

CRYONICS

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EDITORIAL MATTERS

In the January issue of CRYONICS we neglected to mention that Corey Noble is a pseudonym. Also, in this and all issues of CRYONICS, Mike Darwin is a pseudonym for Michael Federowicz.

The deadline for letters of comment on "The High Cost of Cryonics" is April 15, 1982.

Please note that the individual subscription rate to CRYONICS is now \$15 per year. No subscriptions will be issued at the previous rate. Also, we caution against sending cash in the mail; in addition to the obvious risk, we find checks and money orders simpler to process and document.

THE GOOD NEWS

The cover of the January 18 issue of MEDICAL WORLD NEWS boldly proclaims, "Calcium Blockers Given After CPR May Save Brains Denied Blood up to an Hour." The first paragraph of the article neatly sums up the good news: "There's mounting excitement among emergency physicians that calcium blockers may avert neurological loss in persons 'clinically dead' up to an hour before successful cardiopulmonary resuscitation."

The article goes on to detail the recent work of Dr. Blaine C. White, associate chief of emergency medicine at Detroit Receiving Hospital. Dr. White addressed the American College of Emergency Physicians in New Orleans in December 1981 and reported on a number of clinical cases where there were periods of normothermic cardiac arrest in excess of one hour with

successful resuscitation and no neurological deficit. Dr. White has been using calcium blocking drugs such as the recently approved Verapamil, and flunarazine and lidoflazine, which as still classified as experimental. These drugs have the ability to prevent the migration of calcium into the tunica media, the muscular wall of the brain arteries, as well as into the endothelial cells, the cells lining the capillaries. If calcium is allowed to enter these cells in high concentrations, contraction of the muscle fibers occurs with resultant occlusion or constriction of the brain's blood vessels. This phenomenon has been called the "no reflow" effect because even if the heart and other vital systems are restored to good function, blood cannot reach the brain. Additionally, the influx of calcium into the endothelial cells lining the capillaries causes an increase in their permeability to other ions such as sodium, which results in cell swelling and occlusion of the capillaries, thus effectively preventing resumption of blood flow. Reduction of cerebral vascular resistance by calcium blockers may also increase ATP levels and facilitate metabolic recovery and return to normal ATP levels. It is also possible that normalization of depleted ATP levels may be the result of a direct action of the drugs at the level of the mitochondria. White reported that even relatively weak calcium blockers such as magnesium sulfate are effective CLINICALLY.

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Perhaps the most dramatic aspect of White's presentation was the case histories he gave. There was one of a Detroit gang leader who had been stabbed in the heart and aorta, bled out completely, and was brought to a hospital emergency room. From the ER he was taken to surgery where the wounds were closed, blood and Ringer's solution given, and the heart restarted 50 minutes after his arrival in full cardiac arrest. The young man walked out of the hospital 6 weeks later with his only neurological deficit being weakness in his left hand, which was eventually resolved completely with physical therapy. Other cases were presented which were equally dramatic.

Perhaps the most startling thing about Dr. White's protocol is its simplicity. In most cases he gives a single calcium blocking agent in conjunction with dexamethasone, a powerful steroid which is known to minimize brain swelling.

Obviously such developments will surprise few long term cryonicists. We've been saying this was possible for YEARS. In fact, Dr. White's inspiration was the work of Hossman and Sato, which cryonicists have been citing as evidence for brain viability beyond the commonly held 4 to 6 minutes for over ten years! This is clearly good news!

#### AND THE BAD NEWS

I waved the above article at Thomas Donaldson during his recent visit to California. "Have you seen this?" I said excitedly. "My God, they're doing it! They're bring people back alive and well after an hour of ischemia!"

Donaldson paused and smiled. "So now it will be the 'golden hour' instead of the 'golden five minutes,'" he responded, and then laughed loudly. "Nothing will change," he said. "They'll still be saying, 'Poor, poor man, we tried but we just didn't get to him in time. It had been too long -- it was three hours or two hours or whatever.' The physicians will sagely nod their heads and intone 'the golden hour is gone, this patient is irreversibly brain dead.' Mercifully a few more people will live who would not have if it wasn't the 'golden hour' instead of the 'golden five minutes' and that is no small thing to be thankful for. But don't expect any big change in people's attitudes."

