

CRYONICS

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EDITORIAL MATTERS

We goofed (as we usually do!) and forgot to credit John Krug with his letter to the editors which appeared in the last issue of CRYONICS. Mr. Krug was Secretary of the Bay Area Cryonics Society from 1979 through 1982 and authored the letter in our August issue responding to an earlier communication from Eric Geislinger and Jane Talisman. We'll try to be more careful in the future.

We have pictures in this issue! We hope to have more in the future as time and money permit. If you are interest in seeing more photos appear, please let us know and if possible send along a contribution to help cover the costs. We are particularly interested in finding out what you would like to see. Would you like pictures of authors and columnists? Pictures of our physical plant? Pictures of our research, meetings, and activities? Now is your chance to tell us what you'd like to see most.

Response to our request for financial support (complete with pledge forms) in the July issue has been pretty disappointing. We are trying to

avoid raising subscription rates by encouraging voluntary giving. We hate to keep after you for such support, but the alternative is to either increase subscription rates or abandon production.

BERKOWITZ FAMILY FILES SUIT

We understand from Art Quaife, President of Trans Time that the family of Joseph Berkowitz, a suspension patient now in Trans Time's care, has filed suit against Trans Time for ten million dollars alleging fraud. According to the pleadings filed by the Berkowitz family Trans Time was

guilty of negligence and fraud during the transport and perfusion of Joseph Berkowitz. Much of the language of the pleadings is direct quotes from an article which appeared in "Long Life Magazine" in 1978 documenting the perfusion and freezing of Mr. Berkowitz.

The Berkowitz family has alleged that the conditions under which the suspension was undertaken and the qualifications of the staff performing it were misrepresented to them at the time they contracted for the services. At this time there is little in the way of additional details. We hope to have a more complete exposition of this situation in the near future.

SUPER SUNDAY: ALCOR'S SUSPENSION TEAM DELIVERS!

On Sunday, August 7th, the ALCOR suspension team met for its second training session. The first training session was held in May of 1983 and consisted of a basic introduction to the rescue/transport kit and the procedure for taking calls with the paging unit.

The second session was definitely hands-on and began at 9:00 am with a review of packaging and dosage forms by Jerry Leaf. During this time team members were introduced to the various methods of packaging and types of administration equipment provided by pharmaceutical manufacturers. Team members were given hands on experience in opening and setting up a variety of I.V. medications. This task is sometimes a little less straightforward than one might first think, with some products needing vented I.V. sets and some products required added water or special mixing before they can be used. Since many of

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the ALCOR team members do not have a medical/hospital background, it is important to begin with just these kinds of basics. Of course, the use of proper aseptic technique is also important and Jerry did a fine job of giving some hands-on instruction in proper sterile technique.

The balance of the morning session was spent in practice with a training mannequin under the direction of Arthur McCombs who conducted an excellent review of Basic Cardiac Life Support (BCLS) using manual CPR and the heart-lung resuscitator.

At 1:00 pm the group broke for lunch and the monthly ALCOR meeting -- one of the shortest ALCOR meetings on record -- about an hour! Then it was back to the grind with a training workshop designed to build skill in team members at endotracheal intubation (for respiratory support), intravenous catheter placement, and temperature/pressure monitoring. This hands-on session employed a 16 kg. mongrel dog as the "suspension patient." The anesthetized animal was used to allow team members to practice intubation and artificial ventilation and to allow for a complete familiarization with the ALCOR transport protocol (see July, 1983 issue of CRYONICS).

The team members administered all appropriate medications as specified in the transport protocol, began surface cooling with ice packs, and took over ventilation using a manual "bag-type" resuscitator. The animal was

allowed to surface cool to approximately 32 degrees centigrade at which time the team began femoral cannulation for invasive blood pressure monitoring and coupling the animal to an extracorporeal circuit for membrane oxygenation, artificial circulation, and further cooling with a heat exchanger to 10 degrees centigrade. We are pleased and proud to report that all of the team members stayed till after 10:00 pm to accomplish these objectives with most staying well past 11:00 pm despite the fact that they had to be up early for work the next day.

A small core of die-hards who had the following Monday off continued to work with the animal, providing extracorporeal support down to an esophageal temperature of 10 degrees centigrade. This crew, consisting of Hugh Hixon, Arthur McCombs, Mike Darwin, and Simon Carter (of the Cryonics Society of Australia) deserves special thanks and appreciation for their persistence and skill. A special commendation to Arthur McCombs who with very little relief manually ventilated the animal for about 4 hours!

Following cooling to a rectal temperature of 12.5 degrees centigrade, rewarming was commenced. This was probably the most critical part of the operation from a number of standpoints. First, in place of the usual bubble type or silastic membrane oxygenator now used for bypass, we were employing a Cordis Dow 2.5 square meter artificial kidney. On the side of the device where dialysate (washing fluid used to remove excess wastes from the blood) was normally pumped, we were pumping the animal's blood. In the hollow fibers where the blood is normally pumped, we were pumping oxygen. We were also using the device's ability to remove water (through the permeable large surface area of the fiber bundle) to raise the animal's hematocrit (red blood cell count) since we had diluted his blood by almost two-thirds due to administration of the priming solution used to fill the extracorporeal circuit, as well as the large volume of liquid medications administered during the transport protocol. (The normal solution to this problem is to prime the extracorporeal circuit with blood or to transfuse the animal at the conclusion of the procedure; unfortunately this means that another dog must be sacrificed to provide the blood, which is a costly, time consuming exercise.) If the animal was to survive the procedure, we would have to be successful in raising its hematocrit to over 20% by removal of water from the blood.

