergency and will also help protect you from someone you are counting on in a "chronic" situation, who in fact is not going to cooperate.

Four Principles

There are three basic principles which need to be recognized in insuring that your arrangements will be carried out in the event of an emergency:

FIRST: **Realism.** Do not lie to yourself about any aspect of your situation. If you have a wife or husband who is edgy about cryonics now, you must be brutally honest with yourself about how s/he is likely to behave when an actual emergency occurs and the individual is faced with surrendering control to an organization of "strangers" they have nothing but bad feelings about. Perhaps they are certain that cryonics would only result in mutilating the remains of a loved one in return for the "theft" (or even worse, the "waste") of a large sum of **money.** If you have that kind of situation you had better think about some strong legal measures in advance of need (as a bare minimum) and/or think about finding another spouse.

If you are likely to have problems with a parent or other relative whom you

can't easily cut yourself off from, consider doing the following:

a) Moving and not notifying the individual(s) of your whereabouts. Cut them out of your life completely and make sound legal arrangements to protect yourself from them in the event you become incapacitated or incompetent.

b) As an absolute minimum, make sure that you do not carry any identification on your person or in your car or home listing your next of kin. Everywhere anyone searches in an emergency they should surface with one and only one place to turn: ALCOR.

We don't wish to encourage paranoia, but we can tell you with a high degree of confidence that the most likely source of a serious screw-up in your arrangements will be your relatives — even if they are sympathetic to cryonics. We have seen serious error after serious error made by next of kin due to their being emotionally overwrought and unable to make good decisions. Some of these cases are not appropriate to discuss in detail, but we can tell you that they have happened and sometimes they have seriously impacted the quality of care our members have received.

SECOND: **Planning.** In an emergency, relatives are likely to order or demand useless or damaging therapy. Examples include keeping a "brain-dead" patient on a respirator, or insisting on pain medication which could cause an unstabilized cardiac arrest when the patient is unconscious and clinging to life with a cryonics team on the way -- we've seen it all. The thing to remember about relatives is that they will be frightened, totally destabilized by the turn of events (particularly if legal death is sudden and unexpected), and often completely ignorant of cryonics. In any event, they are unlikely to be capable of objective, rational decisions. The dominant emotional condition we have observed in the relatives of dying members are "emotional obsession", often with some irrelevant aspect of the patient's care. In the case of members who are already legally dead, the dominant emotional states appear to be despair, anger, and hopelessness. None of these conditions is conducive to levelheaded action in an emergency.

So, beyond protecting yourself from relatives who may be hostile or confused by insulating yourself from them, what can you do? The first and most important thing is to **discuss things openly with next of kin and loved ones.** Tell them what you expect of them, and, most importantly, **plan.** Go over all the most likely possible scenarios step-by step. Tell them what you expect them to do in an emergency. If you are killed suddenly in a car accident or a mugging, or if you are murdered or die of a heart attack, what should they do step by step? If **you** don't know what to do in a situation like that, your loved ones can hardly be expected to know. To this end we've produced some step-by-step guidelines which you can post in a conspicuous place and which you can use to review what to do with those who surround you. Be sure to layer your defenses. If you have close friends or neighbors, bring them into the loop and be sure they know who to call if your next of kin or others you trust fail to pick up the ball in an emergency.

Make sure you go through this exercise with those close to you at least once a year, and make sure that easy-to-use instructions on how to reach ALCOR and on what to do in an emergency are present at numerous locations in your home -- and even in your car. Otherwise, those around you are almost certain to

react in some measure on the basis of deeply ingrained programming which has been reinforced in them from childhood: call an ambulance, call other family members, call a mortician, call the police... Unless you exert some real effort to insert ALCOR into that chain very early on, you could end up not getting suspended.

THIRD: **Carry cryonics identification.** Make sure you use the tools that ALCOR has already put at your disposal for bringing us into the loop in the event of an emergency. The most important place to start in protecting yourself is to wear your ALCOR identification tag(s) at all times. The Officers and Directors of ALCOR are often astounded at how often we encounter members who **do not have an ALCOR identification tag on them.** Wake up and be realistic. Emergencies can happen to anyone and by definition they are unexpected. In the past two years we have had three emergency situations occur where ALCOR was either not notified or was notified only by chance, **because the member didn't have his/her bracelet or necktag on.**

FOURTH: **Follow ALCOR's guidelines for what to do in an emergency.** They are given below, and are reproduced on a separate pull-out sheet in the center of this newsletter. Use these guidelines to educate those around you and **photocopy** and post the tear-sheet where it is most likely to be of use in an emergency.

Stay tuned for future updates on these instructions.

EMERGENCY INSTRUCTIONS!

1) In any emergency where an ALCOR member is **hospitalized for any reason, or is seriously injured, dying, or already dead, immediately call ALCOR.** No matter how bad the situation may seem or what you have been told by others, immediately and invariably call ALCOR first.

2) If you discover the member seriously injured or ill, call for medical attention by dialing 911 or the appropriate local emergency number; and then immediately **call ALCOR.** If the member is apparently without pulse or not breathing, immediately begin CPR and call rescue personnel. Immediately contact ALCOR. **Instruct the rescue personnel/hospital staff to continue CPR even if resuscitation is not possible and to install a mechanical aid for CPR (Thumper or Heart-Lung Resuscitator) if they have one available, and to begin cooling the patient with crushed ice and/or a cooling blanket.** Instruct the Emergency Room staff to contact ALCOR immediately for further instructions. **If CPR cannot be maintained (hospital will not cooperate), instruct them to pack the patient in ice.**

3) If you discover the member in a condition where resuscitation or medical attention is inappropriate, (i.e., the member is in rigor mortis, is cold to the touch, or has been dead for a number of hours) and it is not possible to begin CPR, always call ALCOR **first,** before calling the police or coroner.

4) Never give up. Remember that there is no guarantee that you can be objective about what is happening. The most important positive action you can take is to phone ALCOR and bring trained cryonics professionals into the loop who can start taking action and providing help!

CALL ALCOR NOW!
(714) 736-1703

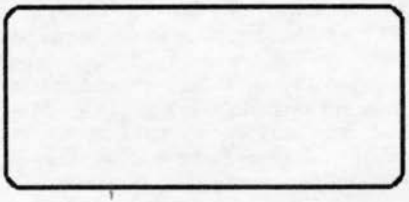
Put Your House In Order

Finally, make sure your legal and financial arrangements for cryonics are fully in place and that everyone who's liable to be "in control" of your fate knows what you want and expect. Choose your representatives carefully. If you have a relative such as a spouse or a parent who would normally be in control in an emergency and who you do not think can handle it to your satisfaction, appoint a medical surrogate and/or a power of attorney you feel you can trust and make sure that information is on file with ALCOR and present in your purse/wallet at all times. And always, remember Point 1 above. In selecting someone for that job think not just about their strong points, but also about their weak ones and ask yourself with ruthless honesty just how well they'll do when push comes to shove.