I realized that Donaldson was right. Sure enough, it even says so right in the article: "Preliminary evidence is that these drugs, normally used to prevent coronary spasm, can extend brain survival from a few minutes to perhaps a 'golden hour.'" It seems things have changed little from the days of Kitty Hawk when townspeople would answer queries about those things flying around in the sky with the admonition: "It's just those crazy Wright Boys thinkin' they can fly." Just like them we know we can fly. What we must learn is that it is often too much to expect the rest of the world to know too, even when we tell them, or even when we fly. MD

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"Between Man and every great and noble venture stand a million mediocre minds."

-- Albert Einstein

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REMOTE STANDBY INSURANCE AVAILABLE!

Art Quaife

Trans Time has emergency responsibility for 102 Suspension Members of the various non-profit cryonics societies. In the event of their deanimation, we are called upon to do all in our power to place them in suspension. But -- this responsibility does not begin until legal death.

Remote Standby Service

If you are signed up with Trans Time for this service and find yourself in a life-threatening situation, and emergency circumstances do not permit your transport to Southern California (Cryovita Laboratories), we will fly a suspension team and equipment to your remote location, prepared to render service there is and when deanimation occurs.

The cost of this service is as follows:

Personnel from Trans Time or Cryovita traveling more than 125 from the center of San Francisco or Los Angeles:

\$ 20.00/hour/person first 3 days, minimum of \$200.00/day/person.

\$ 10.00/hour/person after third day (continuous standby).

Air and land transportation:

At our cost or at charges billed to us, plus 20% markup to cover personnel involved at our home office.

We now have nine trunks of Remote Standby supplies packed and ready to fly, along with a large temperature chest, a heart-lung respirator, and other miscellaneous equipment. This makes transportation charges quite substantial. For example, to conduct a Remote Standby in New York:

Team Time	Estimated Cost
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Two person team, four day door to door	\$2,800
Transportation	\$2,900

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	\$5,700
Four person team, seven days door to door	\$6,000
Transportation	\$3,700
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	\$9,700

Charges to other East Coast cities will be similar. Locations closer to California would have lower transportation charges, but the personnel charges remain the same.

This is quite expensive, and most persons will not readily have the funds available to pay for such a service. But having a Standby team on hand would permit immediate heart-lung resuscitation and cooling, injection of anticoagulants, buffers, and other pharmaceuticals to maintain the patient in a stable physiological state (see "Case Study in Neuropreservation," Leaf and Quaife, November 1981 CRYONICS for further details of what procedures are followed in such an "ideal" situation). The alternative to having a team at hand will likely be no heart-lung resuscitation, long delays before cooling begins, acidosis, and blood coagulation which interferes with later perfusion.

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In offering this service, Trans Time will be dependent upon other institutions such as airlines, hospital administrations, governmental agencies, etc. We will also need a cooperating mortician at your location, who would allow us the use of his preparation room to carry out suspension, and help arrange subsequent air shipment, in the event of your deanimation. Locating a cooperating mortician in advance will be your responsibility. Of course we can always try to find one on the spur of the moment, but with certain delays and uncertain success.

#### Remote Standby Insurance

Note that your life insurance, or other funding you have provided for suspension, will not cover this service. The desired outcome of any Remote Standby is that you live, in which case your life insurance does not come into force. But through the energetic efforts of Dr. Thomas Donaldson, our Vice President of Australian Operations, there is now a group policy available that covers many of the situations in which Remote Standby would be called for. This insurance policy is written by Crawley Warren & Co., a Lloyd's of London broker.

You may apply for one, two, or three years of coverage, with between \$2,500 and \$10,000 of coverage. The premium (payment for the insurance) is 2% of the face coverage per year. For example, the premium for \$2,500 coverage for one year is \$50.00. The premium for \$10,000 of coverage for three years is \$600.00. In addition, there will be a small Surplus Lines Tax (to deal through an American broker representing them) which we understand will be about 3% of the premium (or .06% of the face coverage). The policy provides that in the event you become "Very Seriously Ill" (defined below) and as a consequence Trans Time sends a Remote Standby Team to your location, the policy will pay Trans Time the face amount of coverage. Trans Time will render services up to the limits of this coverage. If less service is rendered, Trans Time will rebate the difference.