Rewarming was also complicated by the fact that femoral-femoral bypass which as the technique we were using to access the the animal's circulation is not

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able to supply an adequate cardiac output to an animal at normal body temperatures. That meant that the animal had to be defibrillated and begin supplying its own cardiac output at the earliest moment possible.

We are happy to report that we overcame all these obstacles! We successfully raised the animal's hematocrit to 26 at the conclusion of bypass and we were able to defibrillate the animal at a temperature of 28 degrees centigrade and achieve an adequate blood pressure through careful management of medications. The hollow fiber dialyzer performed outstandingly well as an oxygenator and did so at a cost of less than \$25.00 as contrasted with over \$350.00 for a Kolobow membrane oxygenator!

Perhaps more to the point and more importantly, we are happy to report that the animal survived and is doing well at this time!! We have a few minor problems with wound infection and it has been something of a tour de force to save the animal since this was a non-sterile run. Despite the over 15 hours this animal was unconscious and being surface cooled, extracorporeally circulated oxygenated, and then rewarmed, in the absence of sterile technique this animal has recovered fully, is eating and walking normally and has no discernible neurological deficits. Aside from the

tremendous increase in skill and confidence this kind of training produces, it also demonstrates that the transport protocol we are recommending is protective during extended hypothermia and extracorporeal support in a healthy animal. Considering the variety of medications recommended in the transport protocol coupled with the "unknown" of hypothermia, this is no small reassurance. At the very least it demonstrates that the ALCOR team has the ability to "bring 'em back alive" within current limits of the state-of-the-art! That's a good feeling for everyone -- team members and suspension members alike.

For those interested in a more detailed technical account of this operation please see the following article. See photographs in center section.

A Brief Report on the Use of the Cordis Dow Hollow Fiber Dialyzer as a Membrane Oxygenator in Profound Hypothermia

by Michael Darwin and Jerry D. Leaf, B.S.

INTRODUCTION

We wish to report here briefly on the preliminary use of a Cordis-Dow 2.5 square meter hollow fiber dialyzer as a membrane oxygenator. This experiment was conducted in conjunction with a training session designed to build skill in ALCOR suspension team members. The purpose of the experiment was to establish simple physical performance of the dialyzer (with respect to blood flow, hemolysis platelet integrity, and ultrafiltration) as a preliminary to more detailed studies where its performance as an oxygenator would be evaluated. To the surprise of the investigators, the device out-performed our expectations and the experimental animal recovered from the procedure.

MATERIALS AND METHODS

A 16 kilogram, male, mongrel dog anesthetized with 1.25 mg./kg. Xylazine (Rompun) and 33 mg./kg. Nembutal was prepared for extracorporeal circulation as follows.

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The animal was maintained n.p.o. for 12 hours prior to induction of anesthesia and was given 75 mg. of cimetidine HCl (Tagamet) six hours prior to induction of anesthesia and at the time surface cooling was begun. Immediately following induction of anesthesia a nasogastric tube was passed and the stomach was lavaged with 60 cc. of Mylanta II antacid diluted to 120 cc. with water. Endotracheal intubation was achieved and surface cooling was begun by packing the animal with zip-lock plastic bags filled with crushed ice. Immediately following initiation of surface cooling the animal was given via a peripheral I.V. line: 50 cc. of 7.5% sodium bicarbonate, 6,600 I.U. of sodium heparin, 32 g. of Mannitol, 2.4 mg. of Verapamil (Isoptin), 2.0 mg. metubine iodide, 125 mg. methylprednisolone (Solu-Medrol), 250 mg. erythromycin (Erythrocin), and 200 cc. of 6% hydroxyethyl starch in 0.9% sodium chloride solution (Hespan).

Surface cooling with manual ventilation of the animal using room air delivered via an Ambu bag was continued down to a temperature of 28 degrees centigrade. During surface cooling the right femoral artery was raised, ligated distally, and a pressure monitoring line passed proximally into the

descending aorta. The left femoral artery and vein were then raised, ligated distally, and cannulated. A Sarns 5 mm. I.D. stainless steel cannula was placed in the femoral artery, and a 16 fr. 40 cm. long USCI catheter was passed through the femoral vein into the inferior vena cava and the tip of the catheter advanced to a point just above the diaphragm.

Extracorporeal circulation was initiated when the rectal temperature of the animal reached 26 degrees centigrade and bradycardia with multifocal premature ventricular contractions developed. The priming solution in the extracorporeal circuit consisted of 500 cc. of 6% hydroxyethyl starch in 0.9% sodium chloride solution, 500 cc. of Lactated Ringer's Solution, 500 cc. of 5% dextrose in .45% sodium chloride solution, 100 cc. of glycerol, and 1,500 I.U of sodium heparin. The volume of this solution in the extracorporeal circuit was reduced to approximately 950 cc. prior to the start of the bypass.