You Can Help

In order to further increase awareness of what to do and who to call in an emergency we are planning on producing phone stickers with our phone number and a brief message on them. We are soliciting two things for this undertaking:

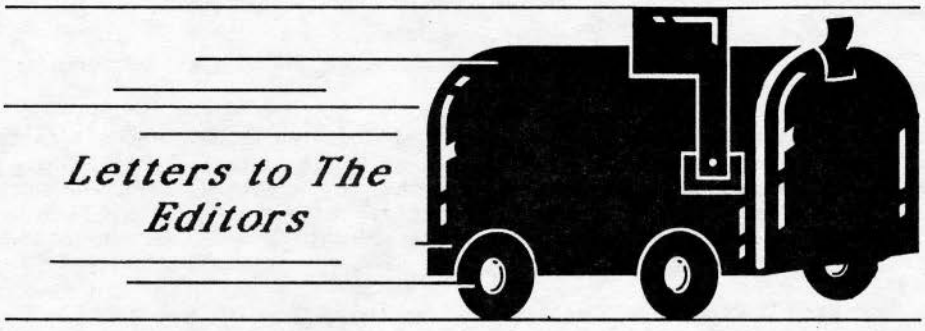
First, a message. The footprint of the proposed sticker is reproduced below and we are soliciting suggestions on how to fill it. Obviously the message has to be brief, easily readable, and has to include the words CALL ALCOR and our phone number in bold print. Do you have any other suggestions for content or layout?



Second, we could use some financial support for this project. It is going to cost about $60 to print 1,000 high quality stickers and about $40 to get them into members' hands. Can anyone help us financially with this project?

Send contributions, financial and otherwise to:

ALCOR
12327 Doherty Street
Riverside, CA 92503



To the editors:

Several references have been made in recent issues of CRYONICS to surviving death by preserving the genome or DNA or some other record of a person's memories, emotions, etc.

While this would produce an exact **copy** of the person wishing to be preserved, I submit that it does not preserve the actual person. As evidence for my position, I offer the fact that a cloning or exact copy of the genome could be done while the patient was still alive, and appropriate memories, etc., inserted. How could this exact copy of him, with all his memories and feelings, **be** the patient if he is still in existence?

Sincerely yours,
Arthur Emens
Orlando, FL

Editor's response: The question you raise is an interesting one, on which opinions vary. It is generally conceded that the two simultaneously functioning personalities would be different people, even though they may have identical memories up to a point, and thus qualify as "continuers" of the same person. (If they were nearly the same, however, it may not matter to them whether one was lost as long as one survived -- but this would depend on the persons!) There is an article in this issue by Max O'Connor that has a bearing on questions of personal identity and the problem of duplication, and another, appearing in a future issue, by Mike Perry. In general, both writers advocate the view that (1) everyone is (at best) a continuer of a past self, not the "same" in all respects, and (2) persons who share memories up to a point might lay equal claims to being "the" person whose memories they share. Thus in your hypothetical example, the copy might claim that he is just as much the patient, no more or less, than the original who is still in existence. This claim would rest, essentially, on the identity of information content in the two individuals, and not on how the information was assembled in each case or how the structures that encode it came into existence.

Dear Mike,

Two excellent pieces in the June issue prompt me to again commend you for outstanding work.

The writing about how to handle the publicity surrounding Segall is truly superb. If I can summarize what I got out of it, it is this: "Let's do our own best, professionally". That is absolutely the only way to succeed. We must be at our best. This is similar to the Protestant idea of a "calling" to a work, or the Catholic concept of a vocation. Emerson said it well when he said that "What you are speaks so loudly I can't hear what you are saying."

And Fred Chamberlain's article, **On Selling Cryonics,** was excellent. It prompted me to write this response, which I hope will be of interest to those concerned with marketing our concept, something I'm now involved in through a writing project.

Before detailing the approach I'm using I would like to recommend three fictional analyses of marketing innovative concepts. Rather than turning our noses up at the idea that we could learn anything from science fiction, let's consider briefly the methods of science fiction writers. What they usually do is to take one change in society and examine all the important consequences it will have. Thus in their imagination they are acting somewhat as a scientist does in a laboratory, who changes one thing in the experiment and then sees what else changes. (Both approaches, in different ways, embody the Aristotelian ideal of philosophy as the study of how things are the same and how different.)

The stories I would recommend are: (1) **Lest Darkness Fall** by L. Sprague de Camp (a 20th century man transported back to 5th century Rome introduces our scientific advances), (2) **Brownshoes** by Theodore Sturgeon (a hippie discovers a cheap, inexhaustible energy source and learns to love in the effort to introduce it into the world) and (3) **The Man Who Sold the Moon,** by Robert Heinlein (a classic in which a captain of industry gets to the moon by private enterprise).

The approach I am working on targets a market, the "early innovators", and uses an idea borrowed from David Ogilvy's **Confessions of an Advertising Man.** This idea is to write a book, ostensibly about a field of interest, but really pitched in such a way as to acquire "clients" -- in my case, members of cryonics societies. I am advertising in periodicals read by this target market, and the book is tailored to their concerns. All replies are notified that Alcor, American Cryonics Society, Cryonics Institute, and Life Extension Foundation have been asked also to send them information.

The book, **Confessions of a Cryonicist,** takes the approach that biostasis is similar to the sorts of things occurring in the 19th century -- railroads, steel, and other innovations. It addresses the question of how we can keep our liberty. Will "frozen" attain the connotation of "railroaded"? I talk about a "unified social field theory" as a way of judging how innovations will affect society. I discuss whether the money used to pay for suspension, maintenance, and revival can succeed if it is like today's money -- or will new ways to store value, keep a standard of account, and facilitate exchange by being a medium of exchange have to be developed in order for the experiment to succeed. There's much more to **Confessions** than I'm able to explain here (350 pp. or so), but this will give some idea.

Again, hooray for Alcor's approach of professionalism and the Chamberlains' analysis of selling cryonics, and incidentally for all the other good parts of CRYONICS every month.

Life and Liberty,
Charles Hartman
Stuart, Iowa.

Dear Editors:

Recently you ran a promotion in your magazine featuring coffee mugs which we sell as fundraisers. The following saying is printed on the mugs:

Now I lay me down to sleep.
I pray the Lord my soul to keep.
If I should die before I wake
FREEZE ME

This slogan was originally composed by Dick Marsh for a talk he gave at the 1986 Lake Tahoe Life Extension Festival, and I did not give him credit for it when I solicited your magazine for free exposure. I hope you can print this so that Dick gets credit. I have written him and apologized for the oversight.

The mugs have sold nicely and we have used all the proceeds to underwrite our activities. Thank you.

Sincerely,
David Pizer for **The Venturists,**
1355 E. Peoria Ave.
Phoenix, AZ 85020

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IDENTITY UNDER DUPLICATION

by Max O'Connor

An earlier version of this article appeared in **BIOSTASIS** (April, 1987). It is reprinted with the permission of the author.