"Very Seriously Ill" means a medical condition which warrants the attending

Physician(s) to declare the patient in "Serious" or "Critical" condition, and warrants a notification to relatives that their attendance is desirable in view of the imminent possibility of the patient succumbing to his or her illness. Trans Time response to life-threatening circumstances not falling under this criterion would require separate funding or credit arrangements.

Note that there are no restrictions on the use that Trans Time makes of the insurance proceeds. So if your condition permitted, we could use the proceeds to transport you to Cryovita Laboratories, having the full team and superbly equipped facility available for suspension.

If your health deteriorates, is this insurance guaranteed to be renewable? Naturally, a time of health crisis is a time when you are most likely to need Remote Standby. You do not want to be "left in the lurch" by being unable to renew your policy at such a time. By taking out three years of coverage, you can guarantee that you will always be covered for at least two more years. After the first year of your coverage expires, you provide evidence of good health and renew for another year (which is added on to the two years remaining on your policy). If you cannot provide evidence of good health, at least you have two years in which to find alternate funding for Remote Standby, or to relocate in California.

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If you are about age 45, Crawley Warren will consider your application separately. They may accept it as above, decline it, or ask for a larger premium. The age 45 isn't firmly fixed, but they have stated their intention to cut this coverage off at some age limit (perhaps 50 or 55).

The coverage will only be available to persons for whom Trans Time has emergency responsibility under agreement with one of the membership cryonics societies. These include all Suspension Members of BACS, ALCOR, IABS, plus a few Suspension Members of CSSF and CI.

If you are interested in this insurance please fill out the enclosed questionnaire and return it to me no later than March 15, 1982. I will then forward all questionnaires to Crawley Warren. They will then let us know if there is enough interest to proceed with the program, and which of the persons submitting questionnaires they are willing to cover. Either Trans Time or their Surplus Lines broker will then request your premium payment, in conjunction with our Remote Standby Agreement.

Trans Time will receive no percentage of the premiums paid. Depending upon the final arrangements for collection and transmittal of insurance premiums, we may impose a charge for our clerical service.

Submitting the questionnaire does not commit you to obtaining the coverage. If you may be interested, PLEASE RETURN THE QUESTIONNAIRE! Crawley Warren states that unless there are a sufficient number returned (number not specified), they will decline the whole business and no one will be able to get the group coverage.

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ALCOR LIFE EXTENSION FOUNDATION

SPRING 1982 MEETING CALENDAR

The MARCH meeting will be at the home of:

(SUN, 7 MAR 1982)

Marce Johnson  
8081 Yorktown Ave.  
Huntington Beach, CA  
Tel: (714) 962-7898

DIRECTIONS: Take interstate 405 (San Diego Fwy) to Beach Blvd. (Hwy 39) in Huntington Beach. Go South on Beach Blvd. approx. 4-5 miles to Yorktown Ave. Turn left (East) on Yorktown. 8081 is less than 1 block on the North side of the street.

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The APRIL meeting will be at the home of:

(SUN, 4 APR 1982)

Bill and Joanne Jameson  
624 W. Elm Ave.  
Fullerton, CA 92632  
Tel: (714) 871-1298

DIRECTIONS: W. Elm Ave. is an East-West street midway between Commonwealth Ave. (to the North) and Orangethorpe Ave. (to the South). 624 is west of Harbor Blvd. (Hwy 72.) Consult a map (as I have not having been there) or call.

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## THE HIGH COST OF CRYONICS -- PART TWO

by Stephen Bridge and Michael Darwin (Federowicz)

### Introduction

This is the conclusion to the paper begun in the last issue. In this segment we compare the prices and philosophies of Cryonics Institute and Trans Time. We wish to thank Jerry Leaf, Art Quaife, Bob Ettinger, and Anna Schoppenhorst, who read the manuscript and offered many suggestions. We hope we have presented a clear and fair picture of the reasons behind past and present suspension costs. We welcome your letters of comment and will publish as many as we have room for in the March and April issues. To be published in the next issue, letters must be received at the IABS office no later than March 1st.

Since we began work on this article, Trans Time has raised its recommended prices to \$75,000 for whole-body suspension and \$35,000 for neuropreservation. Art Quaife, President of Trans Time, said, "We were losing money at the old prices, especially on perfusions. The charges for long-term storage are running about even with direct costs, but they don't cover administrative and other indirect expenses."