The extracorporeal circuit consisted of a simple arterio-venous loop with a 2.5 square meter Cordis Dow hollow fiber dialyzer acting as the oxygenator (see accompanying diagram). Blood was passed over the dialysate side of the dialyzer and oxygen at a rate of 4 liters per minute was passed through the fiber bundle which the blood bathed. The dialyzer was arranged so that ultrafiltrate passing into the fiber bundle would drain out of the oxygen exit port via gravity. Oxygen and blood flows were countercurrent. Cooling and rewarming of the animal was achieved with a Travenol Miniprime pediatric heat exchanger. Microemboli were filtered with a Pall 40 micron extracorporeal blood filter.

Approximately 75 minutes of perfusion time was required to cool the animal to a rectal temperature of 12.5 degrees centigrade and an esophageal temperature of 10.0 degrees centigrade. Rewarming from an esophageal temperature of 10 degrees centigrade to 28 degrees centigrade required approximately 130 additional minutes; for a total pump time of about three and a half hours at an average flow rate of 1,100 cc./min. During the course of perfusion the dialyzer was delivering a plasma ultrafiltrate from the blood/prime mixture at a rate of approximately 5 cc. per minute at a peak blood flow rate of 1,500 cc. per minute. The hematocrit of the animal immediately following the start of perfusion was 8.0 and the total protein 3.5 grams per deciliter. Mean perfusion pressure during hypothermia was 40 mm. Hg.

RESULTS AND DISCUSSION

The animal was successfully defibrillated on the first attempt at an esophageal temperature of 28 degrees centigrade. Rectal temperatures were unavailable due to failure of the monitoring thermistor. Following

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defibrillation a variety of arrhythmias were noted secondary to the profound hypothermia the animal was in. These arrhythmias consisted of ectopic beats, multifocal premature ventricular contractions, and an inverted T or "delta" wave which is associated almost exclusively with profound hypothermia. Defibrillation was undertaken in the presence of hypothermia due to inadequate venous return secondary to the inherent limitations of femoral-femoral bypass and the diminishing circulating volume available as a result of ultrafiltration via the dialyzer. Perfusion pressure during extracorporeal rewarming was 60 to 80 mm. Hg.

Rewarming to 37 degrees centigrade was continued with an electric blanket. The animal began shivering at approximately 33 degrees centigrade. Blood pressure was adjusted to 140/80 by administration of Neo-Synephrine HCl and naloxone (Narcan). Hematocrit and total protein immediately post perfusion were 26 and 5.0 respectively. Four and a half

hours following termination of bypass, manual ventilation was discontinued and the animal was extubated. Following extubation 800 mg. of Kefzol (sodium cephalothin) was administered I.V. and a heparin lock was placed on the peripheral venous line to maintain its patency. Approximately an hour later the animal was standing weakly on its forelegs and the nasogastric line was removed. Nine hours following the end of bypass the animal was

ambulatory and eating without assistance. At the time of this writing (8 days post pump) the animal continues to do well and the only complications noted at this time are an infection of the right femoral incision which is being aggressively managed with 400,000 units of penicillin G and dihydrostreptomycin (Combiotic) administered I.M. b.i.d.

Recovery from bypass was excellent. After nearly three and a half hours of pump time there was no hemolysis noted and platelet function as demonstrated by prompt postoperative hemostasis was also excellent. The animal's normal neurological status and uneventful recovery are indirect evidence of the effectiveness of the hollow fiber dialyzer as an oxygenator. Perhaps most impressive was the utility of the dialyzer in ultrafiltering water from the extracorporeal circuit, allowing for precise adjustment of hematocrit in the absence of transfusion. The authors hope to repeat this experiment in the near future under circumstances which allow gathering data on actual performance of the dialyzer as an oxygenator (i.e., pH, blood gases, and electrolytes).

TYPIST'S NOTE: AT THE BOTTOM OF THIS PAGE WAS A LABELLED DIAGRAM OF THE PERFUSION CIRCUIT USED IN THE ABOVE EXPERIMENT.

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SCIENCE UPDATE by Thomas Donaldson

THE SCN AS A BODY CLOCK: A STUDY OF CELL DIVISION

We have in these columns paid special attention to ongoing work about body clocks, how they work, and how we might someday modify them, especially rewind them. All immortalists will probably see the relevance of this topic for their concerns.

Some significant recent work has suggested that a particular brain region, the suprachiasmatic nucleus, (the SCN) plays a critical role in coordinating and perhaps even producing daily rhythms in rats and several other species. For some rhythms, scientists have reported that damaging the SCN will actually abolish the rhythm itself. For instance, the sleep-wakefulness cycle will cease (N. Ibuka et al BRAIN RES 96 (1975) 76-81), cyclic water-drinking response in primates (Albers, H.E. et al FED PROC (abst) 41 (1967), body temperature (Salek, M.A. et al, J. INTERDISP CYCLE RES 8 (1977) 341-46) and the rhythm of blood cortisone levels (Moore, R.Y. et al, BRAIN RES 42 (1972) 201-206).

However a recent paper by L.E. Scheving et al in the ANATOMICAL RECORD (205 (1983) 2390249) presents a thorough study of rhythms of cell proliferation in rats after removal of their SCN. Scheving et al find that removal of the SCN definitely affects this rhythm but does not abolish it.

