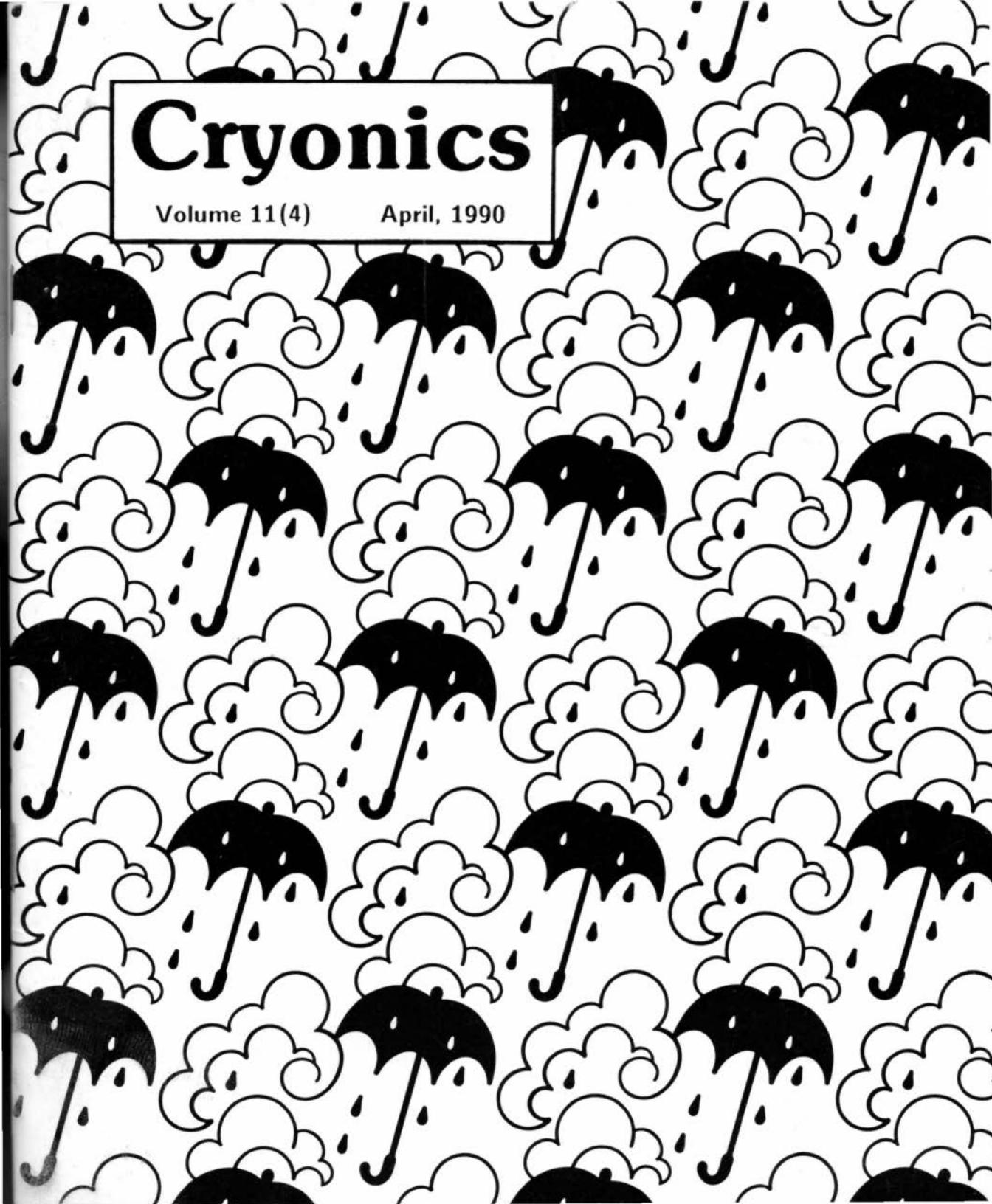


# Cryonics

Volume 11(4)

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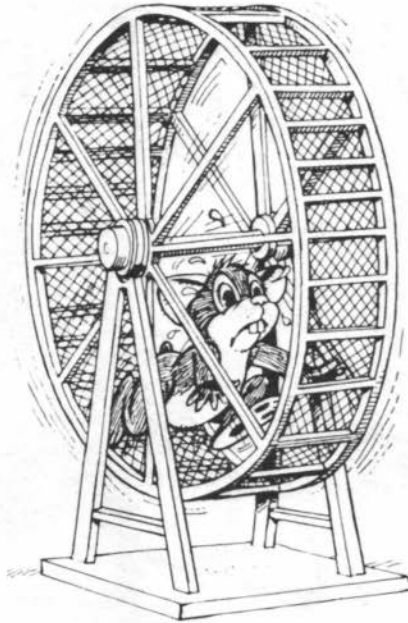


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## EDITORIAL MATTERS

Once again we are desperately trying to get back on schedule. We are attempting to put our three issues of *Cryonics* in as many weeks. Once we get back on schedule we hope to stay there.

We are in need of high quality feature articles from one to fifteen pages long. (If you use a word processor, 3K to 40K, ASCII format, transfer by modem or 5 $\frac{1}{4}$ " MS-DOS floppy disks.) We are attempting to improve our rather deplorable record on acceptance/rejection notification. If you have considered writing for *Cryonics*, now is the time.

\* \* \* \* \*

## OPERATING BUDGET NEWS

by Carlos Mondragón

Alcor's operating budget, i.e., everything besides patient care and research is funded from two principal sources: emergency responsibility dues and the Richard Clair Jones Endowment Fund. We have recently been informed by the trustee who distributes the income from the Jones Estate that residuals will be substantially less than anticipated.

At this time we don't have specifics or details as to how Alcor will deal with this circumstance. Decisions on a revised financial plan will be made at our April 1st board meeting. For now, it is safe to say that the plan adopted in May of 1989 will be radically altered.



## PLEA FOR CONTRIBUTIONS HEARD AND HEEDED

In the January, 1990 issue of *Cryonics* we asked for contributions in support of some key equipment purchases. We are happy to report the response to that plea so far:

Brett Bellmore not only contributed money for the **voice operated walkie-talkie headsets**; he even found a supplier for us. We now have four such units safely ensconced in the Alcor ambulance and ready to respond to the next emergency. We tested the units out and they work great: they even penetrate the impenetrable: the foil-roofed, steel-reinforced concrete of the Alcor facility!

Frank Rothacker contributed \$1K towards **earthquake preparedness**. This money will be spent on securing filing cabinets and getting an earthquake consultation for the patient storage area.

Charles Butin contributed the \$180 required to buy a **reserve battery** for the Alcor ambulance. This was a particularly generous act on Mr. Butin's part since he lives in New York, well outside the normal response perimeter for the ambulance. The reserve battery is now installed in the ambulance.

Last, but by no means least, Lee Corbin made a generous contribution, most of which will be used to purchase items needed for Northern California Emergency Response Readiness: a backboard for their heart-lung resuscitator and additional resuscitation equipment. The balance will go towards the purchase of silicone oil.

We have had a pledge to purchase a **car phone** for the ambulance, but this has not materialized as yet.

We decided to bite the bullet on a few other things (although contributions in

support of these purchases will still be gratefully accepted) such as **Macintosh disc drives** and the **thermocouple switch box**. We have also gone ahead and had a new sign installed on our glass.

Still needed are:

- 1) 1 megabyte of RAM and several large hard disk drives
- 2) Silicone oil

A hearty thanks to all those who contributed. Please know that you've made a real difference in our capability.

\* \* \* \* \*

## NEW EQUIPMENT

by Mike Darwin

The last month has been a busy one in terms of equipment acquisition and it has left us substantially better off in virtually every area of our operation. In running down the improvements we'll start with the administrative:

First and foremost is a new **phone system!** This long overdue acquisition has gone far to unsnarl the lines of communications and cool tempers among Alcor staff. The new phone system (Creative Telesystems) does almost everything except answer the caller's questions (Dr. Perry is working on an AI system for that problem!). We can now forward calls within the facility, page people over intercom, conference call, call forward outside the facility, queue up calls, and put people on hold with music.

The new phone system also has another nice feature: least-cost routing for long distance calls. This will hopefully reduce our long distance bills considerably since the idea is that the system's microprocessor will pick and choose among several long distance companies in order to select the lowest rate at the time the call is being placed. The phone system also does all kinds of other interesting and useful things, but we haven't figured them out yet (at least I haven't). The upshot is that we now have six incoming/outgoing lines (seven if you include the FAX) and the communications snafu is over -- at least for now. Cost: Leased for \$200/mo., plus the phone bill.

Next was a decent **copier**. Our previous copier lasted about six months before it was worn out by the sheer volume of material it was asked to clone. It had gotten to the point where the serviceman was negotiating to rent loft space from us so he wouldn't have come in so often. The answer was a Canon NP-3825 copier with autofeed feature, continuous zoom, and lots and lots of other badly needed features: two-page separation, two-sided originals to one-sided copies, one-sided to two-sided, two-page separation to two-sided, two-sided originals to two-sided copies, overlay, and on and on and on.... The machine can also collate up to ten copies. This has made all our lives a lot easier here. It has been of particular benefit to Arthur McCombs (the big copier user) in handling administrative communications and facilitating suspension paperwork processing. Cost: Leased for \$200/mo.



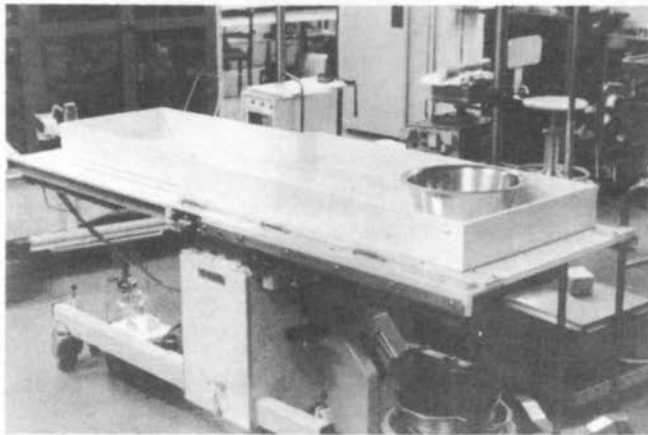
Alcor also made another very important acquisition: an **Atago refractometer** which is capable of measuring cryoprotect-

ant concentration over the full range used in suspension operations. Not having an instrument like this has been a major headache for us in the past. The limited-range refractometer we've been using requires complex and time-consuming dilutions and does not allow real-time evaluation of the patient's condition during perfusion. Thus, we have to "guess" about when to stop introducing cryoprotectant or risk overshooting. The new Atago refractometer takes the guesswork out of the procedure and, perhaps even more importantly, frees up a highly skilled person (Hugh Hixon) from mindless dilutions/calculation for more important measuring work.

Cryovita Laboratories has also made several important acquisitions which will act to enhance our capability, among them a portable X-ray unit and a state-of-the-art Emergency Room style X-ray table. This table will allow for whole body films to be rapidly and reliably shot while the patient is being perfused and, when used in conjunction with a fluoroscopy unit we hope to acquire soon, will allow for real-time evaluation of patients' circulatory patency during perfusion by giving us angiography capability.

A custom-made waterproof (and fluid retaining) table top was made for this unit with a 4" lip (hopefully no more ice bags or dripping water on the floor!).

Cryovita also recently acquired an American Edwards Labs Model COM-1 Cardiac Output Computer. This will allow us to determine cardiac output during research studies as well as to monitor pulmonary artery pressure: two very important capabilities we've had only spotty access to in the past.



*Ice-retaining table top on OR X-ray table.*

\* \* \* \* \*

## AMBULANCE LIFT GATE ACQUIRED

by Mike Darwin

None of us are getting any younger. In particular the Alcor staff is starting to gray, and not just around the temples. For years the regulars around here have never shied away from hard physical labor. We've built operating rooms, hauled tons of equipment around (literally), and moved heavy patients/gurneys under very adverse circumstances. Alas, with a fair number of us now pushing 50 and all of us at least in our mid 30's the heavy lifting days are drawing to a close. "Oh my aching back!" is an oft-heard refrain around the facility these days, and we stock several anti-inflammatory drugs in the facility "pharmacy" (ibuprofen, Nalfon, aspirin, etc.).

Additionally, the weight of the patient/resuscitator/ice/gurney has continued to climb with the increasing sophistication of the technology we are using during transport. With the advent of the Portable Ice Bath (PIB) which can weigh (fully loaded) over 500 pounds and the Mobile Advanced Life Support System cart (MALSS) which weighs 460 pounds (without the patient or ice!), the days of picking up patients are over. Safely picking





*Ambulance lift gate in fully-raised position with Cryovita's MALSS cart and Jerry Leaf aboard.*



*Cryovita's MALSS cart on the ambulance lift gate, end-on.*



*Portable Ice Bath on the end of the ambulance lift gate with portable HLR mounted and O<sub>2</sub> bottles in rack.*



*Portable Ice Bath on ambulance lift gate.*

up the MALSS or PIB with a patient and loading it in the ambulance requires at least six able-bodied men. Six able-bodied men are not always available these days. And even if they were, we'd have better use for them than to have all of them waiting around at the hospital or nursing home to load the patient (we need to keep staff back at the facility to prepare for the arrival of the patient).