We realize that Part I was based on a \$60,000 total and we apologize for any confusion this switch may cause our readers. We believe that our basic conclusions in Part I remain valid.

### PART TWO: CRYONICS PRICES NOW AND IN THE FUTURE

The people in cryonics today appear to be more prepared to cope with the risks and problems involved than were the leaders of 10-15 years ago. Both Cryonics Institute and Trans Time appear to be reasonably sound

financially. Though financial errors have possibly been made, each generally seems to be taking care of this money and planning for long-term existence.

To understand the current charges for cryonic suspension, it is necessary to closely examine the prices listed for Trans Time (TT) and Cryonics Institute (CI). Doing this will only be partially useful, however, because detailed information on actual costs is difficult to obtain. TT has done six freezings in the past five years; but the list of costs we have seen was not very detailed. CI has frozen only one person in the past five years and has released no expense totals. Even if it had, the special circumstances of that freezing do not lend themselves to comparison, and the expenses bear little relationship to the costs of CI's next suspension.

Trans Time (Art Quaife, President) is a for-profit professional company in Berkeley, California. TT contracts to provide suspension services and storage for members of non-profit corporations. It currently has such contracts with Bay Area Cryonics Society (BACS), Alcor Life Extension Foundation (Alcor), the Institute of Advanced Biological Studies (IABS), and the Cryonics Society of South Florida (CSSF). In addition TT has an agreement to provide emergency responsibility services for those Cryonics Institute member who wish the

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additional coverage. Potential donors contract with a non-profit group, not directly with Trans Time. TT charges its fees to the non-profit groups -- suspension fees in a lump sum and storage charges on a yearly basis. TT itself makes no long-term storage contracts, although it encourages the membership organizations to make long-term agreements with their members. In the past TT has accepted suspension patients who had only short-term financial arrangements. However, the recent crisis in which two patients were nearly removed from suspension for no-payment (CRYONICS, September 1981 and January 1982) may force TT to tighten its requirements. TT presently has ten patients in liquid nitrogen storage.

Precise fees and contract costs vary slightly with each contracting organization, but BACS' fees may serve as an example. BACS charges its suspension members an initial fee of \$1000, plus yearly payments of \$110. It requires a minimum financial commitment of \$75,000 for whole-body preservation, to be paid at death through life insurance or a trust. This amount (in line with Trans Time's charges) is divided into 20,700 for perfusion and freezing to -196°C (liquid nitrogen) and \$51,000 for long-term suspension maintenance, with the remainder being a small cushion for emergencies. Trans Time also offers these organizations a less expensive (\$35,000) option called "neuropreservation," in which only the patient's head or brain is frozen. (Since CI does not offer neuropreservation, we will limit our comparisons to whole-body suspensions.)

Trans Time personnel are paid for the work they do, although only Art Quaife is a full-time paid employee. Besides its own suspension team, TT pays for the services of Cryovita Laboratories (Jerry Leaf, President) in Los Angeles to handle many perfusions and to assist with others.

The \$75,000 required commitment does not include any allowance for the possible costs of a remote standby team, which would presumably fly to any part of the world to be ready in case of a member's critical condition. At this time only Thomas Donaldson of Australia has made the separate financial arrangements necessary to guarantee this coverage, although negotiations are in progress with Lloyd's of London to develop some form of group policy.

Cryonics Institute (Robert Ettinger, President) is a not-for-profit company based in the Detroit, Michigan area. It functions like a

combination of BACS and TT in that it contracts with its own members to provide suspension and storage. Full long-term financial arrangements are required before CI will approve a contract. A suspension donor must join CI for \$1,250 (\$1,875 for a couple) and then arrange to provide CI with a minimum of \$28,000 at the time of death. CI strongly recommends additional funds for emergencies and possible future revival and rehabilitation, and it recommends that members living a great distance from Michigan provide extra funds for transportation. "The Immortalist" (the newsletter of the Cryonics Association, the public relations oriented sister group of CI) has stated that "most CI members have funding somewhat beyond the minimum." (September, 1980.) No yearly fees are charged, with the exception that members who wish emergency responsibility coverage with Trans Time pay \$84 per year to CI which pays it to TT as a retainer. These members are also required to have a larger minimum contract to pay for TT's higher perfusion charges. Apparently three CI members have arranged for this additional coverage.