In CRYONICS #78 (January, 1987) I presented a general theory of identity which I hoped would make possible more rigorous and determinate thinking about the continuity of personal identity in the circumstances of cryonic suspension. Unfortunately, soon after writing the piece, I realized that the view I had presented was mostly (though not wholly) either incorrect or inadequate. My purpose in the present article is not to present a second attempt at a general theory of identity (on which I am still working), but to discuss a narrower topic -- that of duplication of the body.

In the discussion that follows I will assume a materialist view of the

mind, the basis of personality. By "materialist" I mean the idea that our mental processes such as reasoning, remembering, experiencing emotions, and perceiving are inseparable from our brain processes. This conception of the mental excludes all dualist views to the effect that the mind is a separate substance which is in no way dependent on matter. In making this assumption I am in accord with all the known evidence in neurophysiology and with the almost universal contemporary philosophical opinion. This minimal materialist assumption will be sufficient for my present purposes; it will not be necessary to examine the technical arguments concerning the relative attractions of the various rival materialist views, such as reductive materialism, functionalism, behaviorism, and eliminative materialism.

To provide a focus for the arguments to be presented consider the following five scenarios:

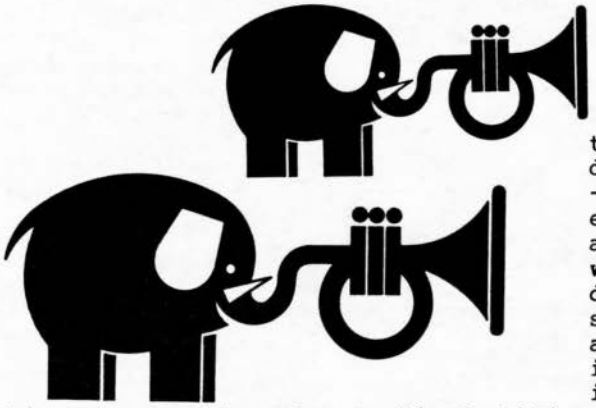
(a) You deanimate (are declared legally dead) and are quickly placed into cryonic suspension. Either the procedure itself or else the conditions under which it is carried out are imperfect, with the result that considerable damage is done to your brain. Decades in the future you are brought back to consciousness. You are told that the repair process required the complete or partial replacement or reconstruction of various neural components -- neurons, dendrites, axons, neurotransmitter stores, neuroglia, and synaptic vesicles. It is demonstrated to your satisfaction that the complete brain that you have now is structurally identical to the one you had at the time of deanimation (except for the removal of fatty deposits and the strengthening of tissue). Subjectively, the last thing you can remember before your awakening recently is losing consciousness in a hospital bed. You are extremely pleased to have survived your death, to have preserved your identity through biostasis.

(b) The situation is exactly the same as in (a) except that the repair process worked as follows: Your frozen body was scanned by an advanced set of STM's (scanning tunnelling microscopes) and the information coded and stored. The coded information was then amended and supplemented to match that of the final body in (a). An entirely new body is then constructed and awakened, while the original body is destroyed. You wake up in your new body and are extremely pleased to have survived, to have preserved your identity through biostasis.

(c) A transporter system much like that in **Star Trek** is invented and put into use. You step into it, the structure of your body is coded, then your body is instantaneously torn apart and the material moved at extremely high speed to the target location. Your body is reconstituted out of the original material in a structurally identical fashion.

(d) You go through a transporter similar to the one in (c), except that your original body is destroyed (after coding) and an entirely new (but structurally identical) one is created at the target location.

(e) As a strategy to improve your chances of really longterm survival, you use the technology of (c) and (d) to store copies of yourself which are updated at various intervals. One day you (your current body) is damaged beyond repair and your most recent backup copy is activated. Your copy -- you -- does not have any memories of the two weeks since the last update, but otherwise the new body and brain are identical to the original.



My intention is to use these examples (and others) as "intuition pumps" on those cryonicists who are unhappy with duplication. They feel that if their current body was destroyed and a duplicate created -- even a duplicate made at exactly the same time the original was destroyed -- the duplicate **would not be** them. They would be dead and gone. The thought of such a copy is of no comfort, or at least, of no more comfort than is the thought of leaving a child in the world after one's death. I hope to persuade such a skeptic that this conviction is, at worst, a mere prejudice which is held in the face of relevant facts and, at best, much too strong a fear.

It is obvious that in any discussion of personal identity or survival some notion of **continuity** will be implicit or explicit. Because of the complex nature of personal identity and of the unusual cases under consideration, I will define not one but four types of continuity:

1. **Material continuity** is the kind of continuity involved when particular molecules, atoms, or even subatomic particles remain in existence over a period of time.

2. **Structural continuity** exists where certain (undefined) structures persist even while the material of which they are constituted changes (gradually or instantaneously). For example, one of your neurons may remain in the same place, connected in the same ways to other neurons and interneurons, and yet the atoms of which it is made can change over time so that, eventually, the same neuron will contain no atoms or molecules that were originally in that neuron.

3. **Functional continuity** is a more abstract, but no less important, type of continuity than structural continuity. An example of this would be where you replace your carpet vacuum cleaner with another model which is structurally quite different but does exactly the same job and to the same standard. In a parallel manner, we can imagine that one of our neurons (or more extensive neural structure) is replaced by a structurally different but functionally identical neuron or machine replacement.

4. **Causal continuity** is the most abstract type of continuity and is generally neglected in philosophical analyses of personal identity. It is hard to give a definition at once precise and concise. When using this notion in the present context it cannot be entirely separated from structural and functional continuity. Causal continuity exists when there is a causally explained connection between body (or object) A and body (or object) B, and where there is some structural or functional continuity (or both) between A and B. An example of this is scenario (d) above. In that case there is no spatio-temporal continuity (there **could** be **temporal** continuity in the case described), yet there is clearly some kind of connection between A and B.

Depending on the causal process involved (in scenario (d), depending on how the transporter works) causal continuity need involve no structural continuity, nor even any functional continuity. The former would be true where B was functionally identical to A but was either made of new matter or even of a different medium (metal and silicon instead of nitrogen, hydrogen, oxygen and carbon, etc.). If you have seen the film **The Fly** you will know what I mean by the latter possibility -- the unfortunate creature which is materialized in the second booth is causally connected to the baboon in the first booth but is functionally very (though not entirely) different.

Probably everyone will agree that material continuity is of no importance or relevance to personal identity. This must be so unless one is to abandon **any** concept of personal identity or personality, for there is no material continuity over time even in the usual case. The particular atoms and molecules that make up our brains change over time, while the neural structure itself persists. It is merely a small extension of this normal process to imagine an operation in which the whole of an individual neuron is replaced by a structurally or functionally identical neuron. As a slight extension of the natural replacement process it would be absurd for the individual on whom the operation was to be performed to worry about a loss of his identity, i.e., to worry about being effectively destroyed and replaced by someone who was much like he used to be. The same comments apply to a further small extension of the example in which a whole neural subsystem (such as the visual) is replaced by a functionally equivalent collection of new cells, or by a functionally equivalent machine part. Since, after the operation, we would have the same memories, personality, attitudes, values, responses, etc., there could be no sensible complaint of destruction of identity.