The upshot of all this is that we decided we could no longer defer purchase of a liftgate for the ambulance, so we bought one. And it works great. And the only thing we can't figure out is why we waited so long.

An L.A. area firm that installs small lift gates and does a lot of customization work for the handicapped did the job in four days. Cost: about \$1900. As you can see from the pictures, we got quite a package for our money, and the intangible benefit of avoiding an otherwise near-certain appointment with a back surgeon is beyond calculation!

\* \* \* \* \*

## **GUIDELINES FOR ACCEPTING NON-MEMBERS FOR CRYONIC SUSPENSION WITH ALCOR**

by Mike Darwin

\* \* \*

*These guidelines were adopted at the March 4 Alcor business meeting.*

\* \* \*

### **Introduction**

The practice of accepting non-members for cryonic suspension is fraught with many liabilities which could potentially destroy Alcor. Chief amongst these are:

- Potential Lack of informed consent in the individual(s) making arrangements with Alcor for cryonic suspension of a non-member.
- Inadequate financial capability of the individual(s) making the arrangements resulting in bankruptcy of the individual(s) and/or litigation against Alcor.
- Liability to litigation from the relatives or other interested parties of the *patient* being placed into suspension.
- Unfavorable media/regulatory impact as a result of the practice being perceived as "predatory" by the media, the community, or the government.
- Inability to meet obligations to existing Alcor suspension members or patients as a result of performing a non-member suspension.
- Liability as a result of actions taken on the basis of mis-information provided by the individual(s) facilitating the suspension of the non-member.

Since Alcor has chosen to accept such risks and formally alter its policy on accepting non-members for suspension, it would seem prudent to have in place a series of both reasonably comprehensive and restrictive guidelines to assist in making the decision to accept or reject a given non-member case.

Despite the seeming impossibility of setting such guidelines (given the complexity and uniqueness of each such situation), there are certain critical elements which must be present for a non-member suspension to be anything other than a very serious risk or a catastrophe waiting to happen.



Please note that the purpose of these guidelines is to *protect Alcor*, not insure that as many non-members as possible get suspended. The very fact that non-members as a class are even *considered* for suspension is an incredible act of largess and risk-taking on Alcor's part. Alcor's first and foremost obligation is to its members and patients. Their safety and security must be paramount. It can be argued that accepting non-members for suspension is in itself an act which is irresponsible to those primary obligations. The purpose of these guidelines is to protect Alcor, even at the expense of excluding many non-members from access to cryonic suspension.

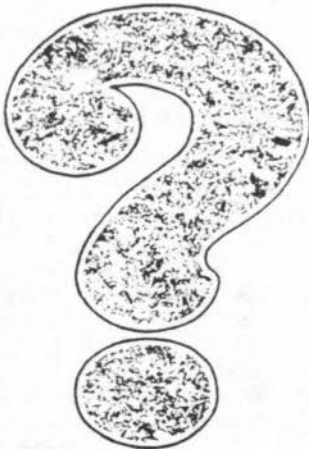
A review of those critical elements is presented on the following pages.

### Determining Critical Considerations

In any *reliably successful* human transaction (i.e., one where both parties are satisfied *long-term* after the conclusion of the transaction) there are certain elements which must be present:

*Character.* First, the character of the individuals involved in the transaction must be suited to the nature of the transaction. By way of example; a marriage or a business partnership requires a much closer "fit" than does a transaction to purchase a package of chewing gum from a convenience store. Complex transactions involving technical considerations and a long-term involvement of both parties demand that all involved have the skill, background, and intelligence to understand the transaction and that all involved be basically *rational* (i.e., use reason as their primary if not exclusive approach to problem solving) in their approach to business and life.

Related elements which are usually essential to a good transactional relationship are listening skills, basic social skills, and information processing skills. In other words, all parties should be able to deal with each other in a *functionally* socially appropriate manner (Note: this does not mean that they have to know which fork to use!), should be able to gather essential information from conversations and printed matter in a timely and effective manner, and should be able to communicate information in a similar, timely and effective fashion.



*Informed Consent.* All parties must know and understand the terms of the transaction *as well as the currently known risks and benefits, actual and potential, associated with it.* They must be provided with critical facts and information, *and their emotional and intellectual state must be such that they can absorb and integrate such information.*

*Financial Stability.* Even rational, socially appropriate people may make decisions that are not compatible with long-term financial survival under the pressure of grief and/or anxiety. In deciding to accept non-members we are, in effect, deciding to take on situations where *we know* that people may not be operating with their critical faculties intact. Thus, if we are to survive such encounters without undesirable blow-back, we must impose *outside* and wherever possible *objective* standards on the individual(s) involved in

order to insure that their financial reach does not exceed their grasp in the heat of the moment. In other words, the responsibility for insuring financial responsibility on the part of the individual(s) attempting to make arrangements *becomes ours* in these situations.

*Practicality and Logistics.* Similarly, we are in the best position to determine what is practical given the situation. Allowing non-members to become involved in "lost causes" and spend money or expend emotional energy which is not likely to result in the prospective patient getting suspended should be avoided. Advice given to last-minute callers should be structured so that "hopeless cases" are defused and halted up-front. An example of such a case would be a situation where the individual(s) attempting to make arrangements have no legal authority to act and those that do are opposed.



*Mutual Benefit.* All parties must mutually *want* to engage in the transaction because they perceive a benefit.

To summarize, all parties to any reliably successful transaction must be rational, appropriately intelligent, and socially functional. They must also understand the risks and benefits as well as the "brass tracks" of the transaction. They must be able to afford it, and the transaction must be possible from a practical standpoint and desirable to all involved. While the presence of these elements doesn't rule out untoward consequences down the line, they go a long way towards minimizing them.

What follows is a set of both objective and subjective criteria for accepting or rejecting non-members for suspension.

### Acceptance/Rejection Criteria

#### Personal

- 1) The individual(s) attempting to make suspension arrangements must have the legal authority to do so.
- 2) The prospective patient must not have left prior written directions, videotape, or even often-witnessed verbal comments to the effect that s/he does not want cryonic suspension.
- 3) Relatives and other interested parties with legal standing must not strongly oppose the procedure or threaten litigation.
- 4) The individual(s) must, without assistance from Alcor personnel, indicate that they had heard of cryonics a significant period of time (months or years) prior to contacting Alcor, indicate that their desire to secure suspension services for their loved one is one that is being made freely, without duress and without pressure or influence

from others, and successfully articulate all of the following core facts, definitions, and premises of cryonics:

- Cryonics is the freezing of legally/clinically dead people in the anticipation or hope that future biomedical technology will be able to reverse *both* the cause of legal/clinical death and damage sustained from the application of today's imperfect freezing process.
- Cryonics is at best a gamble with an unknown probability of success and at worst an undertaking with little chance of working.
- Cryonics is not endorsed by or a routine practice of the medical, scientific, or mortuary communities. It is often publicly labeled by credentialed people as being either a fraud or quackery.
- People treated with today's suspension techniques cannot be restored to life or health with any currently available technology.
- Cryonics is a reasonable undertaking because of any *one* of the following reasons: the historical precedent of biomedical progress and the possibility of repair or healing, the information/structure-based nature of life, the inappropriateness of current criteria for pronouncing death.

The objective here is to make sure that the person(s) already understood the basic principles and limitations of cryonics *before they ever called* and that they nevertheless want the procedure (i.e., that we didn't "sell" them).

To be avoided are situations where the individual(s) do not understand the above premises and facts when they first contact Alcor, and then "latch onto" anything offered to them out of desperation *without being equipped emotionally and/or intellectually to properly evaluate it*.

5) The individual(s) attempting to make suspension arrangements must be functionally socially appropriate. They must impress Alcor personnel as people with whom it would be reasonable to engage in a long-term, sensitive, business or professional relationship.

6) They must be emotionally calm enough to gather and absorb necessary information. Hysterical, confused, or otherwise behaviorally inappropriate people should not even be considered as possible candidates unless and until the underlying emotional/behavioral problem resolves itself.

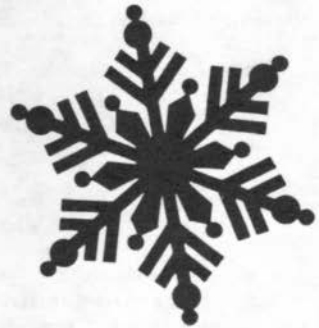
7) There must be *informed consent*. The individual(s) must have communicated to them *and must understand* all the key elements of both cryonics in general and our program in particular. This understanding must include the following elements:

- An understanding of the basic nature of cryonic suspension, both theoretical and technical. For example, they must understand the theoretical rationale for cryonics and possible repair, what the physical suspension procedure consists of, and



what the hazards and benefits of these procedures are. This must include all relevant details of how patients are prepared for suspension and cared for long term.

- A detailed understanding of the financial considerations and the financial structure of Alcor's suspension program.
- A basic awareness of legal considerations, including the uncertain legal status of cryonics (at least for now), as well as the nature and extent of the legal paperwork required.
- Alcor's requirement for *irrevocable control* of the patient.
- The size, operational capabilities, and overall status of Alcor (including financial and legal), i.e., that we are in a small industrial building and *are not* Humana Hospital or the Mayo Clinic.
- The qualifications and capabilities of the staff performing suspension operations and in particular that staff are in many instances not physicians, surgeons, or other board-certified or medically certified or licensed personnel as might otherwise be expected.
- An understanding that suspension members take priority and that delays may occur or that substandard methods may be used to carry out the suspension of the non-member if a member-related emergency arises. For instance, perfusion might be delayed for hours or dry ice storage extended for weeks so that a member could be accommodated, should the need arise.



No representation about future possibilities for the growth or advancement of either Alcor or cryonics should be made in order to influence the individuals' decision. By way of example, people should not be told that "we will soon occupy a million dollar facility with gold fixtures and have celebrities signed up, etc." There should be no attempt whatsoever to "sell" either cryonics or Alcor. Questions about prospects for future advancement may be answered when they are asked. However, such questions should be answered simply and in an emotionally level fashion.

### Financial

Regardless of whether payment for the suspension is being made in cash or on cash/credit basis, a Financial Assessment Application (FAA) must be completed and must demonstrate a sufficiently robust financial condition to undertake the suspension without jeopardizing the individual(s)'s solvency or financial well-being. The FAA along with objective criteria for evaluating it will be a part of these standards.

### Practical and Biological Considerations

Because of the high risk and potentially high media profile of non-member suspensions and the lack of direction from the prospective patient concerning conditions under which suspension should *not* be carried out, it will be at Alcor's discretion to accept or reject potential patients on the basis of their biological condition.

The decision to **reject** a potential patient shall require the unanimous agreement of a Patient Evaluation Committee consisting of Alcor's President, Vice-President, and Director of Research. The decision to accept a potential patient shall require that at least one member of the Patient Evaluation Committee be in favor and that a 2/3 majority of Alcor Directors approve (See accompanying Flowchart). The guidelines below shall be used by the Patient Evaluation Committee to decide to reject a potential patient. These guidelines are not binding, and list some, but by no means all, *contraindicative* conditions:

- Warm ischemia (room temperature -- 11°C to 22°C -- or above) in the absence of cooling to 10°C or below for 12 or more hours.
- Mutilation of, or severe trauma to, the brain such as shotgun wound, massive crushing trauma, etc. Autopsy of the brain is a relative contraindication depending upon the specifics of the situation.
- Clinical "brain death" as determined by 12 to 24 hours of absent cerebral blood flow, or electro-cerebral silence at or near normothermia.
- Persistent vegetative state or other evidence of a past history of profound injury to the cerebral cortex which has resulted in the chronic loss of higher cortical functions. Similar excluding clinical signs would be CT or MRI scans demonstrating overwhelming loss of cortical substance or other evidence indicative of global destruction of the cerebral cortex.

It is the duty of the Patient Evaluation Committee to consider the public and political aspects of the biological condition of non-members accepted for suspension. They should be guided not just by the criteria set forth above but by their own best professional judgment as to the biological defensibility of carrying out the suspension. A guiding consideration should be what *their* judgment is as to the likely condition of the patient and the prospect for repair.

It may be argued that in a very real sense it is not now possible to determine how much identity-critical *information* is present in the remaining structure of the prospective patient. While this is true, it should nevertheless be the most conservative (or radical?) criteria which are applied in evaluating *non-member* suspensions. In other words, the focus should be on rejecting grossly sub-optimum cases which will carry a negative media burden, likely require long storage times (and perhaps high resuscitation/re-entry costs?), and *put Alcor in a poorly defensible scientific/public relations position in any subsequent controversy or litigation.*



#### General Considerations and Requirements

In evaluating non-members for suspension the focus should be on accepting only the *best* cases. No criteria should be used other than those that favor the well-being of Alcor in a direct sense. Under no circumstances should indirect "benefits" to Alcor, such as "depriving the competition of doing a suspension" or "getting the revenue", be a consideration.