In its information book, CI divides its costs into two parts:

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\$8,000 for perfusion and freezing to -196°C, and \$20,000 for storage and maintenance. The above-noted "Immortalist" article indicated that the \$8,000 was for perfusion and freezing to dry ice temperature; however, Bob Ettinger has assured us that this was a misprint.

CI has no paid staff and it endeavors to use volunteers for all aspects of its operation. If necessary, it will pay specialists to help on perfusions, but the intention is to use volunteers as much as possible.

CI has one patient in storage on dry ice and does not presently appear to have its own liquid nitrogen storage capability. However, as reported in the May, 1981 issue of "The Immortalist," CI is doing extensive research on low-vacuum techniques. In the December 1981 "Immortalist," Bob Ettinger states that CI hopes to have a storage unit operational sometime in 1982. He also says, "Cryonics Institute members, meanwhile, need not fret about liquid nitrogen storage in case of death before the unit is ready. Liquid nitrogen storage will be provided for any member with a fully executed, operational contract -- if necessary, by preparing an emergency unit of lesser efficiency or by buying or renting a commercial unit."

The relative costs suggested by CI and TT may become more clear if we break down the figures in the following table. CI figures are from its information book. TT figures are from its price list.

	CI -----	TT -----
Perfusion and cool to -79°C.	\$4,900 (1)	\$12,400
Cool-down to -196°C.	\$3,100 (2)	\$ 5,700 (3)
Storage and maintenance per year. (4)	\$ 900	\$ 2,600
Base for 1st year. (5)	\$8,900	\$20,000

NOTES:

1. This figure includes \$4,000 margin for possible use of outside personnel. CI's basic cost is \$900.

2. This figure includes \$2,800 for 1/2 of a two-patient tank from MVE, which is no longer willing to manufacture this item for cryonics use. No other cryogenic company is willing to manufacture a similar tank for less than \$15,000, so this figure is outdated. However, as stated above, CI is doing research on low-vacuum techniques and may eventually come up with a replacement for these expensive units.

3. TT's tank cost is not included in the direct charges to the patient, since TT retains ownership of the tank. Presumably TT's cost for purchasing storage units comes out of its high annual storage fee.

4. CI owns its own facility. TT rents its property.

5. This does not include potential charges for transportation or unusual situations.

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Trans Time's first year base cost is 132% larger than Cryonics Institute's. TT's suspension maintenance fund of \$51,000 is 155% larger than CI's fund of \$20,000. Each company figures the size of its maintenance fund recommendation by determining the amount of money required to earn the stated yearly costs if invested at an average of 5% interest.

The reasons for the difference in price between Trans Time and Cryonics Institute are directly related to the technologic and economic philosophies of the two organizations. In discussing these philosophic differences, the authors cannot, of course, speak for the management of CI or TT. We can only point out what seem to be the differences, based on published material and personal conversations. We will first consider the technologic differences.

Robert Ettinger of Cryonics Institute, ever the optimist, has great faith in the abilities of future technicians. As he has several times emphasized, CI's purpose is to take a comparatively simple approach to perfusion and freezing because "if civilization endures, medical science should eventually be able to repair almost any damage to the human body, including freezing damage and senile debility or other cause of death." ("Prospect of Immortality," p.1.) CI places great emphasis on an affordable freezing program in order that more people may take advantage of it. Its leaders have recently suggested that cryonics companies should consider offering a variety of lower-prices, lower-technology freezings plans to those people unable to afford the full treatment. CI has frequently criticized TT for having overly elaborate and costly procedures.

Trans Time and its supporters have taken a radically different approach to suspension philosophy. They have rejected the contention that future medical technicians will be able to reverse all kinds of damage and have instead taken the position that the Future helps those who help themselves. These "high-tech" people are intensely concerned with preserving as much cellular and physical structure as possible. They firmly state that cryonic suspension is a biomedical procedure and that the most advanced technology and methods available should be used. The philosophy is that in a last ditch effort to save life, one looks for the maximum that one can do, not the minimum.