Perhaps even these examples will be resisted by some very conservative folk, especially where it is a machine part which is replacing our biological material. It is not clear why anyone would wish to resist such cases as examples of the persistence of personal identity, apart from sheer anti-conceptual dogmatism and conservatism. But, if one **does** accept these examples then one has accepted that material and structural continuity are not relevant to the persistence of identity. And this in turn seems quite reasonable. While **some** physical vehicle is necessary for us to have a personality, to think and to act in the world, we do not **define** our personality or identity in physical terms. Instead they are defined primarily at the functional level. We are concerned about the retention of our memories and experiences, our characteristic ways of acting and reacting, the preservation and promotion of our values, and not about what is going on mechanically that makes this possible (except for purposes of neuroscience). Because of this, startling as it would be, we should not (logically) be disturbed if one part of our brain after another were to vanish and be instantaneously replaced by a functionally identical part, until the whole brain had changed in material and structure. So long as the characteristics listed above, and perhaps also our continuity of thought, were retained we should be confident that there was no destruction of identity.

It should now be clear that the deanimation-repair-revival process of scenario (a) is no threat to the persistence of personal identity. Those who think that it **is** had better be able to produce some good reasons for their assertions. What about the more radical disruption of scenario (c)? Again, there seems to be no obvious principle that allows the earlier cases but disallows this one as an example of the the persistence of personal identity.

In (c) (though not in the otherwise identical scenario (d)) we even have material continuity in addition to functional continuity, if we assume that the reconstituted body has the same molecules in the same places. Scenario (c) does not seem fundamentally different from the case where parts of your brain disappear and are replaced by a functionally equivalent case, except that the reconstitution occurs at a spatial distance from the original. And why should a mere shift in spatial position be of any concern? It would not be so different from a case where one part of the brain after another is replaced as one walks along. How could **speed of movement** reasonably be thought to make a difference to one's persistence or non-persistence? The pointlessness and arbitrariness of such a restriction is further underlined by the realization that position and velocity are relative attributes anyway.

If there is nothing to worry about in scenario (c) there should not be much resistance to scenario (d) since it merely does away with material continuity — a type of continuity that I have already shown to be of no importance at all. If the material of which any **part** of the brain is made is irrelevant then why should it matter as we increase the replaced percentage from 10% to 25% to 50% to 99% to 100%? If, as I have argued, **functional** continuity is the kind of continuity that counts, and that spatial continuity is irrelevant, then it seems arbitrary to claim that while scenario (c) preserves personal identity scenario (d) destroys it.

In scenario (d) there is what I have identified as causal continuity. This need not involve functional continuity, but it must if it is to preserve identity. In normal cases of everyday life we would probably include spatio-temporal continuity in our understanding of functional continuity. The reason for this is to avoid confusion between two functionally very similar objects (which is very unlikely to be a problem when the objects are **people**). The causal continuity in scenario (d) may be understood as a linking of two sets of functional continuity by a special causal process (the transporter). The normal spatial continuity element of our everyday conception of functional continuity is replaced by the special causal connection represented by the coding, destruction, and reconstitution process. Here it is the functional (or even the structural) identity of the original body that is a vital element in the process that leads to the construction of the second body which is functionally (and structurally) identical to the original. (Perhaps no causal connection is even necessary: imagine that you are disintegrated by someone with the intention of permanently removing you from existence, but, by an extremely unlikely -- but

possible -- random quantum event, seconds later a person appears who is functionally and structurally identical to you. Is this person you? This is an interesting possibility but we need not decide on an answer for our present purposes.)

Up until now I have been confident that there is no non-arbitrary way of refusing to move from one case to another. But between scenario (d) and scenario (e) there is, I believe, an important difference, though not such a difference (depending on the precise circumstances) as rationally to give grounds to a fear of obliteration of the self. The difference in scenario (e) is a result of the fact of duplication. Duplication renders incoherent any strict notion of personal **identity** (though not a concept of personal **survival**). To make my meaning clear I will explicate the concept of personal identity and that of survival.

The concept of identity, when used generally, involves two elements. One of these is Leibniz's Law, which states that if A is identical to B (they are the **very same thing**) then A and B must have all the same qualities and properties. Thus, if Max O'Connor and the writer of this article are identical then they have all properties in common. This is an obvious truth. The other element is equivalence, which in turn involves three properties: (1) A is identical to A, (2) if A is identical to B then B is identical to A ("reflexivity"), and (3) if A is identical to B, and if B is identical to C, then A is identical to C ("transitivity"). In particular it follows, by transitivity and reflexivity, that if A is identical to B and A is identical to C then B is identical to C. In philosophical logic these two elements are essential to the concept of identity. The concept of **personal** identity drops Leibniz's Law but retains equivalance. Personal identity is more flexible than identity in general; it picks out an individual defined as a **set of states.** That is, if we consider what we normally take to be a person, we do not define his identity as an individual having such-and-such properties at time T_1; rather, an individual is defined as the set of states (memories, characteristics, etc.) at times T_1, T_2, T_3, ... T_n. We need to define personal identity in this more flexible way to be able to refer to continuing individuals at all.

The concept of survival is one that takes over from that of personal identity when the latter breaks down, but where it is still useful to retain some notion of a continuing person. A person at a later time is a "continuer" of that same person at an earlier time. (This terminology is used, for example, by Robert Nozick in **Philosophical Explanations.**) A and B may represent the "same" person at different times, but when we say that "A is the same person as B" what we really mean is "either A is a continuer of B or B is a continuer of A". Survival involves neither Leibniz's Law nor equivalence, the latter breaking down because of duplication of the individual. If A splits into B and C, then A is the same person as B (B is a continuer of A), and A is the same person as C (C is a continuer of A), but B is not the same person as C (neither is a continuer of the other). There must be some functional (and probably causal) continuity for survival to obtain. The fact that, in duplication cases, we do not retain the term "personal identity" is only a **linguistic** fact; it is stretching the word "identity" too much to remove equivalence as well as Leibniz's Law, and so we substitute "survival". We should not let this linguistic point lead us into believing that duplication cases must involve the destruction of the self. The facts are what they are independently of the terms we use to identify them. So long as functional and causal continuity are

retained, we need not fear obliteration.

Scenario (e), as described, does, however, have an important difference from the transporter cases. Your backup copy was made two weeks before your body was destroyed and so does not have any memories or experiences for that period. But it is surely not plausible to say that **this** makes all the difference and that **now** you have truly been permanently and completely destroyed. If one accepts what I have said so far, then it must follow that the activation of a copy made two weeks earlier is no different, in essence, from losing the last two weeks of one's memory due to, say, a knock on the head which resulted in permanent loss of recall of that time.