Non-members who arrange for the suspension of a

loved one have the highest expectations and the most desire for control of the situation of any class of people we will have to deal with. They feel responsible and in control because *they made the decision*. Often this is doubly the case because they are also *paying for it with their own money!* Thus, these cases present the most opportunity for trouble and misunderstanding. Cases that have been selected because they were "optimum" biologically, financially, legally, and personally are the least likely to result in the individual(s) who facilitated the suspension later trying to recover control of the patient or experiencing unhappiness due to unrealistically high expectations.

### Negative Salesmanship

In these early days of cryonics, in last-minute and non-member cases it is important to emphasize the down-sides. An excellent litmus test of a person's commitment and determination is to attempt to "chill" the enthusiasm of the individual(s) by bluntly and exhaustively laying out the problems with cryonics, with Alcor, and with their personal situation. In other words, *an active effort should be made to discourage the suspension of the non-member*. This tactic has so far proved invariably effective in filtering out those with any degree of equivocation or uncertainty about their decision to pursue suspension for a loved one. If they survive such *negative salesmanship*, and if they meet the other criteria set-forth above, they are likely to be good candidates for acceptance.

### Avoid Encouraging Salesmanship

When "selling" prospective *members*, it is acceptable to talk about future positive possibilities in an encouraging way, and to generally be positive about cryonics and Alcor within the limits of what is known. For instance, it is acceptable to discuss in an upbeat, enthusiastic way with prospective members scenarios for the future, prospects for Alcor's growth, and so on (providing of course these discussions are honest and have a basis in known fact). Such latitude is allowed in these situations since the prospective member is not under any stress and can participate equally in the discussion and be encouraged to take time to check facts, inform himself, and generally form his own opinions.

The individual(s) attempting to suspend a relative or other loved one is not in the same position, and the approach to dealing with such people should be to discourage rather than encourage the suspension. There should be no question at a later time that any hyperbole or rosy scenarios were used to persuade the person to decide upon suspension for their loved one. In reflecting back on their discussions with Alcor personnel the individual(s) should be left with the overwhelming impression that *they had to fight to "get in"*, rather than that they were provided with encouragement and "sold" at a time when they were vulnerable and not capable of making an unbiased decision. This approach is very important in view of our status as a non-profit organization.

Much as with finances, *it is our job and in our interest to impose intellectual and emotional control and balance where it may be missing due to the extreme circumstances.*

### Internal Logistic and Administrative Requirements

A paramount consideration in accepting any non-member for suspension is the well-being of existing Alcor members and patients. Before a non-member may be accepted for suspension it must be determined that:

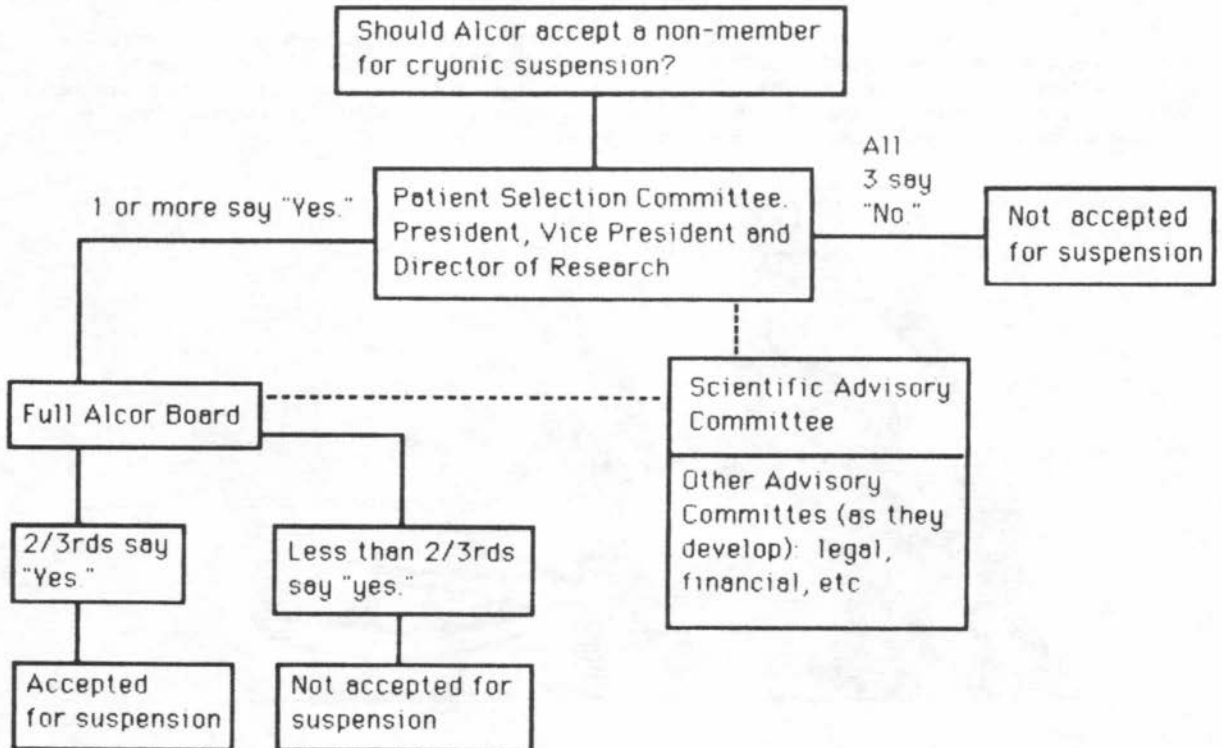


- Adequate cash reserves are on hand to carry out the suspension without impacting Alcor's capability to respond to the suspension of members.
- The risk of a member needing suspension, within a time frame that would be impacted by suspension of a non-member, is judged to be remote.
- There are sufficient reserves of personnel, chemicals, tubing packs, medications, sterile goods, and other supplies to accommodate a non-member suspension without impacting Alcor's capability to respond to members who may need suspension.
- As applicable to the non-member case at hand, there must be a minimum of two (2) empty whole body or neuropatient dewar spaces available for each 200 signed-up Alcor suspension members. In other words, it must be possible to cool the non-member in a way that leaves both the dry ice cooling unit and a dewar slot available for any member that may need it.
- A two-thirds majority of all Alcor Directors must approve the non-member suspension (in addition to the previously noted approval of the Patient Evaluation Committee members).

**Summary**

The decision to accept non-members for suspension should not be made lightly. The above criteria should exclude the vast majority of unacceptable candidates for this service and should serve to insure that Alcor is capable of providing this service without undue jeopardy to existing members or patients.

**Decision chart for non-member suspensions.**



## TRANSPORT OPERATIONS: HOW WELL ARE WE DOING?

by Mike Darwin

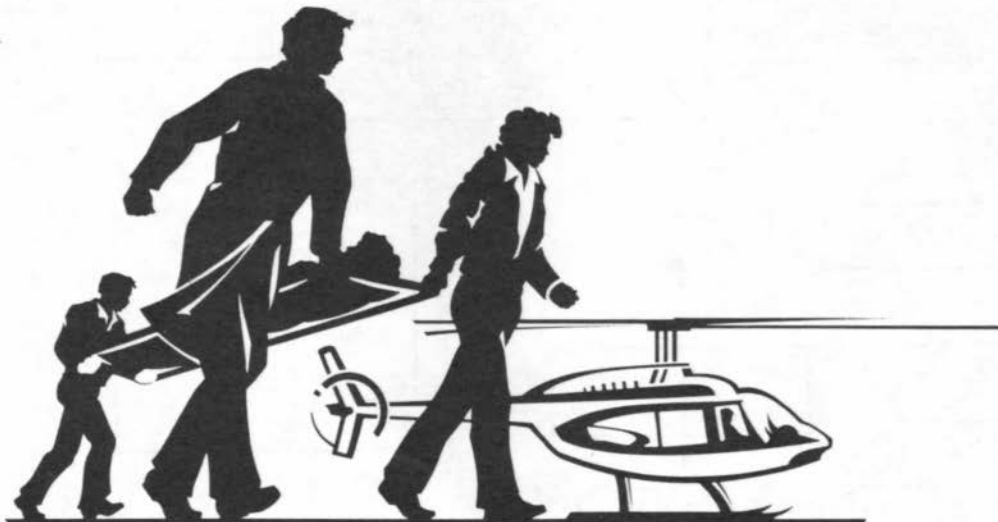
The Transport team is standing by with equipment in the ready. The patient is slowly spiraling toward cardiac arrest. Respirations become less frequent and then stop. Four or five agonizing minutes later a physician pronounces death and tells the Transport Team they can begin.

The Team steps in and starts CPR with a heart-lung resuscitator to restore circulation and breathing, stabilizing the patient during external cooling, and transport to Alcor's perfusion facilities....

The critical question is, *just how effective is CPR, anyway?* We know from both our own experience and an extensive review of the medical literature that even under the best of circumstances CPR is not very effective at providing enough blood flow to prevent currently irreversible injury to the brain. In suspension patients CPR is likely to be even less effective because, unlike the otherwise healthy heart attack or drowning victim to whom CPR is usually applied, the typical suspension patient is usually anything but healthy. Typically the suspension patient has suffered a chronic illness and so-called "chronic (slow) death". In other words, his heartbeat and breathing have stopped because of some serious malfunction in an organ other than the heart.

Thus, the proximate cause of cardiac arrest may well have been some problem that seriously interfered with circulation or oxygenation, such as *shock* due to inadequate blood volume (from dehydration or bleeding) or fluid accumulation in the lungs. Needless to say, if these problems were serious enough to cause natural circulation and breathing to fail, they are going to represent even more of a compromise to artificial circulation and respiration such as CPR, which comes in a poor second place under the most ideal circumstances.

Alcor has taken a number of steps to improve the effectiveness of CPR with the purchase and deployment of both High Impulse CPR and Simultaneous Compression Ventilation CPR equipment (*Cryonics*, 10(8), 8 (Aug, 1989)). Unfortunately, until now we have had no way to determine whether or not CPR is working for a given patient. How do we know that we are moving enough blood and oxygenating it well enough?





The FENEM FEF CO<sub>2</sub> detector.

In the past the only way to determine that was to use costly and cumbersome equipment which was technically demanding and not really applicable to field settings. Recently, all that changed.

A few months ago the FDA approved a simple, inexpensive, and easy-to-use new device that allows us to measure the concentration of carbon dioxide in the air the patient exhales during CPR. It is already well documented in the clinical literature that the carbon dioxide concentration in the exhaled air (so called "end tidal CO<sub>2</sub>") is a very sensitive and accurate indicator

of the efficacy of CPR. The problem with measuring end tidal CO<sub>2</sub> in the past was that the equipment was costly (\$10K+), cumbersome, and required considerable expertise to use.

Enter the Fenem Company and their *End Tidal CO<sub>2</sub>* detector. The Fenem ETCO<sub>2</sub> detector is a small plastic device with a paper reagent indicator that changes color with incredible rapidity in response to the carbon dioxide concentration in air passed through it. The device has a color chart built in which allows for dynamic, breath to breath determination of CO<sub>2</sub> concentration over a range of 0.03% to 5% CO<sub>2</sub>. And what's more, all that's required to use the device is that it be plugged in between the heart-lung resuscitator respirator and the mask or endotracheal tube being used to ventilate the patient. With each and every breath the Transport Technician is immediately appraised of the efficacy of CPR for the patient.

And what's more, the Fenem ETCO<sub>2</sub> detector is cheap: only \$18 per unit in the quantities we're able to buy them in.

The Fenem detector should allow us for the first time to get some real feedback about how well we are supporting suspension patients during transport. And just as importantly, it should allow us to *intervene* to try and optimize CPR in cases where we are not doing an adequate job. The Fenem detector should allow the Transport technician to administer additional IV fluid, adjust the depth of chest compression/frequency of ventilation, and/or give blood-pressure-elevating medication, *and then determine the effectiveness of these maneuvers.*

We believe this represents a major advance in the care of Alcor suspension patients. As of this writing all of the Alcor Coordinators have been issued Fenem ETCO<sub>2</sub> detectors along with detailed instructions on their use. A more technical discussion of the use of the Fenem detector and the evaluation of CPR during cryonic suspension operations is presented elsewhere in this issue of *Cryonics*.

\* \* \* \* \*

## CRYONICS IN THE MEDIA

There has been generous media coverage in the press both in the U.S. and abroad. Much of the U.S. national coverage has been in the form of tabloid articles, and we must say these sleazy publications seem to be in competition with each other to see who can write most the outrageous pack of lies.