Many of the "high-techs" (though not all) have also rejected any notion of a low-technology freezing option, calling it scientifically invalid. As Jerry Leaf stated in a paper given at the September 1981 Cryonics Convention at Lake Tahoe, "When we are talking about the difference between high technology and low technology, we're talking about...reduced ischemia versus prolonged ischemia, clinical perfusion versus mortician's

perfusion. We are not talking about the difference between riding into the future in a Cadillac versus a Volkswagon; we're talking about ending up in the future with viable memory versus being decerebrate." (ECMO Transport: Profound Support of Suspension Patients.) Supporters of TT have criticized eve CI's full treatment as being technically inadequate.

The high technology groups in the past five years have added such a degree of complexity to the perfusion process that a cryonic suspension in California now requires nearly the facilities and staff of a small hospital. These people believe that having the best suspension medically possible is more important than making suspension available to a larger number of people.

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How you view these technologic philosophies may depend on the strength of your beliefs in the current effectiveness of cryonic suspension and in the abilities of future scientists. If you are optimistic about both areas, you are likely to be more attracted to CI's position. If you have strong doubts, you will probably push for continued refinements and more technology. Obviously, it cannot be proven that any current or proposed method of suspension will either ensure survival or totally remove its possibility. But clearly there is a point at which dead is Dead, and that point could well be at a level higher than some or all of the current methods. It does seem likely that up to some point more elaborate methods should produced better results. Jerry Leaf has also pointed out that, even though these more elaborate methods have a much higher initial expense, if they are really of higher quality they should reduce the long-term costs in two ways: 1) Reducing the amount of injury reduces the cost of re-animation, and 2) Less initial injury may allow the patient to be re-animated sooner, reducing storage costs.

Still, the problem of cost remains a serious one for most current and potential cryonicists. \$75,000 is a lot of money to invest in an unproven technique, money which could make someone's life more pleasant right now. It is the opinion of the authors that, if at all possible, a variety of suspension methods and costs should continue to exist to cover the needs of many people. We feel that the more elaborate suspension techniques may be effective; but even if they are not, they are required to stimulate the research necessary to lead to true suspended animation and ultimately to revival. If one only freezes and stores and then assumes that the next generation will begin the re-animation research, each generation may continue to pass the buck onto the next. Someone has to keep progress going and start working for the future today. At the same time, some kind of reasonable quality suspension should be offered at lower price for those people who are not able or willing to support progressive research.

We do not think that just any methods should be allowed. There needs to be some definite criteria as to what conditions are acceptable, although we do not propose to define those criteria in this paper. Whatever methods are offered, it is essential that prospective patients be given clear and detailed information about these choices, their costs and possible consequences, including potential damage. While it may be said that any method is preferable to burial or cremation, there are certainly preparation and storage methods that will obtain the same result. The potential donors must be able to weight cost and benefit in their own minds and decide how much they are willing or able to put into their future chances. We must not give the impression that, for example, suspension without perfusion or long-term storage in dry ice necessarily gives a person the same chance for survival as higher-level methods. There are moral implications as well. Taking money from people for the lowest levels of freezing, such as burial in the Alaskan permafrost, would certainly

appear to be either fraud or simplemindedness of the worst sort. The piper does have to be paid. The person who wants immortality for \$10,000 should be told to use the money for a nice vacation and happy memories while he is alive; he is obviously not serious about living forever.

Deciding which options should be offered is a difficult problem beyond the scope of this paper. It is apparent, however, that CI and

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TT have different opinions. Trans Time already offers the less expensive (though not less medically complex) option of neuropreservation which CI considers to be an unacceptable risk. CI at this time offers only its basic plan, although Bob Ettinger ("The Immortalist," August 1981) appears to be open to the idea of someday offering at least dry ice storage and possibly cheaper options.

While technology is a part of the reason for the gap in price between CI and TT, probably a higher percentage of the price difference is a result of economic and labor philosophies. Trans Time is a for-profit corporation which has at least some intention of making future profits. Most of TT's workers are paid in some way, if only in stock, and they are generally paid in cash for work on suspensions. Additional workers may be brought in from other locations if needed. On a recent accounting sheet for the two perfusions TT did in January 1980, 45% of the total cost for perfusion and cooling to -79°C was for direct labor payments.