What about a case which does even more violence to our (untutored) intuitions? Assume that at time T_1 I have made a copy of myself, Max_2, who is immediately activated and lives a normal life just like me, Max_1. Now, at T_2, I am told that I will be destroyed at T_3, though my recently-made copy will be allowed to continue so that, some time later at T_4 only Max_2 will be extant. How **should** I feel, rationally speaking, at this prospect at T_2? Should I regard this as complete disaster, the end of my existence, my death, the **end**? Or should I regard it simply as a rather annoying event, annoying because the efforts I've made, and the actions I've taken since T_1 will be lost (though, in partial "compensation", I will have instead the memories of Max_2)? Surely the rational response is the second one!. If one has followed and agreed with the moves up to and including the case described in the last paragraph and in scenario (e), then how can one reasonably think that all the difference in the world results from simply allowing the copy to be active since he was made?

I realize that many readers will not be happy with this conclusion at all (though I know that some will find it perfectly acceptable). All I can say to them is: read back through the progression of examples and if you cannot provide a solid argument for stopping at some point short of the conclusion, then why not accept that conclusion and get used to it? It is just not reasonable to take our current "intuitions" as decisive in regard to questions of whether we are **really** dying or surviving (fully or partially), or for any of our other intuitions for that matter. What is felt to be acceptable is socially and theoretically conditioned; it is not some a priori truth which can be discovered by introspection. At some time in the past it was "obvious" that the earth was flat and that the stars were points in a celestial sphere which was a few miles from the earth. These things were obvious because of the theory that had been absorbed into people's conception of the world. When a better theory came along and was eventually absorbed, it was equally "obvious" that the earth was round and that stars were suns at various but very great distances from us.

Perhaps many people will **never** accept the conclusion while it is still only a theoretical possibility. But one day it may be reality; one day people may routinely store backup copies of themselves as a strategy for survival in the very long run. Once that happens and once there is also a theoretical rationale for it (something like the one I have presented here, though no doubt more sophisticated), I believe that we will cease to fear the destruction of our current physical vehicle. We will never find the shift to another copy **as good** as continuation of the original because of the loss of memory (unless continuous updating can be achieved), and the inconvenience involved (the copy may be a considerable distance from where we want to be -- for safety reasons). Nevertheless, we will be grateful for the process and for the opportunity of virtual immortality it offers.

BIG STORY
Part II

Fiction By Cameron Rockwell

Synopsis: Mac Neuman, a wealthy industrialist, is told he has only six months to live. Contacting a cryonics organization, Vitrilife, he and his business partner, Jim, find suspended animation has been proven through vitrification of small animals, but very high pressures are required. Whole body preservation for humans would be so expensive that no one has begun to develop the necessary equipment. Neuropreservation with vitrification is being done, but near-term reanimation is not feasible for lack of clonal transplant technology. The result is that cryonics organizations are still very small, and are likely to remain that way for some time.

* * * * * *

Mac took a deep breath and again looked around Vitrilife's small offices. The worn furniture reminded him of what they'd had at Neuman Electronics, back at the beginning. Little electronics operations were like this. He'd expected the foremost organization trying to save people's lives at death to be something quite different, and Vic, although very well qualified, was... well, somehow Mac had expected Vitrilife's president to be an older, more experienced leader.

"What kinds of resources do you have for research?" Mac asked.

"Most of it comes from membership dues... just barely two thousand signed up." Vic shook his head and smiled sourly. "The dues are two hundred dollars per year for the average member, so our total budget is, say, four hundred thousand a year."

"What about reserves, assets; how about donations?"

"There's about five million in the kitty, but that's for keeping people in

storage--about two hundred at this point. We can't touch those funds for research. After other operating expenses, we have maybe two hundred thousand a year for research. Donations? Maybe thirty to forty thousand a year."

Vic studied the puzzled expression on Mac's face. "I can almost read your thoughts," he said. "Our research staff is five people full time; all of them could have better jobs elsewhere. Just think what it would be like if we did things the way you do in your company!"

Mac visualized the situation for a moment and then he understood. The marketplace was in its infancy. Less than one person in a hundred thousand had arrangements, from what Vic said. The majority of those were in good health. Of people who were dying, not one in a million was being suspended. Things could drag on this way for a long time. Not good!

"Vic," said Mac, "If resources were no problem -- no problem at all, how fast could you get things done?"

Wheels started spinning in Vic's mind. Seventeen years ago he could have answered that question immediately, but he'd long since concluded no one would ever ask it.

"You're talking about getting things done fast?" Vic asked cautiously. "But when you say 'no problem with resources', what's that mean? Can you give me a better feel? You're going to give us some kind of large donation for research?"

Mac grinned. "I don't know what you'd propose," he said, "But suppose I could raise five hundred million in cash and pour it into a new holding company which just invested it in short term instruments and common stocks? Suppose Vitrilife was the general partner of a limited partnership, with the holding company as the primary limited partner?"

Vic's eyes widened. Mac couldn't possibly have said that!

Mac continued, "Three days from now, you'd be able to sign commitments of ten thousand dollars or less, ten or less per day, on your own. I'd cosign on larger things, no limits."

Vic was still skeptical. No one handled money like that. He'd talked to many, many wealthy persons over the years. They just didn't do things this way.

Mac read the frown on Vic's face correctly. "No, I wouldn't leave it all up to you," he said. "I'd spend three days a week here for the first month, so you wouldn't have to wait on approvals for large expenditures, and I'd be in on a lot of the brainstorming during that time. We'd set up goals and compensate you and other key people with limited partnership shares for meeting them, in addition to salaries!"

Vic broke in, "This isn't conventional. Your business associates... your family! They'd think you were crazy!"

"I don't have any family," Mac said. "My business associate, there's only one... well, he's OK. There would be safeguards to protect me, but I'm skillful at not tying people's hands. We'd need some legal review to protect Vitrilife's

non-profit status, of course. For the moment, just give me a comprehensive plan... by tomorrow morning!"

Vic got to his feet restlessly. "I think I get it," he said, "But you might as well see how this comes together from the beginning. I need a few people down here right away. It's almost noon; by mid-afternoon, we'll be into a first planning meeting; you should be there. Are there things you need to do first?"

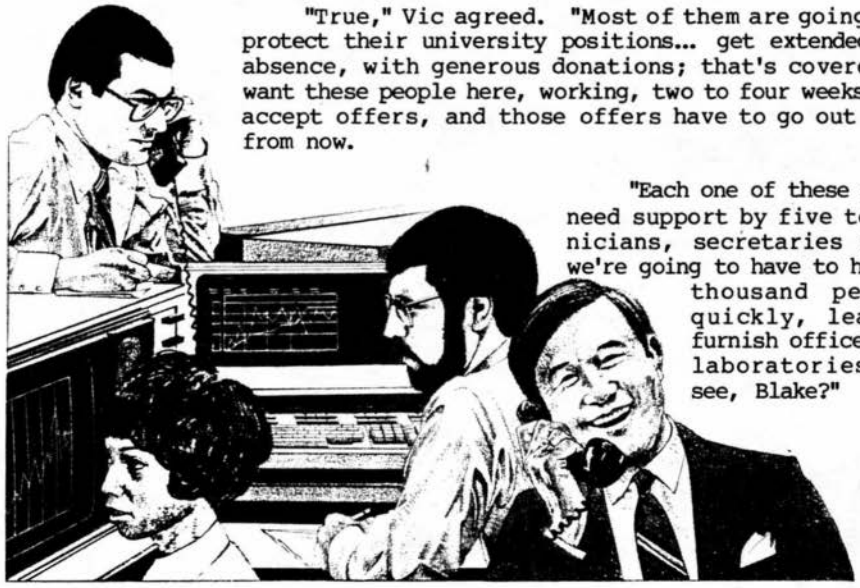
"I need about an hour on the phone with my partner and my accountant," said Mac. "Why don't you set your meeting for three this afternoon, and tell people not to plan on going home early! Right now, how about a second quick tour of what you've got here, so I'll have a better idea of where we're starting from?"