Leading the pack is, as usual, *Weekly World News* whose motto seems to be "just make

it up as you go". Take their February 27 issue as a case in point: the cover proclaims: "Rhode Island Woman Frozen In 1902 Brought Back To Life!" Inside we are told the tale of one Clara Hodges, who reportedly was frozen for later revival after dying of pneumonia in 1902. Indeed, not only are we to believe that she was frozen, she has also been revived and is being kept hidden in the Northeastern United States where the CIA is keeping her under constant observation.

Elsewhere on the page is another article entitled "Freeze Your Body - Or Just Your Head, Either Way It won't Cost You An Arm Or A Leg", this one, unbelievably, is about Alcor, and is actually factual! The *Weekly World News* interviewed Alcor Administrator Arthur McCombs, and the article that interview generated is actually accurate.

Other tabloid press included articles about Elizabeth Taylor, Michael Jackson, and the alleged revival of JFK from 20 years of cryonic suspension. We are great believers in freedom of the press, but what a price to pay! And to think these people actually make money doing things like this!

Other press of a more responsible nature included an article which appeared in *Success* magazine entitled "Methuselah Madness", which featured Alcor President Carlos Mondragón. This article, in a rather tongue-in-cheek manner reviewed business developments in in the cryonics and life extension arena.

A major article on the quest for extended youth and life appeared as the cover article in the March 5 edition of *Newsweek*. This nine page spread was both a responsible and reasonably comprehensive review of both mainstream and "fringe" life extension research and therapies. Cryonics even gets a mention near the end of the article when it discusses the Life Extension Foundation in South Florida and notes that LEF will "happily refer you to any of several cryonics firms which, for \$100,000 or so, will freeze your body in liquid nitrogen until medical science can cure what killed you and (even trickier) figure out how to bring you back to life." And of course there was the obligatory quote labeling us as quacks: this time from Dr. William Jarvis, president of the National Council Against Health Fraud.

Overseas, the *London Times* carried a generally positive article about Alcor UK and the soon-to-be-opened British facility. There was also some less appetizing tabloid coverage (the latter was so bad that all we can say about it is that it makes the *Weekly World News* seem restrained!).

We've probably missed a few, but that's the roundup for this month, anyway.

\* \* \* \* \*

## EUROPEAN CRYONICS CONFERENCE

by Saul Kent

The first ever European Cryonics Conference will be held on Oct. 26-28, 1990 at the Gatwick Moat Hotel at Gatwick Airport in London, England. The conference will begin with an informal session on Friday evening, Oct. 26, followed by a full day of presentations on Saturday, Oct. 27.

On Sunday morning, Oct. 28, transportation will be provided to the new Alcor, U.K. facility constructed by Alan Sinclair. A tour of the facility will include a discussion of how the facility is expected to be used to benefit Alcor members throughout Europe as well as a backup for Alcor members in the United States. After lunch, the group will

return to Gatwick Airport.

*Cryonics Authorities*

The conference will feature cryonics authorities from the U.S., where the cryonics movement began in 1964 with the publication of *The Prospect Of Immortality*, by Robert C.W. Ettinger, and where active cryonics programs have been established for many years.

Among the speakers from Alcor, U.S.A. will be Michael Darwin, Alcor's Director of Research, who will provide the European audience with a dynamic and comprehensive overview of cryonics and the cryonics movement; Dr. Ralph Merkle of the Xerox Palo Alto Research Center, who will discuss the emergence of the revolutionary new field of nanotechnology, expected to lead to the development of advanced medical repair systems capable of restoring cryonics patients to life, health, and youthful vigor; and Saul Kent of The Reanimation Foundation, who will speak about how cryonic suspension members can take their money with them and look forward to a future of wealth and prosperity as well as health and longevity.



*Other Featured Speakers*

Among the other featured speakers at the conference will be Dr. Pierre Boutron of the Laboratoire Louis Neel in Grenoble, France, a leading cryobiologist, who will speak about the latest advances in low temperature research; and Dr. Joseph Knoll of the Semmelweis University of Medicine in Budapest, Hungary, who will talk about the potential life extension benefits of Deprenyl, a highly-promising anti-aging drug that he developed in 1964.

*An International Event*

The European Cryonics Conference will be a truly international event. Participants will be attending from at least nine different countries, and it will be the first time that cryonicists from so many different places will have the opportunity to get to know each other.

Further information about the European Cryonics Conference will be carried in the May issue of *Cryonics*, and a brochure giving the full details of the conference will be mailed to members as soon as it is ready. Anyone who wishes more information about the European Cryonics Conference should contact: Saul Kent; 16280 Whispering Spur; Riverside, CA 92504; USA.

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**MEMBERSHIP STATUS**

Alcor has 168 Suspension Members, 357 Associate Members, and 13 members in suspension.

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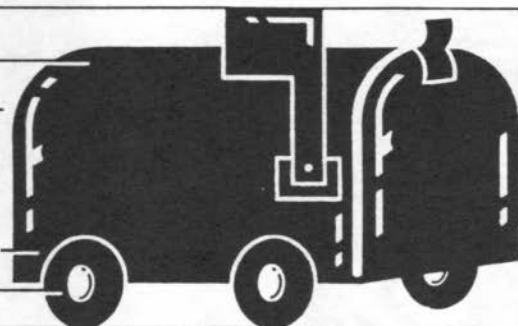
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*Letters to The  
Editors*

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Dear Mr. Darwin,

I believe that none of Alcor's money should go to members who have failed to follow Alcor's advice about executing a Durable Power of Attorney. Even if Alcor had billions in the bank, I would still consider this a waste of money. Hopefully, cases like this will convince people to follow Alcor's legal advice. And personally, I think it is dumb that people allow themselves to get severe brain damage before freezing. If I expected to get brain damage in the near future I would follow the path shown in the *L.A. Law* episode.

Also remember that, although I don't mind Alcor freezing non-members, these patients should be charged extra. Otherwise Alcor will lose money over the long run when unusual situations crop up. It would be much better if Alcor charged an extra 25% for each non-member and put this extra money into a fund to cover the unusual problems that crop up. Alcor MUST do everything possible to build up a large cash reserve. Freezing non-members at normal costs or giving away money to people who need to be frozen are not helpful in this cause.

I have an idea on how to solve your short term cash problem: Allow members to loan you money until Alcor is on solid financial ground. For example, you could create five year notes that would have the provision that they could be redeemed early if Alcor desires. Interest would be paid at redemption time so that Alcor would not be saddled with interest payments until it could afford to pay them. This policy would enable people who are currently building up cash reserves that they will eventually use for their own cryonics treatment to temporarily lend their money to Alcor.

Another possibility would be to raise your annual dues and simultaneously lower the costs of suspension. For example, you might want to have \$500/year dues with \$30,000 neuro and \$80,000 whole body suspensions. Not only would this raise more money in the short term, but it would better fit our spend now, save later society.

On a non fund raising note, I think you should charge "nothing" for the initial paperwork. Of course, one year's dues would have to be submitted in order to get the paperwork to prove that the person is serious. It just sounds better to say you are charging nothing even though you will actually be getting about the same amount of money.

Sincerely,  
Eric Klein  
Chelmsford, MA

*See, however, Mike Darwin's clarification of the matter in the March issue of Cryonics. -- Ed.*



\* \* \*

Dear *Cryonics*,

Al Roca in the February 1990 issue comes up with the amazing conclusion that having a given position on abortion is "irrelevant to cryonics".

This is an example of grossly distorted thinking: in effect it means that "I don't give a damn about someone else's life as long as my own life is preserved."

The so-called "fetal life" is in effect a unique and different human being -- who may also wish someday to be suspended.

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

\* \* \*

Dear Editors:

Rand Simberg's article, "The Frozen Frontier" does much to explain the applications of cryonics to space and space to cryonics. His point about the low frequency of launches driving high launch costs is concisely stated and quite correct. I concur not only as a space enthusiast, but as the Director of Marketing for a small launch services firm with direct knowledge of the industry.

There is another area of space activity which could use technology closely related to cryonics. The development of this related technology could be instrumental in furthering the work of space exploration and the work of cryonicists, and could be a major source of research dollars in the immediate future.

As your readers may know, NASA is currently considering options for human exploration missions to the moon and the planet Mars. In the future, missions to planets beyond Mars may be considered, including missions to the moons of Jupiter and Saturn. In the case of Earth's Moon, a mission takes a mere three days using current technology. For Mars, a trip takes about nine months each way. For Jupiter, trip times extend beyond a year in either direction. Even with improvements in technology, trip times for the outer planets and other stars will be extensive.

One problem which human explorers on long missions will face is degradation due to low gravity. Artificial gravity created by rotating the space vehicle about one axis can be used to alleviate such degradation. Rotating just the crew sleeping quarters or just the crew beds may be another solution. However, even if this problem goes away, there will be another major human factor: boredom.

Even on their three-day trip to the moon, Apollo astronauts noticed the absence of landmarks to give any perception of travel -- the event seemed discontinuous. At one point you are near Earth. After three days of doing the same stuff over and over again, you find yourself near the Moon. Then you have something useful to do again. Now picture a trip 90 times as long to get to Mars.

The technology for cooling subjects to near the freezing point of water and reviving them presently exists. If I understand correctly, certain canine occupants of the Alcor offices have undergone cooling to that temperature and restoration. [To 5°C for four hours. --Ed.] As NASA continues to consider missions to the distant planets, the application of that technology will be increasingly necessary. Research on increasingly complex and finally human subjects will need to be conducted. Alcor's facility and staff have logical qualifications for such research. NASA's Life Sciences Directorate at the NASA Johnson Space Center here in Houston has the research funding.

The benefits to Alcor, besides the direct research dollars and fees charged to NASA, include a better understanding of high temperature cryopreservation perfusates (their toxicity, cancer-causing potential, long-term use, and proper application), a better understanding of recovery of patients from limited cryopreservation, a better understanding of human post-recovery behavior, and greater political, scientific, and social acceptance of cryonics technologies. The development of this area of research will attract more scientists and engineers into the field of low-temperature human preservation, potentially bringing a multiplicity of new perspectives, ideas, and inventions to cryonics.

The space program benefits in obvious ways. Long distance trips will not be as strenuous to space explorers. The psychology of being launched, taking a nap, and waking up at your destination to plunge into work is clearly better than the psychology of getting launched, getting along in cramped quarters with a bunch of other folks, getting stressed out before getting anywhere, and then being plunged into work. It may also be possible that effects of long-term space travel, such as demineralization of the bones and redistribution of body fluids, will not be as advanced in cryopreserved space explorers -- the much slower metabolism of "suspended" explorers may alleviate or eliminate the effects of weightlessness. Even if this is not the case, it is clearly easier to manage a trip with frozen passengers than with live ones: fewer nutrients, less volume for crew quarters, no cooking, no beer, no complex passenger interactions, no exercise, no human errors due to carelessness or emotional upset.

An obvious spinoff of developing this "high-temperature" area of cryonic suspension is in medical transport. Liquid nitrogen temperatures are clearly called for if you are dead and expect to be that way for some time. Long term storage calls for the lowest temperatures that are physically and commercially appropriate. But what if you are just sick or injured but far from medical support? What if you are stable but surgery is not available for some time? What if a large number of patients overwhelms a limited hospital facility? High temperature suspension may be a middle ground, a form of transport through time which could be more easily accomplished with today's technology. Even if such transport only buys a few days rather than years, it could have remarkable applications.

A natural extension of this technology is familiar to readers of Heinlein's *The Door Into Summer*. What if you just want to skip a few years, let your investments cook for a while, step out of the rat race? Suppose "high temperature suspension" bought time for a cancer cure without necessitating your demise? Obviously, this kind of long sleep may not be possible with present or near-term technology. Certainly, the legal and social implications are significant. But, if patients in "high temperature suspension" are not physically or legally dead, and can enter and leave suspension of their own free will, then, by extension, the same can be applied to those in long-term storage, thus alleviating questions of wills, death certificates, perpetuities, and the manifold legal questions surrounding current cryonics technology.

I would be happy to discuss these concepts in more detail with any of your staff or

readers. Please feel free to print my address and phone number.

Sincerely,  
James E. Davidson  
2306 General Colony Drive  
Friendswood, TX 77546-2383  
(713) 334-4212 (W)

To the Editors:

Recently the issue of capital punishment has received some attention in *Cryonics* (Jan. and Feb., 1990). It is an issue of special interest to cryonicists, who are interested in protecting and extending human life. I'd like to contribute some brief thoughts on why, despite arguments to the contrary, I do not favor the death penalty.

In a nutshell, I oppose killing people except when it is necessary to protect other human lives, and I think that the basic aims of criminal justice, in the case of capital punishment, would be better served by another means. These aims are (drawing on a report I did in high school) (1) protecting society from further wrongdoing by the criminal, (2) deterring others from committing the same crimes, and (3) rehabilitating the criminal. Nowhere among them do we see something like "giving the criminal what he deserves for his wrongdoing", "gratifying society's need for revenge" or "getting even with that sonofabitch", which I think many people have at the back of their minds who advocate the death penalty. The revenge motive is a natural one but I don't think it makes a suitable ground for institutionalized killing. Instead we need to think about how the death penalty rates on what I regard as the more legitimate aims of criminal justice as stated above. Clearly it does an admirable job with (1), but, I believe, a very questionable one with (2), and it fails horribly with (3).