In contrast, Cryonics Institute is a not-for-profit corporation which strongly emphasizes that it depends almost totally on volunteer help from members, both for day-to-day activity and for suspensions. CI will hire specialists (perfusionists, morticians, etc.) if a volunteer is not available, but it continually works toward self-reliance.

It is TT's intent to have patients in storage pay for the full cost of storage and maintenance in its rented facility. CI's intent is that all members pay in advance for the cost of the building the group has purchased, with the idea that future payments by patients will be lower.

CI's non-profit, volunteer, shared-payment philosophy definitely gives it a great advantage in cost. However, money is only one factor to be considered by the prospective cryonicist. Which economic philosophy is more practical in the long run is more important, and this question has been the subject of great debate. In the past five years many pages of "The Immortalist" and "Long Life Magazine" have been filled with ringing defense of and opposition to one side or the other. Art Quaife has claimed that "it is extremely risky to count upon others donating their services to maintain you in suspension, without being paid...What happens when they (present CI members -- ed.) are not around?" ("The Immortalist," June 1977.) Robert Ettinger says that the volunteer organization is more cohesive and long-lasting because all members are concerned with keeping each other alive. "Many of us, even if we could afford commercial cryonics, would hesitate to put our lives in the hands of stockholders and managers who may be more interested in dividends or in empire building than in the welfare of patients." ("The Immortalist," November 1978.)

We have no wish to begin this rather fruitless argument again, and we only bring it up to point out the differences to the reader. We would like to add that as long as cryonics remains small, a great amount of labor, even in for-profit companies, will have to be done on a volunteer basis. Likewise, if cryonics expands greatly, even non-profit organizations will have to pay some full-time office and technical personnel.

Beyond that it is not useful to make dogmatic statements about this issue, since neither organization has been in business long enough to demonstrate long-term proof of its economic philosophy. When

considering the needs of cryonics patients, ten years is not a very long time. Trans Time has been in business long enough and has done enough suspensions that it should be able to judge its expenses reasonably well. But as to practicality -- TT has had nine years of losses and only one year (1978) with a marginal profit. The company has recently been faced with a number of serious financial decisions resulting from previous actions which did not turn out well. Art Quaife has stated that TT requires two or three suspensions a year to break even. At its current level of activity (two suspensions in 1980, one in 1981), TT is likely to continue losing money for some time. Charges of excessive profits are certainly unfounded at this time -- although there is still room for debate whether or not TT's philosophies result in excessive prices. TT's prices are not due to corporate profits but are the direct result of high overhead (property rental, purchase of equipment and supplies) and payment of team members for work done (not the same as profits).

The long-term effectiveness of Cryonics Institute's economic philosophy is pretty much an open question. CI currently has an advantage in financial stability, partly because of the volunteer system, partly because of a more deliberate over-all business policy with fewer risks being taken, and partly because it has only one patient in its care. This situation could change significantly if CI eventually has several people frozen. It seems possible that several freezings a year would greatly improve Trans Time's efficiency and financial stability, but that a similar situation at CI could result in organizational and financial problems. If CI's prices turn out to be less than what is necessary even for its volunteer set-up, frequent suspensions could create a severe cash-flow shortage. The voluntarism itself could be difficult to maintain over a long period of time, especially in an in-between stage where volunteers are so busy with perfusions that they risk losing jobs but not so busy that they could become paid employees of CI. On the other hand, if CI can demonstrate that it can survive as an organization and provide quality suspension at a lower price, Trans Time may find it difficult to maintain either its prices or its economic philosophy. In any case, the situation will not become more clear through discussion, but only through Cryonics Institute doing suspensions and showing whether its systems succeeds or fails.

It should be evident at this point why the prices of Cryonics Institute and Trans Time vary greatly. The prices are direct results of the organizations' widely divergent philosophies. Determining why TT is quite so high or why CI is quite so lower is a more difficult task. The authors do not have the data to justify either CI's confidence in its low price or TT's need for its high price. The directors of these organizations must justify themselves. We can only offer readers what facts we do have and let them draw their own conclusions. We hope that for future suspensions each group will offer detailed cost sheets to back up their charges to patients.