Mac had seen the lab once, but a second trip through was very helpful. The biggest deficiency was lack of a large pressure container for whole human beings. Aside from that, there were needs for a tremendous amount of additional floor space, but plenty of industrial parks nearby were less than eighty percent leased. Vic and Mac talked briefly about staffing, as they walked. Then they went their separate ways, to get ready for the afternoon meeting.

Blake Stanley, vice president of the cryonics organization, was overwhelmed when Vic called him. "Five year employment contracts for a hundred cryobiologists?" he croaked. "That's almost everybody! If you throw out the insect and plant specialists, that's all you've got left!"

Vic smiled. "You got it! We want them all! The high salary levels and five year minimum guarantees should get most of them to go for it right away."

"But most of those people are tied up!"



"True," Vic agreed. "Most of them are going to have to protect their university positions... get extended leaves of absence, with generous donations; that's covered too. We want these people here, working, two to four weeks after they accept offers, and those offers have to go out three days from now.

"Each one of these people will need support by five to ten technicians, secretaries and so on; we're going to have to hire about a thousand people very quickly, lease space, furnish offices and equip laboratories... do you see, Blake?"

Blake saw. He saw this had to happen someday; wished they'd done more planning for it. At the same time, he knew by three that afternoon he'd be ready. Too bad it was a terminal illness but it was usually this way, waiting until the last minute to do something.

The next week passed as if the digital clock in Vitrilife's office were counting off days rather than seconds. Vic, among many other things, was embroiled with schedule problems in getting the large pressure chamber. "Eight months?" gasped Mac incredulously. "There's got to be a way to do it faster! Can't we just pay more for it?"

Vic shook his head. "I don't think so," he said. "We're talking about a pressure chamber the size of a fuel oil truck, with walls of cast steel eighteen inches thick. Prior, urgent commitments to heavy industry outweigh our needs. We'll keep trying to move the delivery date up, but they're really stubborn about it."

"Look, Vic," Mac said, "What we're after is like one of those big battleship gun barrels, right? Can't we find something in the way of scrap that would do the job?"

"The U.S. never made anything bigger than sixteen inch guns," Vic said. "Even the Japanese stopped at eighteen inches. We need twenty-two inches diameter on the inside of the chamber. Custom fabrication is the only way."

"What's the limiting size of the human body?" asked Mac. "It's the shoulders, right?"

Mac walked to the wall and marked at the side of his arms on both sides. Twenty inches. He marked beside his hips at each side. Fifteen inches.

"Where did the 'twenty-two inches' come from?" asked Mac. "I know, it's probably an estimate of what we'd need to accommodate a range of people, including the shoulders. But if we took the arms off at the shoulders..." He paused, because Blake was having trouble controlling his laughter. "Something funny I don't know about?"

"Sorry," Blake choked, trying to stop laughing. "It's just there's this story about the time a TV news team did a story about Cryonics on Long Island; they sawed the arms off a manikin to get it into a capsule. The neighbors thought it was a real person and called the police!" Mac looked around, and saw that Vic was trying to stop laughing also.

Vic managed to get control of himself first. "Mac, it's actually a very good idea," he said. "But we never thought anyone would come up with a real life solution that required sawing off the arms! They would, after all, be rather easy to re-attach surgically, later.

Mac was smiling too, now. "So you think this might solve some problems?" he asked.

"Sure," Vic replied. "We'll see if any old sixteen inchers are lying around, as a start. The biggest risk is they've all been melted down for scrap. I'd bet the Japanese guns went that way pretty quick after the war, but we'll

check on it. Meanwhile there's always a hope the cryoprotectant research will do away with the need for high pressure completely."

As luck had it, sixteen inch guns had been removed from a battleship to convert it for guided missiles. They were still in mothballs, available as salvage items; the price was nominal. Soon, a mammoth gun barrel was lying in the chain link fenced parking lot of a new building.

As dozens of researchers worked to eliminate the need for pressure, the barrel was cut and sealed at the eight foot point. The original breech mechanism was reinstalled. Finally, mounted on a wheeled carrier, the whole assembly was rolled into a high bay area for final x-ray inspection, hydrostatic testing, and instrumentation.

One day, as Mac climbed out of his car on his way to see the completed pressure chamber, he found the reporter he'd spoken with months earlier, June Carter, waiting for him in the parking lot. "I understand you're working on something very secret and very important," she said, with an impish grin.

Mac paused. He recalled the interview now — June had written an article on Neuman Electronics... very upbeat. Mac couldn't understand how she'd gotten it into print. Jim told Mac he thought she should be invited back to do more of that, or, maybe they should even hire her to take over the public relations department. Yes, Mac had promised to give her a shot at anything really newsworthy that came along. Yes, he'd forgotten to do it, and what was happening here was certainly newsworthy.

Now, leaning back against the car for a moment, Mac was fascinated by June's perceptive eyes and smiling face. Then he became intimately aware of her short skirt being whipped by the brisk wind about her shapely figure and slender legs, outlining her as if she were wearing a bikini. June's soft blonde hair was backlit by the sun and framed among billowing white clouds hanging in the deep blue sky behind her. For a moment, Mac was oblivious to everything except a feeling of visual ecstasy, then the sensation was drowned by a vivid recollection of his rapidly progressing illness; he suddenly experienced a fleeting, bitter regret that he didn't have more time.

Mac smiled back weakly. "I remember now, June," he said. "I really owe you one, for the great job you did after that lousy interview I gave you. But we're not ready to publicize things on this project yet. Tell you what! There's a series of news releases being prepared; I'll talk with you again just before they come out, OK?"

June nodded, but concern filled her face. "You don't look so well!" she said, and stepped closer to Mac. A compelling sense of her warmth and softness along with a faint scent of perfume filled his senses. In the chill wind, June's body was almost touching his and Mac

felt as if it would be the most natural thing in the world to reach out and gather her in, but instead he stood upright and backed away slightly.

"I have to go now, but I promise we'll talk before long, all right?" Mac said.

"All right," replied June, her expression still worried and concerned. "Take care of yourself!"

"I'm doing everything I can about that," said Mac, hesitating for a moment with his eyes fixed on June before turning to the gate at the edge of the parking lot.