Generally in the U.S. capital punishment it is invoked only for particularly heinous acts of murder, involving premeditation, malice aforethought and intelligent planning. People who commit the crimes for which the death penalty is now considered appropriate, are by any reasonable standards, very sick people, even if tests establish that they are "rational", "know the difference between right and wrong", and "knew perfectly well what they were doing". Sometimes the subject may seem perfectly normal most of the time and may in fact have solid accomplishments to his credit. (This was true of Theodore Bundy, a bright young law student who raped and murdered young girls on the side.) It is difficult to take a position defending the lives of such hideous and dangerous misfits, yet I feel this is the right position to take. Mainly this is because I feel so strongly that (1) there is probably some good in even the worst of human beings, and (2) thus the best way to treat any illness is not to destroy the patient, assuming he or she can be spared in a way that will not endanger other human lives. I think sufficiently dangerous individuals should be kept in perpetual confinement rather than killed, pending a better understanding of the causes of their problems and how these problems might be treated. Obviously there are many cases where such people have been wrongly released, and much greater safeguards need to be in place against such mistakes in the future. This I think would be feasible within the present system of correctional facilities, although it would require changes some might be unwilling to make. Since death-row inmates are relatively rare, the per-taxpayer expense of maintaining people like them would be small enough that I don't think it would be a significant burden.

Regarding the "murderer syndrome" as an illness is not just idle speculation on my

part. R. Cowen, for example, writes in *Science News*:

"In a study of convicted male murderers, Markku Linnoila of the National Institute on Alcohol Abuse and Alcoholism, working with colleagues within the federal government and at the University of Helsinki in Finland, have uncovered new data linking the impulsiveness of the murders with chronically low levels of a serotonin breakdown product in cerebrospinal fluid. Men who had committed murder without clear premeditation had the lowest levels of the breakdown product, known as 5-hydroxyindoleacetic acid, or 5-HIAA. In addition, men who had killed more than once had lower levels of 5-HIAA than did one-time murderers."<sup>1</sup>

Although this study mainly relates to non-premeditating murderers, who are less likely to be candidates for execution, it suggests a more general link between socially harmful behavior and identifiable disorders of the brain. In another study J.W. Prescott suggests that violent behavior results from preventable developmental causes such as "failure of intimate physical affectional bonding in the maternal/infant relationship" and "failure of intimate sexual affectional relationships during adolescent and adult development." He adds:

"Extensive scientific research has documented that sensory stimulation (touch and movement) during the formative periods of brain development is absolutely essential for normal growth and development of the brain and behavior. Deprivation of this form of sensory stimulation ... results in abnormal development and function of the brain. Structural damage to brain cells (abnormal dendrites, loss of opiate receptors) and abnormalities of brain function, as reflected in the neurochemical and bioelectrical activity of brain cells depends on the severity of sensory deprivation. Brain abnormalities induced by sensory deprivation account for the consequent abnormal emotional and social behaviors: depression, alienation, anxiety, boredom, hostility, rage.

"... in my cross-cultural studies I have been able to predict with 100% accuracy the violence (killing, torturing, mutilation of enemy captured in warfare) and non-violence of forty-nine primitive cultures distributed throughout the world based upon the two predictor variables: the degree of infant physical affection and whether premarital coitus was permitted or punished."<sup>2</sup>

We do not yet have full understanding of homicidal behavior even in the simpler cases, and may even be far from it, but I think understanding will come. Some cases would no doubt arouse our sympathy if the facts were known better, though perhaps others would not. In any event, I favor regarding even the worst aberrations of the criminal mind as forms of mental illness and trying to treat and cure these problems rather than sacrificing more human life.

#### REFERENCES:

1. Quoted from "Sociopaths, suicide and serotonin", R. Cowen, *Science News* vol. 136, p. 250 (Oct. 14, 1989).
2. Quoted from "The failure of pleasure as a cause of addiction", J.W. Prescott, *Save Our Selves* vol. 2 no. 4 p. 1 (Winter 1989/1990), excerpted from an article in *Truth Seeker* Sept./Oct. 1989.

\* \* \* \* \*

## A FEW THOUGHTS ON THE DEAD ANT HEAP AND OUR MECHANICAL SOCIETY

by Steven B. Harris

*An ant on the table cloth  
Ran into a dormant moth  
Of many times his size.  
He showed not the least surprise.  
His business wasn't with such.  
He gave it scarcely a touch,  
And was off on this duty run.  
Yet if he encountered one  
Of the hive's enquiry squad  
Whose work it is to find out God  
And the nature of time and space.  
He would put him onto the case.  
Ants are a curious race;  
One crossing with hurried tread  
The body of one of their dead  
Isn't given a moment's arrest--  
Seems not even impressed.  
But he no doubt reports to any  
With whom he crosses antennae.  
And they no doubt report  
To the higher up at court.  
Then word goes forth in Formic:  
"Death's come to Jerry McCormic,  
Our selfless forager Jerry.  
Will the special Janizary  
Whose office it is to bury  
The dead of the commissary  
Go bring him home to his people.  
Lay him in state on a sepal.  
Wrap him for shroud in a petal.  
Embalm him with ichor of nettle.  
This is the word of your Queen."  
And presently upon the scene  
Appears a solemn mortician;  
And taking formal position  
With feelers calmly atwiddle  
Seizes the dead by the middle  
And heaving him high in the air,  
Carries him out of there.  
No one stands round to stare.  
It is nobody else's affair.*

*It couldn't be called ungentle.  
But how thoroughly departmental.*

"Departmental"  
by Robert Frost

Ants really do behave in somewhat the way Frost describes, as famous entomologist and ant specialist E.O. Wilson, writing recently in *Discover* magazine (11(3), 44 (Mar, 1990)), reminds us recently. Dead ants in a nest are not treated like other organic matter, but instead identified specifically as dead ants, and deposited in a special dead ant heap. This an example of highly social behavior.

It might be natural to imagine that ants destined for mortuarial services are recognized as such by sight or touch, but this is not the case. Ants are odor-sensitive creatures whose small brains (only a couple of million neurons) force them to respond only to very simple stimuli, and then only in a limited number of ways. Thus, dead ants are identified not by look or feel, but by their smell of decomposition -- in this case an odor conferred by esters of oleic acid. Ants have no intelligence as we understand the term. Anything that smells of oleic acid esters, therefore, will be taken to the dead ant cemetery, no matter what it is. Oleic acid esters painted on a tiny piece of wood will cause it to be treated as a tiny ant corpse. Even a live ant, if painted with oleic acid esters, will be removed by its fellows, still struggling, to the cemetery. Nor will the painted ant be allowed to return to the nest until it has cleaned itself thoroughly. In the meantime, as far as its nestmates are concerned, it is dead.

### *The Problem*

There is the stuff of comedy here. In fact, one major theory of comedy posits that we find human (or in some cases, animal) action funny when the organism, for plausible or natural reasons, is found to be behaving as an automaton. This is the reason why bureaucracies, organizations, and government are ripe for satire. The British seem especially good at humor of this type. The "dead ant joke" will be

recognized in one variation in the movie *Monty Python and the Holy Grail*, in a shtick which has Black Plague victims identified by an over-efficient (i.e., mechanical) society and dragged off to the cemetery, still protesting mildly that they're not quite dead yet.

To cryonicists, of course, not all of this is black comedy; some of it is black reality. In modern human society the dead are identified in rather simple fashion, too. The identification is done by a person in a white coat writing something on a form; but for all the effect this procedure has on social action it might just as well be done by oleic acid esters, for what happens next is that the victim is removed to the equivalent of the dead ant heap. This action is done quite automatically and mechanically, despite the fact that humans are purported to have considerably more than two million neurons. Nor, in this situation, will any amount of kicking and protest by the victim's friends and associates change the societal label of "death" which has been officially affixed to the victim. At most, this sort of fuss may only succeed in calling out the hive's enquiry squad, who will most likely respond to this stimulus by attempting yet again to deal with the victim in the standard way, with a trip to the cemetery. It is all thoroughly departmental.



A live ant which has been odiferously labeled as dead will be dragged back to the dead ant heap for as long as the human experimenter has the heart to keep applying the chemical. One wonders if humans are any more capable of learning than ants in this regard. Juliet is not dead, she just looks that way to Romeo -- but the tragedy of misunderstanding seems forever inevitable. In theory this change is only a matter of attitudes, but the aggravations of trying to enlighten one's society may sometimes be best understood only in the most heroic metaphor. Consider the scene when Jesus is told of the severe illness of Lazarus. "Our friend Lazarus sleepeth," asserts Jesus. His audience is dubious, for Lazarus has been in the tomb four days. "By this time he stinketh," the sister of Lazarus tells Jesus in the King James version. Of oleic acid esters, no doubt. As cryonicists we suddenly gain new insight here as to why Jesus weeps: these are not tears of sadness, but tears of frustration at being stuck in an ant farm.

#### *What Can We Do?*

The philosophy of cryonics is a way of looking at reality which may invite frustration and desperation of the highest order. The question that most concerns us is what can be done about this frustration. Perhaps the world of the entomologist can provide a modest lesson.

The first thing to remember is that bureaucracies behave inflexibly because bureaucracies have no brain, but instead are relatively simple machines operating, like an ant colony, by simple programming rules. Thus, in many cases, the mistreatment which individuals receive at the hands of the social mechanism is entirely impersonal -- as

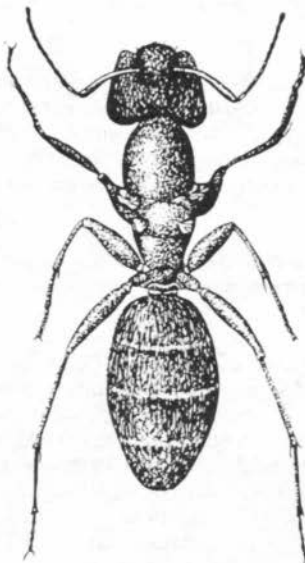


impersonal as the behavior of insects who've gotten the wrong set of chemical cues (readers may recall this theme also strongly played out in another British movie, *Brazil*). Attorneys, through long experience, understand the essentially mechanical and impersonal nature of the legal system. One of the principal shocks which laymen have in coming into contact with the real world of police and correctional work, in fact, is the level of emotional detachment with which most of these functions are actually carried out. The passion which one has been led to expect from TV and movies is quite often simply missing.

All of this can make a difference in the way we, as cryonicists, perceive and deal with legal struggles such as those cryonics has faced over the years. In our personal lives the natural response to social attack is to counterattack or (at least) to withdraw from contact, particularly that in which requests for any help are made. Interestingly, often these are exactly the *wrong* steps to take when "attacked" by a bureaucracy, since this sort of attack may be quite impersonal and without much active malice. Instead, often the most productive course in this situation is to continue talking to the bureaucrats involved, and to put aside one's pride and continue to ask services of the system in ways which are ever more creative. Retaliation and attempts at punitive action, too, are usually ineffective. Rather, just as social insects can be sent down futile paths by manipulating scent trails, manipulation of legal trails can be used to send the other side down blind legal alleys until everyone loses interest.

Of course, none of this is as satisfying as combat, and in the context of our social training it may not feel very natural to do. Amateur sociologist Eric Hoffer talks of the need for True Believers to feel persecuted for righteousness' sake, and to some extent there is little doubt that persecution (or the feeling of it) builds cohesion in organizations. Also, the problem for cryonicists is complicated in that, with little doubt, in some circumstances we actually have been persecuted in the past. We all know that the reaction of individuals to the idea of cryonics proceeds from a very deep (and sometimes very negative) psychological level, and this can make it tempting to assume that *all* of the problems which cryonics has had with the legal system are due to the negative psychological reactions of individuals.

The point of this article, however, is that persecution should be left as a diagnosis of exclusion, while we attempt to solve our problems in other ways. One of the things which socially effective people come to realize sooner or later, is that in adversarial dealings with bureaucracies, individuals gain enormous power by deliberately draining all anger and emotion from each encounter, and spending that energy finding ways to apply for concessions and service. Hard as that may be to do in certain emergency situations, this is a lesson which still remains essential to cryonics. Insect societies provide the metaphor. Whether one is being dragged to the scrap heap because one has been sprayed with the wrong chemical, or because one has not been able to check the correct box on a State of California VS-9 form, it's all pretty much the same mechanical thing. In either case, the problem is an intellectual puzzle, not an act of malice, and the long term answer is not physical or emotional struggle. *Of course* the system that carries out such actions is monumentally brainless. But if we ourselves are not capable of solving the problem by altering some simple programming within that system, then we ourselves will not deserve to be counted much brighter.