They measured cell proliferation and/or cell division in two ways, first by measuring the synthesis of DNA in cells taken from a variety of organs of the rats, and secondly (for corneal cells alone) by directly counting cell divisions. It is a truism in the study of body rhythms that cell division occurs rhythmically; it is an experimental fact that cell

division occurs at the highest rate at night with a minimum during the day. Scheving et al simply took a population of rats, and then destroyed the SCN of the experimental rats, and then (after a period of adjustment) killed them at various times (the time of death being important), including the middle of the night, and fixed their tissues for later comparison with controls.

They looked at cells of the tongue, esophagus, stomach, colon, and the cornea. For all these except the cornea they measured cell division by the synthesis of DNA. The most important fact is that these animals DID retain a 24-hour rhythm in their cell division. However, the amplitude and the phase of the rhythm became shifted; animals without SCN had rhythms of cell division consistently earlier by 4 hours than normal animals. The amplitude varied with the organ studied; for instance, the peaks and valleys became less pronounced in the tongue cells, and more pronounced in the colon and stomach. Scheving et al also looked at the rhythm in blood cortisone levels, and contrary to other workers they found that removing the SCN did not abolish rhythm.

One major question left unanswered by this work on cellular rhythms and the SCN arises from the precise experimental model Scheving et al used. Rather than allow their animal to attain a free-running rhythm isolated from all environmental cues, they subjected their animals to a standard 12-hour light-dark cycle. This fact leaves open the possibility that these rhythms of cell division were somehow caused by the cycles within which the experimental animals lived. On the other hand, evidence exists that the SCN's primary role consists precisely of coordinating autonomous cell rhythms with the light-dark cycle, so that the objection might not hold quite so much weight. (Continued on page 8.)

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SECONDARY EFFECTS OF IMMORTALITY

We have all wondered what it will be like when people can finally expect to live for hundreds of years. This short article is my contribution, for which I claim nothing definitive, to working out some of the secondary effects of immortality, that is, effects other than the most important ones.

One of the things which happens to cryonicists is that they live in a world in which death is highly regarded. This means that almost every piece of literature, and a fair amount of art (representational art most of all) focuses on an obsession with death and the macabre. In literature "adult" books are those which do not have death as a background, and usually themes much more macabre than simple death. People read this fiction or see these plays unable to notice the annihilation facing them in actuality. In contemporary art the problem is less outstanding; there is no death in Albers or Jackson Pollock. But in older religious art or contemporary paintings such as Bacon or the later Picasso we have what are fundamentally pictures of dismembered people undergoing torture.

We have all been trained up to believe that this literature and art is valuable and a worthy expression of the human spirit. As a cryonicist gradually comes to see that it is uniformly the product of deranged minds, unrecognized as such because it exists in an entire society of psychotics. Of course we can evaluate these works according to canons of "good artistic composition," but that is only a means by which critics avoid confronting the psychosis. There will come a day when all of this stuff is actually

LOCKED AWAY and all the crucifixions taken down or painted over. And after a long acquaintance with art and the psychotics who produced it, a cryonicists eventually comes to feel that this will be a GOOD THING, that these art works SHOULD be forgotten, that they DO lack merit. So that is one of the secondary effects of immortality.

Here is another. Everyone who has attained a certain age, and has not sunk into permanent credulity, will eventually meet with a serious personal betrayal by people or institutions which he/she has trusted. I don't mean just seeing this happen to others: I mean that YOU will someday be betrayed, and know that you were betrayed, and realize that trust you had PERSONALLY placed in someone or some institution was MISplaced, only you found out too late. The fact is, that a great many institutions and people in present society, where the lifespans are so short, depend quite heavily on the GULLIBILITY OF THE YOUNG.

Of course if people expect to live for hundreds of years, and ALMOST EVERYONE has already attained an age of 300, there just won't be any young people available to be screwed around. Everyone will have outgrown their schooling in trust of the authorities. Complaints will arise that people all have egos much

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too big now, they won't ever do what they're told, and anyone who wants to get more than one person to do something will have to argue A LOT harder. Not only that, but someone's reputation will follow them for hundreds of years. "You were saying that 200 years ago, and look what happened after!" or "These were the guys that caused the fall of Rome. Do you want them back AGAIN?"

Fads are likely to vanish completely. The interesting thing about fads is that those taken over by them rarely see that they are taken over. The fad is a modern thing, the latest thing, and a REAL ADVANCE on its predecessors. How could anyone who IS anyone believe differently? But most of such attitudes come from the fact that their proponent simply wasn't alive the last time round. And of course many people benefit from perpetrating a fad.

I would surmise, in fact, that everytime we trace back an objection to immortality because of its supposed social effects we will find that the fundamental worry is that immortality would produce a scarcity of gullible people. And a cryonicist, considering this, eventually comes to believe that all of these institutions founded on gullibility SHOULD NOT survive.

Here are some specifics. The Army and the Police. Academia (for those unaware of the situation, lower-level staff such as graduate assistants or lecturers are being used mercilessly as cannon fodder on the promise, which they GULLIBLY believe, that eventually they will find a secure position). Every institution without exception which promises a promotion up in the ranks as reward for good performance (everyone CAN'T become President of the company. THEREFORE NO REAL REWARD IS BEING OFFERED!).

These take in a lot of institutions. Certainly societies without such arrangements would be very different. Perhaps the graduate assistants would have to get better pay, or the professors would have to do more actual teaching. Companies might have to pay people more even if they DON'T promote them. Police commissioners would have to adjust to a situation in which ALMOST ALL policemen actively distrusted the morality of

the laws they were asked to enforce. There would be soldiers, but no cannon fodder for the army.