Inside the fenced enclosure, walking toward the high bay building, Mac found pictures of June in the parking lot blocking out everything else. This is preposterous, he told himself, you're much older than she. As the four story building loomed over Mac and he approached the thirty foot high door, Vic and Blake joined him. Together, they walked into the cavernous room and stood before the wheeled pressure chamber.

"It looks like something from an alien spaceship," said Mac, as they examined it.

"Let's hope it turns out to be a white elephant for the Smithsonian," said Vic. "We sure don't want to use it! If your illness slows up a little, we may get the larger one before you need it, or, the guys on the cryoprotectant teams may eliminate the need for pressure. You don't really want us to take your arms off at the shoulders, right?"

"Better the arms than the head!", scowled Mac.

"Heads were the best thing anyone could afford up until this moment," Blake said wistfully. "But with this setup, whole body vitrification will soon be a reality, even though the cost will still be incredible. I bet half a dozen people will go for it during the next year!"

"What would a round trip demonstration with a whole human being accomplish?" asked Mac. "Do you think that would speed things up?"

"Of course!" said Vic, "We'd be swamped, regardless of what it cost. Once people really believe it's possible, they'll move mountains to get it. But where do we get the 'volunteer'?"

"If the big capsule is ready before I'm too far gone, it would be a temptation to try it myself!" said Mac.

"That's crazy!" said Vic, annoyed. "I mean, how do we know it would work? We've gotten animals back, and they seem perfectly OK, but we can't tell yet exactly what would happen to human memory! To do it, just as some kind of 'stunt'..."

Mac reached out, ran his hands over the massive pressure chamber, and laughed. "You know what you sound like, Vic?" A profound silence gripped the area. "You sound like all those people who are scared to get 'frozen', because

they're not yet sure it would 'work'!"

"But a lot more research is needed..."

"When is this uncertainty finally going to come to an end?" Mac said with finality. "Not until somebody makes a round trip! You people have been at this so long you're overlooking the obvious. Somebody has to come back 'first' and nobody is going to be really confident until it happens. I'm sinking a couple of hundred million into this and I sure as hell expect to get something back besides a tax writeoff."

Mac gestured impatiently. "If almost everybody is scared to do this, it compromises my chances to come back five or ten years from now. How long are we going to wait to be absolutely sure? On the other hand, if this is clearly workable, and it becomes popular, my chances to be back soon go way up."

Mac grinned. "This venture could turn profitable, too! I've got everything to gain. Who ought to be taking the biggest risk, anyway? See?"

"But suppose you come back like some kind of vegetable?", Vic asked.

"Suppose it's ten years from now and you bring somebody else back, and he's the vegetable, not me?" replied Mac. "Then I'd be waiting even longer. No, it's got to be done now! Assuming they still can't cure me, I'll take a second, longer trip, but I'll know cryonics is proven and booming, not just dragging along!"

Mac grimaced, "In the unlikely event I don't have good memories, then you're going to have to send me on down the line a little further, but you'll have a much better idea of how to attack the problem from whatever you observed in bringing me up the first time."

"What about the legal problem?" asked Blake.

"What about it?" said Mac. "We're claiming we have suspended animation, not just some last ditch freezing thing. Yes, I know! You'll have to get me pronounced 'dead' the first trip. You guys are going to have to take some risks, too! The lid could blow off, but you're going to be in control to a high degree!"

Mac's disease did slow down, and he was still pretty much up and around when the larger pressure chamber was finally delivered. At a meeting of researchers about a week prior to the planned date of Mac's suspension, the cryoprotection people announced they were close to a solution of the pressure problem. They advised a one week wait, and a switch to their new procedure, which eliminated a need for the high pressure chamber.

Mac asked many questions, and finally chose to take the new route without the pressure chamber, delaying even one week more for more verification with large animals. During that time, four German shepherds made the round trip in fine shape with no need of the pressure chamber.

"It looks like these pressure chambers are museum pieces now," Vic said as they walked past them the day before Mac's suspension.

"Okay by me," said Mac, smiling. "Look, you know what we said about keeping me under for six weeks?"

"Yes," Vic said, "anything shorter wouldn't be very convincing!"

"But what if you held me down for three, four months, or up to a year! If a cure's developed during that time, there'd be no need for a second trip! Even if it took a couple of years, that might be the best solution."

"I agree," said Vic.

"Then let's work out how it's going to be handled," Mac said. "We can get things planned out for all the possibilities of how therapies might come along, this afternoon, and you'll have clear guidelines on how long to hold me under. Sound OK?"

"Sure," Vic said. "I like that better anyway -- makes it look less like a publicity stunt!"

"Is June in the small conference room?"

"Yes, but she doesn't really know what's going on, yet."

"No problem. I'll meet you and the other people after lunch to work out the timing plan on bringing me back."

June was puzzled, having been left alone for the better part of an hour in the small conference room. She wandered around the walls, looking at diagrams, charts and pictures of equipment that seemed to have little to do with Neuman Electronics products. The word was out that some kind of massive biological research project was underway, but security had been very tight. There were wild rumors that it had to do with suspended animation, but no one on the inside was talking to the press. The cryonics organizations, especially Vitrilife, had not changed their publicity approaches in the slightest, even though it was rumored they were involved somehow. June's curiosity was at a fever pitch.

Mac entered the room, said hello, and sat down, inviting June to have a seat next to him. She thought he looked particularly dragged out.

"Is this the big story you promised me?" June asked. "You don't look too

happy about it! What's going on?"

Mac smiled. "I know I don't look so good, June. By ordinary standards, you'd say I have only a few days to live; it's a pretty serious illness." He paused, wishing he'd found some other way to say it, as June's face paled and she clenched her hands.

"No! I'm not done for..." Mac continued.

"There's some kind of cure?"

"Not for my illness, yet. Look, June, here's a press kit our people have worked up. They'll be giving copies to others later, but you'll have a two or three day running start. I'm sure I can trust you to wait until I'm gone before you run this."

"Gone?" June cried. "You said you weren't 'done for'!"

"That was the wrong way to say it," Mac added hastily. "This is going to be a shot at true suspended animation! I could be back in a few months, or a year, depending, but soon... not ten or twenty years. You'll have the initial story, probably a few days from now, and when I come back you'll get an exclusive on that one too. Am I forgiven now, for putting you off that first time?" He tried to smile, but had the feeling his weakness was too visible for the smile to be convincing.

June winced. The excitement Mac had expected was not there, only worry. "Are they going to cure you when they bring you out, then?" she asked.

"It depends. Maybe I'll have to make a double trip, as a demonstration of suspended animation, if a cure isn't available soon, or maybe I'll be back for good the first time. The point is we think this is a reasonable thing to try, and I'm the guinea pig. Right now I'm running on borrowed time... not expected to last much longer. You've got the tape recorder running, right?"

June nodded.