May we remember not to personalize simple stupidity. It's a lesson we can learn from the ants.

## CARDIOPULMONARY SUPPORT: EVALUATION AND INTERVENTION

by Mike Darwin

### Introduction

During the last four years Alcor has accumulated a significant amount of data about the effectiveness of CPR in suspension patients. Unfortunately, the indications are that CPR is failing to meet the metabolic needs of most suspension patients.

Even under fairly optimum clinical conditions where an otherwise healthy individual has experienced sudden cardiac arrest, direct measurement of mean arterial pressure (MAP) during *closed chest* CPR has demonstrated MAPs significantly below those known to be compatible with current criteria for cerebral viability (McDonald, J., *Annal. Emerg. Med.*, 11, 292-295 (1982)). Evaluation of cerebral blood flows achieved in *healthy* dogs given CPR following induced ventricular fibrillation has demonstrated cerebral cortical blood flows which are only 19% of those observed prior to cardiac arrest and the initiation of closed chest CPR. By contrast, in the same study open chest CPR was demonstrated to provide cerebral blood flows which were 67% of control (Tatsura, A., et al., *Resuscitation*, 12, 147-154 (1984)).

The typical cryonic suspension patient to whom cardiopulmonary support can be applied is, with few exceptions, almost by definition, one who has experienced a long agonal course in a medical setting. In other words, a patient experiencing a "chronic death" (slow death) as a result of a systemic illness which has impacted a variety of organ systems. There are thus additional reasons why CPR is likely to be inadequate in cryonic suspension patients: atherosclerotic disease, primary or secondary pulmonary disease (metastatic cancer of the lungs, pulmonary edema, chronic obstructive pulmonary disease (COPD), etc.), and septic shock.

A review of resuscitation literature and Alcor's own unique clinical experience has served to expand our understanding of the limits of CPR administered during cryonic suspension.

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

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

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

transport. (Unless pre-existing disease is responsible for their elevation.)

### The Utility Of CPR

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

CPR is still being used in suspension patients because it can be objectively demonstrated by evaluation of markers for injury (such as serum levels of tissue-specific enzymes) and by clinical signs (such as the integrity of the capillary bed during subsequent cryoprotective perfusion and the absence of clotting) that patients supported in this way are in better condition than those who are not.

### Clinical Assessment Of CPR During Transport

The effectiveness of CPR in a given suspension patient can be expected to vary widely depending on the underlying cause of cardiac arrest and the agonal course. A patient dying of septic shock secondary to liver failure from metastatic cancer with complicating pulmonary edema can be expected to benefit far less than a patient who is pronounced legally dead as a result of an arrhythmia in a coronary care unit (followed by a brief and unsuccessful attempt at resuscitation).

Thus, it is of importance that the Transport Technician be able to assess the patient during CPR and arrive at an evaluation of its effectiveness.

### Methods Of Evaluation

The classical methods of evaluating the efficacy of CPR are the presence or absence of the carotid and/or femoral pulse, pupillary status, and skin color. Recent studies suggest that carbon dioxide excretion may be the most sensitive and useful indicator currently available for evaluating the efficacy of CPR (Sanders, A.B., et al., *JAMA*, **262**, 1347 (1989); Gudipati, C.V., et al., *Circulation* **77**, 234-239 (1988)).

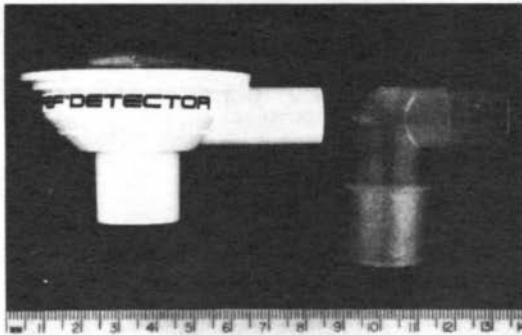
The problem with the use of end-tidal carbon dioxide monitoring (measurement of the CO<sub>2</sub> concentration in the patient's expired air) has been the complexity, high cost, and bulkiness of capnography equipment required to reliably measure end tidal CO<sub>2</sub> in the field.

Early in 1989 Fenem Airway Management Systems began marketing a simple, inexpensive device which uses a sensitive, rapidly responsive chemical indicator to evaluate the carbon dioxide concentration in a patient's expired air during resuscitation or intubation efforts. The FEF end-tidal CO<sub>2</sub> detector is a simple, disposable device which is interposed between the endotracheal tube and the bag-valve unit or the HLR respirator hose. A nontoxic chemical indicator strip displayed beneath a transparent dome on the device detects CO<sub>2</sub> concentration with each breath. The device can measure CO<sub>2</sub>

concentrations from 0.03% to 5% using three separate indicator strips.

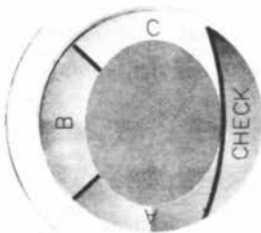
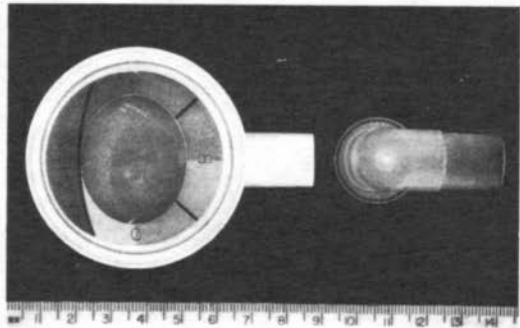


*The FEF Detector in place between a bag-valve respirator and the patient's endotracheal tube.*

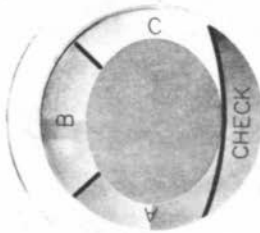


*The FEF end-tidal carbon dioxide detector in profile. A standard anesthetic circuit angle piece is shown for comparison.*

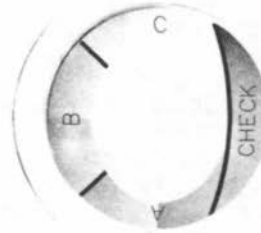
*Top view of the FEF detector, with a standard anesthetic circuit angle piece for comparison. Surrounding the clear window are areas marked CHECK, A, B, and C which represent a color chart of ranges of end-tidal  $CO_2$  from room air (0.03% -- purple-CHECK) to 4% or greater (yellow-C).*



Inspiration



Expiration (low perfusion)



Expiration (normal perfusion)

*$CO_2$  detector indications (original in color).*

### Conditions For Use Of The FEF End-Tidal CO<sub>2</sub> Detector

The FEF Detector should be used from the very beginning of every transport procedure. Not only is the device a useful tool for evaluating the effectiveness (or lack thereof) of CPR, it is useful in determining if the endotracheal tube or Esophageal Gastric Tube Airway (EGTA) has been placed correctly. Accidental intubation of the esophagus with the endotracheal tube, or accidental placement of the EGTA obturator in the trachea will result in failed ventilation and thus in failure of gas exchange (i.e., oxygen will not be delivered to the lungs and carbon dioxide will not be carried away). The FEF Detector will thus show no difference in CO<sub>2</sub> concentration from inspiration to expiration.

The FEF Detector should be kept free of ice bags and should be protected from wetting. Cooling of the device may decrease its responsiveness. Alcor has not yet had the opportunity to evaluate this device either in the field or in the laboratory in order to determine how it will behave in response to induction of hypothermia. Presumably, as the patient cools, CO<sub>2</sub> production will decline and the responsiveness of the device may also be affected as the expired air stream coming from the patient decreases in temperature as well. Until these changes are documented and characterized in the laboratory it will be difficult for the Transport Technician to assess the utility of the device over the time-course of an entire transport.

According to the manufacturer the working life of the FEF Detector in a normal clinical situation is approximately two hours. In practice, many anesthesiologists using the device report that working life can be as long as 4 to 6 hours. In a typical HLR-assisted suspension patient transport, the device may well last 6 to 8 hours.

In any event, it is anticipated that the period of peak utility for the device will be during the first 1 to 2 hours of cardiopulmonary support in order to optimize CPR if possible and document its effectiveness.

### Optimizing CPR Using the FEF Detector

If evaluation of the patient using end-tidal CO<sub>2</sub> indicates inadequate perfusion (end-tidal CO<sub>2</sub> concentration is equal to or less than 0.5%) at the start of CPR, attempts should be made to identify the problem(s) and correct it. The first thing that should be done is to insure that the endotracheal tube (or EGTA obturator) is correctly positioned and that the patient is being adequately ventilated. If adequate chest expansion and gas delivery to the lungs is present, then attention should be given to the patient's hemodynamic status by insuring that the patient is adequately hydrated, and that vascular tone is sufficient to insure adequate perfusion. Keep in mind that transport medications typically will expand the patient's vascular volume by approximately 1.0 - 1.5 liters. Unless the patient is severely dehydrated, this expansion of vascular volume by a liter or more should be sufficient.

If the patient's fluid status is determined to be adequate and end-tidal CO<sub>2</sub> concentrations are still not deemed to be adequate, an attempt should be made to secure adequate perfusion by the administration of pressor drugs to improve vascular tone. Phenylephrine HCl (Neo-Synephrine), 1%, 10 mg/ml should be administered intravenously. Following an initial bolus of 0.5 mg the patient should be observed for a period of 10 minutes to determine if the drug has improved perfusion as indicated by an increase in carbon dioxide concentration in the expired air. If there is no improvement in end-tidal CO<sub>2</sub>, a repeated bolus of medication should be given.

If the patient does show a positive response to phenylephrine, an IV drip of the

medication should be established to provide on-going pressor support. Keep in mind that the half-life of phenylephrine under normothermic conditions is approximately 15 minutes. Hypothermia will decrease responsiveness to the medication and prolong its duration of effect by decreasing its rate of metabolism.

### Clinical Methods

All three of the clinical (i.e., those not requiring special measuring equipment) methods of patient assessment listed under "Methods Of Evaluation" should be used by the Transport Technician. However, three caveats apply:

- 1) The presence of a carotid and/or femoral pulse is a *necessary but not sufficient* sign of adequate CPR. CPR may be effective at generating a palpable pulse, but the duration of the high pressure wave (the MAP) and the pressure on the venous side of the circulatory system (which is markedly elevated during closed chest CPR) determine *actual blood flow*. Thus, it may be possible to have a peak arterial pressure of 160 mmHg (normal is 120 mmHg) and still have almost no blood flow since the *time* spent at this pressure may be very short and the venous pressure may be markedly elevated.
- 2) Reactivity of the pupils to light is unlikely to return during closed chest CPR, even when administered to patients who have suffered cardiac arrest without associated complicating pathologies. In most cases CPR is simply not effective enough in meeting cerebral metabolic demands to allow for recovery of pupillary reactivity. In addition, the administration of potassium chloride and high doses of barbiturates will also result in pupils which are fixed in mid-position.
- 3) Of the three clinical signs, skin color is probably the most reliable since a return of color to skin and mucosa indicates delivery of oxygen-saturated blood, at least to those tissues. However, this sign may also be misleading since the skin will be the first to cool and thus experience reduced metabolic demands (reflected by a failure of even the very poor flow of oxygenated blood being delivered by CPR to be de-saturated). However, it is still useful to note a return of color, even if it occurs late in CPR and external cooling since it is indicative of the delivery of *some* oxygenated blood to the tissues.

Despite the limitations discussed above, careful note-taking documenting these clinical signs in the patient's transport record is of importance.

### Other Clinical Signs

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

*Pulmonary edema* may be a pre-existing condition in the patient. However, regardless of whether some degree of pulmonary edema preceded transport, pulmonary edema occurs frequently and with rapid onset (<30 minutes) of the start of closed chest CPR. The reason for this is that closed chest CPR results in high intrathoracic pressures with



intra-cardiac pressures generated on the down-stroke being equal in all four chambers of the heart. The combination of low cardiac output and high pulmonary venous pressure is a recipe for pulmonary edema. Research has documented the rapid development of pulmonary edema and resultant poor gas exchange in humans receiving close chest CPR (Ornato, et al., *Crit. Care Med.*, 11, 79-82 (1983)). One study which examined 2228 unsuccessfully resuscitated cases of prehospital cardiac arrest documented a 46% incidence of pulmonary edema at autopsy (Nagel, E.L., et al., *Crit. Care Med.*, 9, 424 (1981)).

The Transport Technician should thus be alert to the development of clinical signs of pulmonary edema such as gurgling noises during ventilation, or the presence of a pulmonary exudate (usually blood-tinged -- i.e., light pink in color) welling up in the endotracheal tube or in the mask of the EGTA. Frequent auscultation of the patient's chest during transport is recommended so that the development of pulmonary edema can be determined as soon as possible and documented in the patient's record. The development of rales (abnormal breathing sounds) before the presence of pulmonary exudate is noted in the endotracheal tube also offers the possibility of intervention with aggressive suctioning thus protecting what little gas exchange capability that may remain.