There must be other effects of immortality, too. Perhaps other readers can expound on them.

(Continued from page 6.)

Scheving et al conclude from their experiment that the SCN acts to coordinate rhythms which would otherwise act independently, rather than to actually bring them into existence. To what degree the SCN can actually control the length of the cycle rather than merely the phase remains unknown; no one has yet shown a direct relation between his important work on circadian rhythms and either aging or development.

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NEW LEGAL FORMS FOR CRYONIC SUSPENSION

Art Quaife

In December 1980, the California Attorney General's Opinion No. 80-710 stated that cryonics groups are not acceptable donees under the Uniform Anatomical Gift Act. While this opinion does not have the force of law, it would have considerable influence in court in the absence of clear law. The Bay Area Cryonics Society thus asked Attorney Jim Bianchi to find an alternate legal route to accepting deceased patients. After a gestation period of two and a half years, Jim has given birth to a new set of legal forms to be used in arranging for cryonic suspension.

The documents, totalling 122 pages, are divided into 22 chapters. I will try to briefly summarize their contents (most of the text below is lifted from Jim's manual).

1. Legal Basis of the Forms

LEGAL AUTHORITY TO ARRANGE CRYONIC SUSPENSION

Jim chose to rely upon California Health and Safety Code section 1700, which provides that oral or written instructions related to the interment of one's human remains must be carried out. If a person does not leave any instructions, then the relatives have the power to decide what happens in the following order of priority: 1) spouse, 2) children, 3) parents, 4) relatives in the next degree of kindred, 5) public administrator.

This law requires that instructions left in a Will for the disposition of the remains shall be immediately carried out, regardless of the validity of the Will in other respects or the fact that it has not been probated. If the arrangements are being made by next of kin, this statute allows them to do so provided that it is not contrary to any instructions in the Will of the deceased, and that the suspension is authorized by the nearest surviving relative in the order of priority listed above. If there is more than one relative in the priority class, the majority prevails.

While cryonic suspension is not listed as an alternative under the definition of "interment," Jim argues that it falls in this class, having been left out simply because cryonic suspension did not exist when the statute was last amended in 1965.

MAKING A DONATION UNDER THE UNIFORM ANATOMICAL GIFT ACT

Because of the advantages of making a donation under this Act, Jim decided that these legal forms should contain some means that will allow suspension arrangements to take the form of a donation under the U.A.G.A. should, at some later date, that statute be amended to make cryonics groups acceptable donees of (CONTINUED AFTER PHOTO PAGES)

***TYPIST NOTES:

THE NEXT THREE PAGES CONTAINED PHOTOGRAPHS.

PAGE ONE

TOP PICTURE:

The extracorporeal circuit: A) hollow fiber dialyzer/oxygenator, B) blood pump, C) venous return reservoir, D) 40 micron blood filter, E) heat exchanger, and F) oxygen inlet line.

BOTTOM PICTURE:

Bill Jameson (left) and Lawrence Gale (right), monitor the progress of perfusion.

PAGE TWO

TOP PICTURE:

Arthur McCombs (right) ventilates the animal while Mike Darwin (center) prepares for external rewarming with an electric blanket.

BOTTOM PICTURE:

Simon Carter, Secretary of the Cryonics Society of Australia, checks the animal's endotracheal tube for adequate respiration.

PAGE THREE

TOP PICTURE:

Mike Darwin checking on the progress of the animal following resumption of spontaneous breathing.

BOTTOM PICTURE:

The animal regains consciousness 15 hours after the start of the procedure.

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human remains. He made provisions in the form Will and form Trust where individuals making their own arrangements empower their trustee to donate their remains at some future date. Where relatives are making the arrangements, they can make the donation anytime before their death, and he has prepared a form giving a trustee power to donate the remains should the law change after their death. There is no guarantee that this will work, but he sees no other way it can be accomplished.

ARRANGING FUNDING FOR THE CRYONIC SUSPENSION

We are all familiar with the various devices for funding a suspension: life insurance, a trust, a Will passing property to a trust, joint tenancy of real or personal property. The method presenting the fewest problems

for cryonics groups has proved to be life insurance, but a variety of funding methods have to be accommodated by any standard form. Initially, he designed several trust instruments to be used for inter-vivos, testamentary, or pour-over trusts. He then decided to design a single form that could be used, with slight modifications, in any funding situation, whether the funds are coming from relatives, the deceased, or life insurance. A difficult task, but one that will make it easier for the individual's attorney to draft a suitable trust without having to evaluate a hundred pages of form trust documents.

USING A CHARITABLE TRUST

The basic trust document he drafted is characterized a "charitable trust," the purpose of which is to further scientific research and education to advance the field of cryobiology. This trust purpose is accomplished by the cryonic suspension of the human remains designated in the trust. The beneficiaries are organizations and individuals dedicated to the advancement of this field who are to be designated by the trustee. The trustee is BACS, Alcor, a corporate fiduciary, or law corporation; to be designated by the person making the trust.

He elected to make it a "charitable trust" to avoid problems of taxation of the trust income, and because such trusts are not limited in duration by the "rule against perpetuities." this rule can limit non-charitable trusts to an average of 60 years in duration; a length of time that may be inadequate to accomplish the purpose of the trust.