"All right, keep it running for the next hour or so. Let's just talk about whatever you like. If you're going to do this story you'll probably want a lot of details. All of our people were so happy about the way you handled that earlier thing that there was no contest." Mac was breathing in an irregular way, and seemed to be a bit paler than when he'd first come into the conference room. It was evident that even the effort of talking was costing him a lot.

June shook her head sadly. "I wanted to do a big story on Neuman Electronics, but not this way!" Her eyes were moist and her voice was trembling as she began the interview.

They talked and talked. Lunchtime came and went. Several times Vic stuck his head in the door and told Mac the planning session was underway. Each time, Mac told Vic he would be there in a few minutes. In the hours that passed, June came to know Mac better than anyone she'd ever met. She found herself telling Mac things about herself she'd never mentioned to anyone before. Finally, exhausted, Mac got to his feet to say goodbye. June came to him and buried herself in his arms. Luckily, no one entered the room during a very long kiss

that was as much a promise as it was a farewell.

The next morning, in the operating room, there was an air of expectancy as Mac slowly walked in, wearing a patient's gown, and sat down on the operating table. He'd rejected the idea of being sedated and moved after he was groggy.

"What the hell!" he'd said. "Astronauts used to ride the elevator up to their vehicles and strap in. I'll feel more comfortable just lying down in the surgical field to begin with!"

After the preliminary anesthetic was given and Mac was out, no one seemed to want to be the first to speak. Then Blake, his voice muffled by the sterile mask, said, "All right, let's get going. We don't want to keep Mac waiting on the launching pad any longer than necessary!"

(to be concluded next month)

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Advances In Development

by Thomas Donaldson

Recently the 5th EMBO (European Molecular Biology Organization) workshop on development of Drosophila on 21-29 June 1986 (reported in **NATURE** (**322**, 404-405 (1986)) presented several striking advances on development. **Drosophila** is the fruit fly. Because so much work has been done on Drosophila for almost 80 years we understand a great deal about the exact genome of Drosophila. This animal therefore serves as a testbed for us to find out about development of the higher animals, such as mammals and hence ourselves.

The current main issue in development is to explain how our genes control our successive development from a single fertilized egg cell into a human being containing perhaps 10,000,000,000,000 cells. Taking a global view, most animals show a differentiation between their anterior (forward) and posterior (behind). Most animals also show a dorsal-ventral (back and belly) differentiation. Finally, insects such as **Drosophila** divide into segments. We would like to explain all of these global characteristics of development both in terms of the genes controlling them and biochemically. At the EMBO meeting scientists reported significant progress on all of these traits.

First, Christianne Nusslein-Volhard and her colleagues from the Max Planck Institute presented their work showing that the anterior-posterior axis in Drosophila is laid down by cytoplasmic inheritance from the **mother.** This means that even before fertilization, the egg has a front and back end. This front and back end then develops into the front and back end of the adult animal. By transplanting cytoplasm from the back end of the egg to the front end, Nusslein-Volhard produced an embryo which had no front end at all. (Such embryos obviously could not even hatch). Furthermore, she and her colleagues found mutations for which the females couldn't produce viable embryos. Their embryos failed because they had no anterior end. They have specified and cloned the exact gene involved, which they name **bicoid.**

We have indications which are at least as interesting for the genes controlling the dorsal-ventral axis in **Drosophila.** K.V. Anderson, C. Nusslein-Volhard and others have found at least 10 mutant genes which will produce, in female **Drosophila,** embryos which do not have a ventral (belly) side (**CELL, 42,** 779 (1985)). In this case, the chemical produced by these genes is now characterized. It is an enzyme, of a class called the **serine proteases.** Similar enzymes act in blood clotting to amplify an initial signal. This work suggests that this chemical sets off a series of reactions establishing coordinates from the dorsal to the ventral side of the embryo.

Segmentation now seems to be controlled by several genes. Analysts have called them collectively the **gap** genes. These genes control the development of the successive segments of the fruit fly's body. These genes are in the **embryo,** not in the mother. They fire off successively to cause creation of each segment. Hans Meinhardt has presented a theory of how the gap genes act (H. Meinhardt, **J CELL SCI SUPPL, 4,** 357 (1986)). Its predictions were all verified at the EMBO meeting. For instance, mutations in gap genes will delete different segments of the embryo. Loss of one gap gene causes the adjacent one to take over the region it controlled. Both of these predictions are verified.

Segments **seem** unique to insects. It's therefore interesting that vertebrates may show some of the same segmentation. There is a mutation in mice, called **rachiterata,** which causes replacement of one vertebra (without a rib) by another (with a rib). This resembles the behavior of mutated gap genes in fruit flies (W.J. Gehring, **CELL, 40,** 3-5 (1985)).

Our real interest in all of this work on development consists not just of a desire to understand but to control. If we can work out the processes by which these genes are expressed to control development, we should be able to achieve many cures now totally inaccessible or only clumsily achievable now. This includes not only regrowing limbs, but also regrowing injured nervous systems and ultimately whole bodies from a head alone. Control over growth and development will mean that surgery will become outmoded. Many kinds of healing will become possible. This possibility only seems far from our imaginations because our ability to achieve it seems so far away.

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"Remember, nobody said cryonics was going to be easy!"

"That's right, they said it was going to be impossible!"

JULY - SEPTEMBER 1987 MEETING CALENDAR

ALCOR meetings are usually held on the first Sunday of the month. Guests are welcome. Unless otherwise noted, meetings start at 1:00 PM. For meeting directions, or if you get lost, call ALCOR at (714) 736-1703 and page the technician on call.

ALCOR

ALCOR LIFE EXTENSION FOUNDATION

The JULY meeting will be at the home of:

(SUN, 12 JUL 1987) Brenda Peters Combest
4324 Troost Ave., #206 (NEW ADDRESS)
Studio City, CA

Directions: Take the Ventura Freeway (US 101) to the Laurel Canyon Blvd. exit (Just west of the Hollywood Freeway -- Ventura Freeway interchange in the San Fernando Valley). Go south on Laurel Canyon to Moorpark and turn left. Go East on Moorpark past Colfax (first light) to Troost. Turn right on Troost. 4324 is in the middle of the second block on Troost, on the left. Call up to #206 from the lobby.

The AUGUST meeting will be at the home of:

(SUN, 2 AUG 1987) Bill Seidel and Candy Nash
10627 Youngworth Rd.
Culver City, CA

Directions: Take the San Diego (405) Freeway to Culver City. Get off at the Jefferson Blvd. offramp, heading east (toward Culver City). Go straight across the intersection of Jefferson Blvd. and Sepulveda Blvd. onto Playa St. Go up Playa to Overland. Go left on Overland up to Flaxton St. Go right on Flaxton, which will cross Drakewood and turn into Youngworth Rd. 10627 is on the left (uphill) side of the street.

DUE TO THE PARTICIPATION OF ALCOR IN THE 1987 NORTH AMERICAN SCIENCE FICTION CONVENTION (CACTUSCON) IN PHOENIX FROM 2-7 SEPTEMBER, 1987, THERE WILL BE NO SEPTEMBER MEETING.

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