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

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

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

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

If it occurs, it is important to note the presence of gastric hemorrhage as evidenced by dark blood with or without stomach contents leaking from the mouth or the gastric tube. Filling of the stomach with blood (as evidenced by oral leakage) is indicative of the loss of a significant volume of blood and the probable total compromise of CPR.

#### Laboratory Methods

A variety of laboratory methods are available to evaluate the effectiveness of CPR in meeting the patient's metabolic demands. Some of these, such as measurement of serum lactate and tissue specific enzyme levels cannot be applied in the field. Nevertheless, they are relevant to the transport technician in that subsequent evaluation of these markers for injury will *not* be possible unless blood samples are collected at regular intervals during the transport procedure.

As data from previous suspensions indicates, blood glucose becomes very low during sustained CPR. This probably occurs as a direct result of the ineffectiveness of CPR in meeting the patient's metabolic demands. Under normal circumstances the liver and pancreas regulate the concentration of blood glucose. Low blood glucose during CPR is almost certainly a result of failure of the liver to produce glucose (due to inadequate hepatic perfusion) and of the consumption of available glucose stores by anaerobic metabolism (also as a result of inadequate perfusion).

Regardless of the cause, blood glucose levels in the 19 to 25 mg/dL range (60 - 70 mg/dL is normal) are cause for serious concern whether or not they are directly indicative of the inadequacy of CPR. Fortunately, blood glucose may be simply and reliably measured in the field using any of a variety of reagent strips and a whole blood sample collected from the patient.

### Adjustment of the Patient's Blood Glucose

If the patient's blood glucose is below 60 mg/dL, intervention to raise it is indicated. Typically, each 50 cc of 50% glucose (dextrose) will raise the blood sugar of the average 72 kg man by 100 mg/dL. Thus, each 1 cc of 50% glucose will increase the patient's blood sugar by 2 mg/dL. The dose in cc's of 50% glucose administered should thus be determined by subtracting the patient's measured blood glucose from the desired blood glucose and dividing by 2, thus:

$$\text{Dose 50\% glucose (ml)} = (\text{req. glucose (mg/dL)} - \text{meas. glucose (mg/dL)}) \div 2$$

Once the dosage of glucose has been calculated and drawn up it should be administered by IV infusion using the flash bulb or medication addition port on the IV set.

Fifteen minutes following the administration of glucose, the patient's blood glucose should be re-evaluated and additional glucose administered as indicated. *It is important not to overshoot and increase blood glucose significantly above 70 mg/dL, as elevated levels of blood glucose during CPR are associated with increased cerebral injury.*

\* \* \* \* \*

## DEATH ON VACATION

review by Kevin Q. Brown

One of the greatest risks for a cryonicist is the possibility of not getting cryonically suspended quickly after clinical death (lack of respiration and heart beat). Even people located near their cryonics facility who are suffering from a terminal illness may have their wishes thwarted by local hospital administrators or government officials. People visiting or living in another state or (worse) another country face even greater logistic and legal challenges to ensure a prompt suspension, should it be needed. The Aug. 1989 issue of *International Living* had an article of interest to cryonicists visiting or living outside the United States. "Death Takes A Holiday", by Carol and Dan Thalimer was, of course, not written with cryonicists in mind, but the delays and red tape described below do give a cryonicist food for thought.

If you are planning to live or travel abroad, decide in advance what you want done if you or family member dies outside the United States. Have a will drawn up and make custody plans for your children. Decide what you want done with your body. Do you want it buried locally, cremated, donated to science, or shipped home? Put your wishes in writing, leave a copy of the document with a family member at home, and carry another copy with you. Make no plans that are time-critical, because you can't know how long all the formalities and red tape will take. Assume that it will be at least 10 days before the body is shipped home.

Local laws and customs must be considered when you make your plans. (The U.S. consulate is a good place to ask about these considerations.) Few countries require that a body be embalmed. Many religions and some countries require that a body be interred within 24 hours of death. Most Moslems believe that after a person dies, his body has no significance. The custom is to bury it before nightfall.

There are, for example, only a few places in Saudia Arabia where a body can be embalmed. However, U.S. law requires that a body be embalmed before it can be returned to the United States. Returning a body from Saudia Arabia to the United States is an exercise in logistics and diplomacy.

#### *Some Cases In Point*

Pat Reiley is the director of human recourses for Lumus Crest, a U.S. engineering firm employing Americans in Persian Gulf countries. During his tenure, Reiley has been responsible for returning several bodies to the United States.

In one case, an American was killed in an automobile accident. The body was taken to a local morgue for examination, and a death certificate was issued by the Saudi government. Reiley, acting as representative for the family, had a certified translation made of the certificate for the U.S. authorities. He arranged for the body to be embalmed, got an official U.S. death certificate from the consulate, and contacted the airline to make arrangements for shipment. Reiley and an embassy official witnessed the body being placed in a steel casket, which was then welded shut. The U.S. Embassy issued a certificate stating that the body alone was sealed in the coffin, and a customs clearance was obtained. The airline made cargo space available on a commercial flight. Reiley and a family member took the same flight to the United States to ensure that the coffin was transferred at each stop. Upon arrival in the United States, the sealed coffin was cleared through customs and then released to the mortuary for services and burial. The seal on the coffin could not be broken.

Returning a body to the United States can be costly. Shipment of a coffin as freight can cost \$4,000 or more. And you must add the cost of an airline ticket for the person accompanying the body.

In another case handled by Reiley, the family of the deceased wanted the remains cremated in England and the ashes returned to the United States. As in Saudia Arabia, the body was taken to a local morgue, and a death certificate was issued. However, the British do not require that a body be embalmed. Neither is it required that an embassy official be present when the coffin is sealed. After the body was cremated, the ashes were sealed in an urn, which was shipped to the United States. No one was required to accompany the ashes.

In a third case, the individual died as a result of a fall from a second story window. Local authorities would not release the body until the cause of death was established. Because there was the possibility of foul play, the investigation took almost a month.

In each of these cases, the company employing the deceased helped with the arrangements. However, if you are not working for a U.S. company overseas but are traveling on your own, the responsibility falls on you. In this case, contact the Center for Emergency Services at the local U.S. consulate for help.

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## THE EMPEROR'S NEW MIND

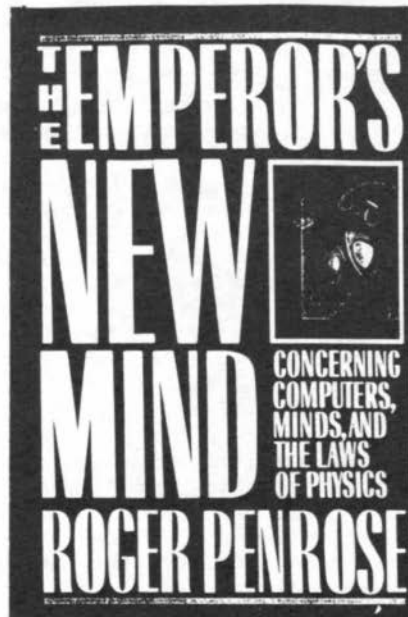
book review by Brian Wovk

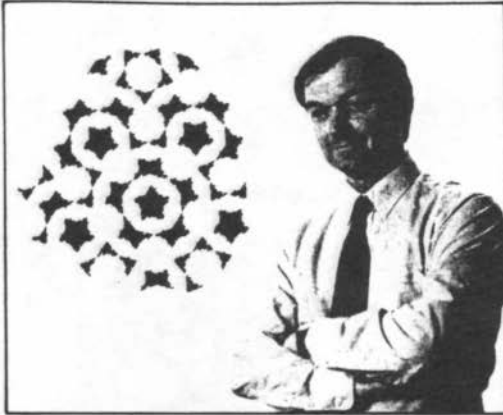
*The Emperor's New Mind* (Oxford University Press, 1989) is British physicist Roger Penrose's new book on the physical basis of intelligence and consciousness.

It seems several years ago Penrose became upset while watching a BBC TV program dealing with the subject of artificial intelligence (AI). He was disturbed by the extreme opinions voiced by advocates of so-called "Strong AI". Strong AI is the theory that all attributes of the human mind, including intelligence and consciousness, can be reduced to a machine-encodable algorithm, and indeed run on a machine. In other words, Strong AI is the belief that computers will one day be as intelligent and conscious as human beings, and, conversely, that human minds can be faithfully transferred from natural brains to artificial brains. (The latter idea is the basis of the "downloading" school of immortality, whose proponents include luminaries such as Marvin Minsky and Hans Moravec.)

The concept of a mere algorithmic machine emulating a human mind disturbed Penrose so much he wrote book about it. *The Emperor's New Mind* is a wide ranging tour of many of the most interesting ideas in mathematics, physics, and neuroscience today. In fact the bulk of the book is not even directly concerned with his thesis, which is that Strong AI is an "emperor with no clothes."

Penrose argues that there are aspects of human intelligence that could never be implemented in a rule-based algorithm, serial, parallel, or neural net approaches notwithstanding. (He correctly points out what many AI thinkers forget: All parallel and neural net algorithms can in principle be reduced to equivalent serial algorithms.) The core of his argument is related to the infamous theorem of Kurt Godel. In 1931 Godel subjected the mathematical world to a shock from which it still hasn't recovered when he proved axiom systems can contain truths unprovable from within the axiom systems. Penrose seizes on this fact as evidence that the human mind cannot operate algorithmically. How can a rule-based system see truths not derivable from





axioms? To support this thesis, Penrose necessarily outlines a possible non-deterministic quantum model for the physical operation of the human brain.

On balance Penrose's book is a very good one. He is a skilled writer and is able to communicate complex philosophical and technical ideas with uncommon clarity. His book is worth reading and owning even for just its factual content. I believe, however, that his central thesis is arbitrary and exhibits several philosophical blind spots.

To begin with, I don't believe Penrose adequately distinguishes between intelligence

and consciousness. He acknowledges that they are distinct, but insists that a truly intelligent entity would necessarily be both conscious and non-algorithmic. This is not obvious to me. Also, his reliance on Godel's result is quite hand-waving and does not adequately address the issue that brains thinking about mathematics surely employ unconscious axiom systems far exceeding the scope of those in the mathematical system being contemplated.

I believe that the book's biggest flaw, though, is the irritating vitalism that seems to pervade it. There is frequent reference to things that "machines cannot do" and "machines will never do", with little recognition of the fact the our brains are machines. Even if they are not algorithmic machines, they are still made of atoms and molecules, and will always be amenable to alterations and emulations of various sorts. Indeed, even if Penrose's ideas are absolutely right, they will have no deep consequences for AI, "uploading", cryonics, or technology in general.

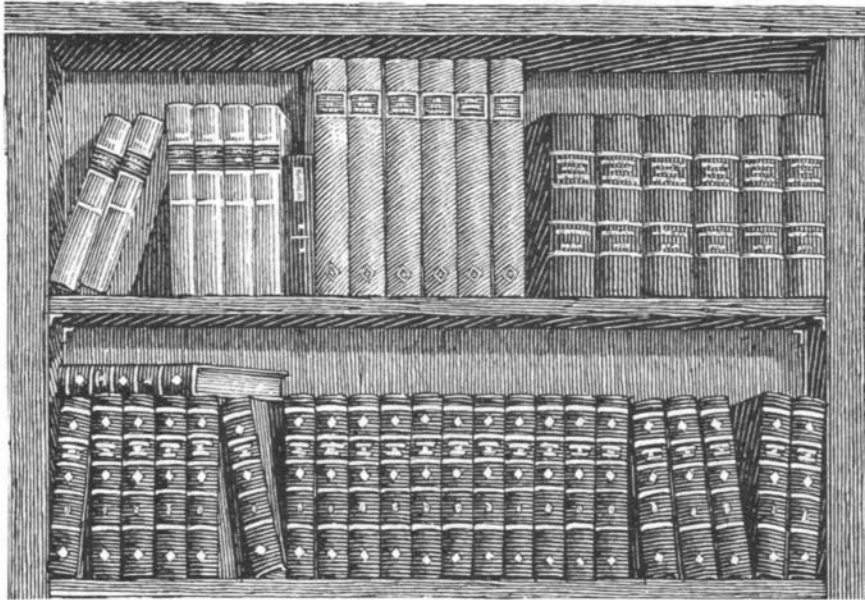
*The Emperor's New Mind* is a counterproductive book inasmuch as it will reinforce the false brain/machine dichotomy that already exists in our culture. In cryonics we rely heavily on the concept that the brain is a machine which can be turned off, turned on, and repaired -- and rightly so. Biostasis and cell repair are valid concepts independent of the actual details by which the brain thinks.

The same is true for "uploading". If it turns out that only a certain kind of non-algorithmic machine can support consciousness, then people will only upload into machines of this kind. That doesn't mean there is no room for improvement. In the same way that our brains are more advanced than those of lower animals, 22nd century non-algorithmic "Penrose brains" (if they are what is required for consciousness) will be much more advanced than ours today.