A charitable trust has the mixed blessing of state regulation. Periodic reports must be made to the office of the Attorney General, and that office has the authority to take legal action in the event the trust is improperly managed. This may be an inconvenience for the trustee, but it is good to know that someone will be checking up on the trustee long after the relatives and friends of the deceased have themselves passed on. Another advantage is that beneficiaries of the trust need not be specified with precision, allowing the trustees to select individuals or organizations at the time of death that are most likely

to perform a viable suspension.

A charitable trust does have its disadvantages. A trust is not considered "charitable" if it is intended to benefit a specific individual (this would be a gift) or benefit the person providing funds for the trust. Stated otherwise, if the persons who are to benefit are not of a sufficiently large or indefinite class so that the community is interested in the enforcement of a trust, it is not charitable. As a consequence, the trust he drafted is for the benefit of scientific knowledge, and not for the sole purpose of suspending and reviving the individual whose remains are used in this research. It contains several provisions showing that if conflict arises between proceeding with a suspension, and furthering the educational and scientific purpose of the trust, the charitable purpose will prevail and the trustee can cease the suspension efforts.

Most cryonicists will probably not approve of such provisions, and insist that their suspension continue at all costs. In that event, their attorney can strike all the charitable provisions in the trust form, set aside additional funds for taxes on trust income, and hope that a revival can occur within about 60 years before the trust is extinguished by the

"rule against perpetuities." But I (AQ) believe this thorny area requires further thought, and that there are viable arguments that proceeding with a suspension even in worst cases can contribute to our knowledge, thus upholding the charitable purpose of the trust.

There is no guarantee that this instrument will succeed as a charitable trust. Therefore, he included several back-up provisions that would save the trust from being extinguished by provisions violating the "rule against perpetuities."

One provision that has the greatest chance of failure is the one of allowing individuals who are funding their own suspension to gain access to the trust funds upon their revival. He attempts to save this future interest by characterizing it as a "reversion to the grantor"; but acknowledges that the doctrine has never been used in this type of situation (i.e. where the grantor is dead for a while). However, we should not cringe from using a creative approach. If it proves unworkable, the trustee is empowered to try something else, such as, giving the funds to a trust or foundation dedicated to assisting persons destitute after revival from cryonic suspension.

SUGGESTED CHANGES IN THE ROLE OF CRYONICS GROUPS

Jim enumerates arguments that many problems can be avoided if the non-profit groups concentrate on education and research, in addition to giving general information about the legal arrangements that should be made. Non-profit groups should not be involved in the actual arrangements unless they are designated as trustee; a duty that is invoked upon one's death and not

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before. The emergency responsibility services should involve a contract directly between the individual and the corporation providing the services. Relatives making arrangements for the patient should also make a service contract directly with the profit corporation providing the service.

THE FORMS

Jim created two sets of forms, one set to be used by individuals making arrangements for themselves, and one set for relatives making arrangements for next of kin who make no contrary provision in their Will. Each form has three parts: a blank form, a sample form that is completed and to be used as an example, and detailed notes explaining how each form is to be completed, and citing the reason for including certain provisions. He also made questionnaires suggesting what information will be required to complete the forms.

SEEKING THE ADVICE OF AN ATTORNEY

A cryonicist with a relatively simple estate situation (e.g. a single person putting all of his estate into the cryonics trust) could probably fill out these forms without an attorney. But Jim points out that these forms pertain exclusively to matters related to cryonic suspension; they are not intended to resolve all the personal affairs related to one's death, and the distribution of one's property upon death. He intends that these forms be incorporated with the overall testamentary plan prepared with the advice of counsel.

2. Discussion of Forms for Self Suspension

An overview of 8, 9, 12, 15, and 16 below.

3. Discussion of Forms used for the Suspension of a Relative.

An overview of 19, 9, and 20 below.

4. Suggested Sequence of Events

The order of events from initial joining of a cryonics group through post-suspension administration of the trust.

5. Legal Arrangements in an Emergency

In a worst case, legal authorizations could be as simple as a deathbed holographic Will, stating only "I DIRECT INTERMENT BY CRYONIC SUSPENSION OF MY HUMAN REMAINS," followed by their signature and the date. Witnesses are not required, but it must be entirely in the person's handwriting with no other print or type on the paper. However, this does not deal with the more difficult problems of providing sufficient immediate and long term funding at the last minute.

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6. Checklist to Evaluate Legal Documents Prepared by Others

A list of 19 points to check to determine the adequacy of forms that vary substantially from the ones that Jim prepared.

7. Transition to New Documents

While we accepted patients in good faith under the UAGA, Jim believes that next of kin now have primary control over any further disposition of the frozen remains.

8. Suggested Questions for those who want Cryonic Suspension

This form is for a non-profit group wishing to acquire the information needed to complete the forms. Each of the 22 questions cites the form it relates to, and contains a thorough explanation of why the information is needed.