If you are planning to be suspended by Trans Time or Cryonics Institute, it is important that you understand what you are getting. With TT you will obviously pay a lot more money; but you aren't paying anyone to get rich (not now, anyway). You are paying for a philosophy of more elaborate technology and paid help. And it is possible that the large storage fees will mean TT profits in the future. At CI you will also pay for a philosophy, that of simpler technology and

volunteer help (perhaps your own). The more expensive option may or may not be more competent and correct than the cheaper one. It would be wise to deeply investigate both options before making your choice and paying your money. You have to listen to each group, visit them if possible, and then decide whom you believe. We hope that choices continue to exist.

#### THE FUTURE

How will costs change in the near future? Trans Time, with its high-technology philosophy, will certainly experience increased expenses as it adds more sophisticated equipment and techniques. But each group will have to raise prices at some time because of constantly increased costs for all perfusion items. The costs of chemicals and drugs are likely to go up greatly as the cost of developing and testing new drugs becomes an increasing burden on the manufacturers. There is every indication that energy costs will continue to rise over the next ten years at least. Steel production is likely to grow only slowly in the coming years due to reduced demand as a result of slowed industrial growth and due to outmoded facilities at most American steel companies. The high-quality steel necessary for medical instruments and storage dewars will be especially expensive and difficult to obtain. The availability of liquid nitrogen itself is to some extent dependent on steel production. In the past LN2 was considered a waste by-product of steel manufacture, and supplies were greatly in excess of industrial and medical uses. In 1965 in many areas of the country LN2 could be had for a little over the costs of hauling it away. The increase in LN2 prices today (currently \$.30-.50 per liter) reflects not only decreased steel production, but also a rising demand by cattle breeders and industrial users. Projected advances in microelectronics, such as the Josephson junction which may soon see widespread application in computers, will place a large added demand on the available supply of liquid nitrogen, raising the costs further.

We can hope for economies of scale that might come with more people being frozen, but we must not count on them. Since 1967 fewer than 40 people have been frozen. With the possible exception of James Bedford, all but 11 of that total, and every person frozen prior to 1973, has been thawed out and disposed of in a conventional manner. There is no evidence to suggest that the cryonics movement is preparing to undergo a sudden expansion, and we doubt that current suspension members are planning to start dying at an increased rate.

Even if cryonics should gain widespread support, we must remember that the projected economies of scale will apply primarily to long-term storage and are not likely to have an early effect on the costs of perfusion. The capital required to purchase buildings and equipment for a large cryonics movement will be immense. We should also point out that, in some respects, the current prices of perfusion and related services are artificially low. Wide acceptance of the freezer program would create a demand which could only be filled with full-time employees, although a few small volunteer groups might persist. Governments will require licensing of cryonics practitioners, with appropriate educational and professional requirements. As an example, Trans Time team members currently receive

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approximately \$5.00 per hour for their services. A registered nurse in the Los Angeles area may make nearly three times that amount. When surgeons, perfusionists, cryobiologists, and other technical personnel are required on a full-time basis, the cost of perfusion will increase dramatically.

## SUMMARY

Many factors have influenced the rise in suspension prices from 1965's estimate of \$8,500 to today's two-layered price range. Factors affecting all groups are:

1. An unrealistically low original estimate, resulting in part of the increase being more apparent than real.
2. Economic factors such as inflation and higher demand for LN2.
3. A low general acceptance of cryonics, resulting in start-up costs and overhead being shared by comparatively few people.

Other factors have primarily affected the costs of high-price organizations such as Trans Time:

4. Greater technical sophistication, especially that in perfusion.
5. Paid workers rather than volunteers.
6. Putting a larger percentage of the burden for costs on suspended patients rather than on all prospective patients.

There is little likelihood of decreasing prices in the foreseeable future, and every likelihood of increased prices, eventually even by Cryonics Institute. However, as long as both major groups remain in business, the differences in price and philosophy will remain. We hope that this article has led to a greater understanding of those prices and philosophies, even though many people still may not approve of them.

"For old Pete I've built a 'cat bathroom' to use in bad weather -- automatic, self replenishing, sanitary, and odorless. However, Pete, being a proper cat, prefers to go outdoors, and he has never given up his conviction that if you just try all the doors one of them is bound to be the Door into Summer.

"You know, I think he is right."

-- Robert A. Heinlein  
"The Door into Summer"