And what about AI? Clearly Penrose's book says nothing about the feasibility of true AI, only about the means for achieving it. If AI designers must use molecular technology to build non-algorithmic, conscious machines modelled after the human brain to achieve their goal -- then they will. The end result will be intelligent conscious machines -- like ourselves -- which is what they (and we) expected all along.

\* \* \* \* \*





## SUPERSTITION AND SCIENCE

book review by Thomas Donaldson

Sometimes on reading a book either about change or the past I stop and wish that I had someone aged 96 nearby, still mentally clear, so that I could stop and ask them seriously: was it really like this? Is that what people really thought and how they behaved? Unfortunately such people are currently far too scarce. (And perhaps if everyone lived as long or longer the concept of "history" would change!).

The need to ask this question came over me often while reading J.C. Burnham's book *How Superstition Won And Science Lost* (Rutgers U Press, 1988). Burnham talks of spans of time which some very old people living now might just remember. His book concerns the popularization of science, and public attitudes to science in America, from the 19th Century to the present. It's not just a tract or puffery either, because Burnham is careful with his history, citing accounts of those who were actually *there*. (This is very important because myths about the past are so common).

Burnham is quite serious about the victory of superstition. Moreover he makes (to me, born in 1944 with no personal experience of what happened before) an excellent case. **SUPERSTITION HAS TRIUMPHED.** But to understand his case we also need to understand what he means by superstition. He doesn't mean what many might first think; but after reflection many cryonicists should agree that his definition is good.

Anthropologists, faced with peoples all over the world with widely disparate myths and ideas, have realized that we cannot define "superstition" in terms of *content*. Possible human beliefs cover too much territory. Therefore any definition of superstition applicable to more than a single group at a single time looks not at the specific content of the beliefs, but at the *attitude of the believer towards them*. Beliefs are superstitions if held with unquestioning passive awe. They are superstitions if held because some proper Authority has blessed them with Truth. They are not superstitions if



held with skepticism, questioning, and personal independent examination.

Naturally this definition leads to some paradoxes. Some New Guinea "natives" devoid of Western schooling may easily turn out far less superstitious than some modern hackers immersed in computers, aircraft, all the objects of modern life. Those hackers may very well despise the native for his foolish belief in witch doctors. Yet the natives had no other ideas to furnish their minds. Attitude, not content, is most important.

(Did you know that anthropologists in the 50's took surveys of "natives" and found that well over half *did not* believe in sorcery? And thought its practitioners were foolish old men! They did, however, have many beliefs about human physiology and medicine, not to mention physics, which we would think are wrong.)

To begin, therefore, with analysis of the triumph of superstition, Burnham looks at popularization of medicine and science in the 19th Century. One major difference between then and now lay in the constant attention of quite prominent scientists and doctors to public education. James Clerk Maxwell did not hide in his laboratory while he was working out electromagnetism. He was constantly giving public lectures on it. Not only public lectures, but public lectures to *factory employees* and *workmen!* That means: not just to the "educated" public, but to the Public. You know, the Great Unwashed Masses. At these lectures he would not just hand the Public lots of equations, either. He would show them, performing his experiments (only just performed for the first time) in front of an audience of the Public.

In modern terms, imagine Stephen Hawking coming out in his wheelchair (with computerized translation aids, since he finds it hard to speak now) to speak to an audience of Rock Fans. After Madonna, folks, we'll give you Stephen Hawking, to tell you about the nature of space and time. But not only that: these rock fans would be quiet, patient, fascinated, and appreciative of what Stephen Hawking had to say.

Burnham has quite a good case that things have changed a lot since then, and for the worse. Most popularization of science and medicine has passed from the scientists themselves into the hands of journalists. Even the journal *Science* has most of its news articles written by reporters, not scientists themselves. (Anyone interested can read *Nature*, where working scientists do this writing. The difference is very clear). By now reporting consists very much of reciting Wonders and Marvels, all as stated by Authorities. Furthermore, many famous scientists, having acquired hieratic robes with their PhD, will comment on issues far outside their specialty to interested journalists. Their comments will appear as News the next day.

If most people only had an attitude to science which saw it as a source of Wonders and Marvels that passeth all understanding, that wouldn't matter so much. Yet the attitude to Authority becomes dangerous: people argue by incantation of Names rather than by understanding. How often, nowadays, do people argue a question not by arguing out the facts, but by assembling lists of Magic Names, which they almost chant to one another? My Authorities are better than your Authorities! I am sorry to say that such ideas have even infiltrated cryonics itself. Our pamphlets too have started to incant Magic Names (Arthur C. Clarke! Hans Moravec!...). Yet success of cryonics for those who choose it depends and will always solely on correct perception of the world. That is, on facts not superstition.

Scientists still do write books for public consumption. These turn out very mixed. Some are very good (I will cite *The Anthropic Cosmological Principle* as one such). People may not have listened so widely if the author had been someone obscure, but these books had something to say. Others (Penrose, Davies) clearly stand out as examples of an

Authority trying to make money from his own Name. I think that Burnham may have overstated his case. But still, he points to a problem.

His book also has interesting tales to tell of how we got where we are today. Kellogg didn't just invent a cereal. He was a physician and major crusader for American public health in the 19th Century. Many early American teaching materials crusading for public health were so good (in explanation both of health and science) they were pirated in England. Subtly, at the beginning of the 20th Century, the emphasis changed to behavior alone, not to any understanding of why and how these things might work. In 1935 one health educator, D.H. Armstrong, raised questions about the experimental foundation of many of the Health Rules promoted by these educators. It was the 1930's when newspapermen, not professional scientists and medical researchers, began to take over health reporting. Actual scientists almost disappeared in journalism.

Burnham gives other such histories. One interesting fact is that decline into superstition happened later for astronomy and physics than for medicine: serious reporting of astronomy or physics peaked in the 1930s. Yet by the 1960s much environmental reporting (which passed for science reporting) grew actively hostile, even to scientific methods. Another interesting story suggesting a change is the history of *Scientific American*. Before 1948 it was much more popular, addressing people at a lower technical level, and called the *Scientific Monthly*. Afterwards it changed to something much more high-brow, popularizing science not to people in general but to people connected with other scientific disciplines, almost all of them highly educated. When it changed one disappointed subscriber wrote: "You have ruined the finest hobby and shop magazine in the world".

Just as in medicine, science reporting for general science turned from serious descriptions of principles by scientists into recitation of Wonderful Facts by journalists. Much more seriously, debate on public issues needing science to decide them has turned from attention to principles and facts into incantations of Authoritative Magic Names.

If most people have no real understanding of science, but have done no more than amass a collection of Wonderful Facts, then we can't expect public judgment of scientific or medical issues to work out at all well. Whether Authorities like the FDA and the AMA have tried to make a compliant superstitious public, or else public lack of understanding begat the FDA and the AMA, Burnham (nor I) have nothing firm to say. Science and medicine have withdrawn into their private Temples. Their words need interpretation by a bureaucracy.

My own personal suspicion is that the Authorities came first, then tried to create a slavish attitude to themselves. And in medicine at least, these Authorities consisted of state power protecting the Sacred from the Profane. It's hardly reassuring that atomic energy has expanded that entire hieratic apparatus into physics itself, J.C. Maxwell's joy. We can detect signs that molecular biology and nanotechnology will receive the same fate.

For cryonicists this is hardly a good situation. Cryonics may exemplify one aspect of this hieratic, superstitious approach: if you want to slow down new insights or progress, it's just what you want. If you can only practice medicine as a member of a select group of Doctors, then admission to that group (even if it began as the purest test of competence) can slowly grow into test of Correct Belief. Heretics are thrown out or never allowed in. The Public is told: "See how we vigorously protect you from the ignorant and fraudulent? Trust us." Some cryonicists may see quite particular bite in these thoughts now.

If money, support, and acclaim come from the Authorities, they come from social arrangements rather than brute fact. Hence, in parallel with this growth of superstition and Authority, comes one more practice: deliberate falsification of scientific results. Maxwell could not have falsified his results even if he wanted: he made his experiments in public to a packed hall. Yet how many stories circulate now about fraud in science? Fraud isn't *possible* without Authorities to be deceived.

These Authorities then, to protect their good name, therefore establish offices to enforce Good Conduct among the Priests. (The NIH has already been trying to set up rules and officers to enforce these rules for Good Conduct among scientists doing any Federally funded research). These Rules and Officers make it that much harder to do research rather than bureaucratic procedures.

Furthermore, with Authorities comes the possibility of Heresy. Since they feed on it, the Authorities find they cannot stamp out Heresy no matter how hard they try. (It's like Law. Crime cannot exist without Law.) Cryonics may very well show something quite serious and interesting: that Heresy has started to organize, to do its own experiments and carry out its own exploration of the Universe, come what may. And this Heresy may remain for many years Proscribed. Suppose we revive someone from suspension. Does that mean we will automatically receive a hearing? No! That patient was exceptional, suspended with modern techniques, with a condition we can cure now easily. All of those others, anyone wanting suspension now for Officially Incurable Illnesses -- they believe foolishly in a heretic science.

No trend goes on forever. It's possible to work within restrictions and even as a heretic. And even if some ideas become totally suppressed, change and progress cut off, as in the Roman Empire, barbarian lands still exist, either inside or outside. No society can resist Fact forever. After all, just like skepticism and independence, Authority floats on Facts, which do not care what attitudes or social arrangements we may choose, seeping into them all, either to dissolve them or strengthen them.

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## MEETING SCHEDULES

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

# ALCOR

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The MAY meeting will be at the home of:

(SUN, 6 MAY, 1990)      Saul Kent and Jo Ann Martin  
16280 Whispering Spur  
Riverside, CA

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

This meeting will be the same weekend (May 4-6) as the *Reanimation Conference* at the Clarion Hotel, Ontario Airport, Ontario, CA.

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The JUNE meeting will be at the home of:

(SUN, 3 JUN, 1990)      Brenda Peters  
8150 Rhea  
Reseda, CA

DIRECTIONS: Take the San Diego Freeway (Interstate 405) north into the San Fernando Valley, to Roscoe Blvd. Go west (left) on Roscoe 3-4 miles. Rhea is 2 blocks past Reseda Blvd. Turn south (left) on Rhea, which has a geodesic dome church on the corner. 8150 is the second house in the second block, on the left.

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The JULY meeting will be at Dave and Trudy Pizer's, in Wrightwood, CA, concurrent with the Venturist's *Cryonics Conference*

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Alcor members in the San Francisco Bay area have formed an Alcor chapter, and are aggressively pursuing an improved rescue and suspension capability in that area. Meetings are generally held on the second Sunday of the month, at 4 PM. Meeting locations can be obtained by calling the chapter's Secretary-Treasurer, Thomas Donaldson, at (408) 732-4234 (home), or at work, (415) 593-3200 (ask for Thomas Donaldson).

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The MAY meeting will be held at the home of:

(SUN, 13 MAY, 1990)      Roy Yowell  
12 Skyline Crest  
Monterey, CA

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The JUNE meeting will be held at the home of:

(SUN, 10 JUN, 1990)      Keith Henson and Arel Lucas  
 1794 Cardel Way  
 San Jose, CA

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The New York Cryonics Discussion Group of Alcor meets on the the third Saturday of each month at 6:30 PM, at 72nd Street Studios. The address is 131 West 72nd Street (New York), between Columbus and Broadway. Ask for the Alcor group. Subway stop: 72nd Street, on the 1, 2, or 3 trains.

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The meeting dates are as follows:

APRIL 21             MAY 19             JUNE 16             JULY 21

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If you live in the New York, Philadelphia, New Jersey, or Boston areas and would like to participate in the rebirth of New York cryonics please contact one or more of the following people:

Gerard Arthus             (516) 474-2949  
 Curtis Henderson         (516) 589-4256

\*                     \*                     \*

## CALENDAR: Other Events Of Interest

- The Reanimation Foundation will hold a *Reanimation Conference* May 4-6 at the *Clarion Hotel* at Ontario Airport, Ontario, CA. See the February, 1990 *Cryonics*, or call 800-841-5433 for details.
- Alcor will be present at the *Space Development Conference*, Memorial Day weekend in Los Angeles. Call Alcor for details. Volunteers are also needed to man our exhibit.
- A July 4 Cryonics Festival sponsored by the Venturists will be held at the Mountain View Lodge in Wrightwood, California. The weekend features outdoor activities, speakers from Alcor and the American Cryonics Society and noted science fiction author Gregory Benford. For information contact *The Venturists*, P.O. Box 458, Wrightwood, California 92397, phone (619) 249-3553.
- There will be a *European Cryonics Conference* October 26-29 at Gatwick Airport (London). This will include a tour of Alcor, U.K.'s new facility. See this issue of *Cryonics* for details and contact Saul Kent at 16280 Whispering Spur, Riverside, CA 92503; USA for additional information.

ALCOR LIFE EXTENSION FOUNDATION  
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