9. Declaration of Trust

This is the core document handling the financial arrangements. It also attempts to address the many problems that can arise during the course of a suspension, and enables the member to provide the trustee with his/her directions in the event of a crisis. It will accommodate funds from any source, provide for any form of cryonic suspension, permits the designation of a trustee other than a cryonics group, can be assigned to a new trustee if the original trustee can no longer perform, imposes specific monitoring duties upon the trustees, and grants the trustee power to alter the trust or execute documents needed to satisfy any new legal requirements. This document does not authorize the suspension, it merely governs the financial arrangement and decisions to occur after one's death. Other features are discussed in 91) above. (22 pages, including a table of contents)

10. Example of Completed Declaration of Trust

11. Notes on Declaration of Trust

53 notes of explanation and references to the relevant code sections.

12. Testamentary Directions Regarding the Disposition of My Human Remains

This document invokes one's legal authority to direct a cryonic suspension. The form can be used as a Will in itself, or a Codicil that amends a preexisting Will. It is best to have it serve as a Codicil. Members should be encouraged to make a formal Will resolving all the legal and tax problems associated with their death. This document merely resolves the authority directing a cryonic suspension.

Jim drafted this form to comply with the requirements of an

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International Will, one that will be valid in any state, and in most countries, regardless of where the property is located. The primary difference between this and a California Will is that it must be signed on the bottom of each page, and be executed by a third witness who is an attorney or other designated government official. Normally, a California Will need only be signed at the end, and needs only two witnesses, none of whom need to be an attorney or official. Some members may wish to do away with such enthusiasm, and execute in the same manner as a California Will, with just two witnesses. This is fine, and can be accomplished using this form and excluding the Certificate of International Will that is attached to the form.

13. Example of Completed Testamentary Directions

14. Notes on Testamentary Directions

38 notes of explanation for preparing the Will.

15. Model Procedure for Executing Testamentary Directions

Jim has furnished detailed instructions for the execution of an International Will. These can be ignored if the member elects to have this document executed using the procedure in the state where they reside.

16. Declaration by Next of Kin

Any Will can be vulnerable to attack if it can be established that the person was of unsound mind, or acting under undue influence. This form creates witnesses who can verify that such circumstances did not exist. And most important, it provides witnesses to the deceased's understanding that there are no guarantees being made regarding revival of their human remains. This document may prevent some legal unpleasantness, but it is not essential to complete the legal arrangements for a cryonic suspension.

17. Example of Completed Declaration by Next of Kin

18. Notes on Declaration by Next of Kin

15 notes of explanation.

19. Suggested Questions for Next of Kin Wanting Cryonic Suspension of a

Deceased Relative

This is similar to the questions asked of individuals arranging their own suspension. The major differences are the questions that will enable you to determine whether the relative making the arrangements has the authority to do so.

20. Authorization for Anatomical Donation by Next of Kind or Other Authorized Person

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We cannot make cryonic arrangements through the Uniform Anatomical Gift Act until the law changes. If such a change takes place while the relative is still alive, s/he can then invoke their power to authorize donation of the remains. This form delegates this authority to a trustee who can proceed with a donation if the law changes after the relative dies.

21. Example of Completed Authorization of Anatomical Donation

22. Notes on Anatomical Donation by Next of Kin

19 notes of explanation.

Jim believes that such complicated arrangements are essential to overcome the many stumbling blocks that can arise during the course of cryonic suspension, from death to revival. But no doubt many members will be put off by their complexity and the time required to complete them, and will fail to do so. Thus one of the next projects for BACS and Trans Time to address is the minimal documentation they will accept to place a person in suspension. Such documentation would be sufficient to protect BACS and Trans Time, but would not provide as much protection for the patient as the full set of documents.

Jim is well aware that he has not said the last word on legal arrangements for cryonic suspension. As we continue to navigate these uncharted waters, we can expect continued inputs from other attorneys, from members, and from the courts and legislatures. Nonetheless, he has made a significant step forward in addressing the numerous legal pitfalls that could cause a patient to wind up in the ground.

Trans Time has entered the legal forms into its computer, and with BACS is publishing them as CRYONIC SUSPENSION: LEGAL FORMS MANUAL. A copy of the unbound 122 page Manual can be obtained from Trans Time (1122 Spruce Street, Berkeley CA 94707) for \$15.00, sent by first class mail.

". . . We take risks, we know we take them. Therefore, when things come out against us, we have no cause for complaint."

Robert Falcon Scott
British Explorer of the Antarctic
1868-1912
(His last journal entry.)

"But let us beware of publishing our dreams until they have been tested by the waking understanding."

MORE COMMENTS ON CRYONICS FEES

Since CRYONICS has printed some recent comments by John de Rivas and others about my own suggestions on cryonics fees, and particularly since I must not have made myself sufficiently clear on some important points, I feel that I should respond to this comment.

John de Rivas apparently believes that I wanted the cryonics societies to charge a FLAT entrance fee of \$10,000 to EVERYONE who refuses a medical examination. This is not quite so, although I would indeed agree that if someone WERE to actually REFUSE a medical examination once requested, a \$10,000 fee would indeed be appropriate. However there are important qualifications. In the first place, the NORMAL circumstances for someone who joins should be like that of insurance policies: often a medical examination is not actually requested; rather what would happen is that an applicant would certify that he/she is in good health, and agree that if their claim to good health is found FALSE they will either not be frozen, or pay appropriate penalties. Very similar provisions are exactly those many insurance companies utilize.

This means that NORMALLY no medical examination would be requested, even though the RIGHT to request one would be agreed to by the applicant. Applicants who have no other reason for hesitation than shyness about revealing their cryonics interests to a doctor would have nothing to worry about.

Secondly, about the proposed flat fee of \$10,000 for someone wishing to join: as I have intimated, this fee would be asked ONLY WHEN THE APPLICANT WAS EXPECTED TO SOON DIE. Someone with, say, diabetes, whose expected longevity would be less than normal, but who could still expect many years of life, could simply take a medical and pay adjusted fees. Diabetes, in fact, is a very good example, since lifespan data for diabetics already exists and we could probably even waive the medical in that case.

However there remains the case of someone with, say, terminal cancer, who wishes to join a cryonics society in that condition. I feel that a flat fee of \$10,000 is exactly the most appropriate charge, and I very much DO NOT feel that we can achieve the same effect by debiting the member's Suspension Fund once they have died.

My reason is that one of the major problems of cryonics for a long time has been VERY POOR CASH FLOW. It is all very well to tot up the number of members and decide that at \$80,000 each our suspension organization will SOMEDAY have assets in the tens of millions. That money is no good to us at all now, and in particular it does nothing at all to help us to SURVIVE to that wonderful day when we will indeed have assets in the billions. That is the reason for Membership Fees in the first place.

Because of this problem, and PARTICULARLY because cryonics is very small and underfunded, we can't really equate money coming in now with money which MAY come in when a member dies. Let's consider the case of the

terminal cancer victim. If he/she dies just after joining, we are well off. But people DON'T always obligingly die just because doctors have decided that they are terminal. They have a tendency to linger on. Every year this member lingers on he/she will COST us in Emergency Responsibility. Every crisis in their disease will cause us to mobilize; even if we do NOT mobilize, we will have to remain in CONSTANT READINESS to do so.

Now in fact, even if we were to add all of the extra cost onto this member's cost of suspension, and even if we WERE a large organization easily able to afford the delay in receipt of money this would cause, we certainly could not equate \$10,000 received WHEN THE MEMBER DIES to \$10,000 received NOW. There is the interest factor to consider. Actuarially we would expect to charge about DOUBLE the fee of \$10,000 if we debit the charge to the members Suspension Fund, of course ONLY in the case of a member known to have terminal cancer. If we tried to increase Suspension Fees for EVERYONE, rather than Membership Fees, then we would have to raise Suspension Fees by MUCH MORE than 2 times. I have just explained, of course, why the small size of cryonics makes this a very poor idea indeed.

The major need of all of the cryonics organizations is for resources IN HAND. These resources can be the labor and donations of younger members who will continue their efforts into the indefinite future, or it can be higher fees from older members. ANY proposal to increase our Suspension Fees rather than our Annual Dues will do nothing at all to solve this problem: in fact, it is likely to make it worse, since it will increase STILL MORE the incentives for older, sicker people to join and younger people to stay away. SUSPENSION FEES ARE NOT RESOURCES IN HAND.

Finally, there must be many readers of CRYONICS who are interested in cryonics and may even consider joining some day. I believe some comments to them would be appropriate.

1. Let us suppose that we DO NOT charge membership fees which increase with age. We will then have a weak organization which will resemble most of all a life insurance company with rates which DID NOT increase with age. Would you REALLY want to take out life insurance if the rates DID NOT increase with age? Would you REALLY feel that SUCH a company to which you paid your money was stable and likely to provide your family if you were to die? If you really do wish to join a cryonics society, even someday, then it is very much to your interest that it be stable and have enough money and workers coming in to meet the demands upon it. Surely you do not believe that cryonics societies can exist unsupported in the air?

2. Let us suppose that the cost of yearly Membership Dues and the Entry Fee is putting you off joining. If that is really so, then

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you provide an excellent example of EXACTLY WHY we should have fees which increase with age. If you DO wish to join someday in the future, and avoid paying your dues NOW, then without any equivocation you are proposing to rely upon the efforts of present members to keep the organization going until you choose propose to put costs on all of us without providing any compensating benefit at all.

This position may seem harsh. However it is a lesson derived from all previous cryonics experience. Just because life is valuable and important does not create any moral claim on us to save it at every opportunity. If

we heeded such claims, we would quite simply bankrupt ourselves and not even save the lives presently in our care, not even our own lives. To use inflammatory terms already raised in this context, WE are called FASCIST and MACHO for refusing to allow ourselves to be imposed upon, while YOU are HUMANITARIAN and ALTRUIST for letting us adopt the burden of saving your life.

Whatever else may be said, such attitudes will not produce a strong cryonics organization, and you are likely to ultimately find when you DO need suspension with a terminal illness that the only organizations available are weak, unstable, and unimpressive. In fact, with continuation of a fees policy which favors old and sick members, there could very well be NO CRYONICS ORGANIZATIONS AT ALL. If you really want to be suspended, that would hardly serve your interests.

3. I personally did not start urging this policy as a means to scare nonmembers into joining. However I think that anyone who is not now a member should think very carefully about the early history of life insurance in England, where it first started. This history is exactly the motivation for my present suggestions: IN EVERY CASE, early insurance companies which charged identical fees for all members either changed their fee structure to reflect age and health, or WENT OUT OF BUSINESS. Sometimes they went out of business quickly, and sometimes they lingered for decades, but collapse was their end. I did not make this history up, you can read about it in histories of insurance, and the threat to all of our suspension arrangements is not an imaginary one.

However if you are REALLY worried that you might not be able to join when we finally DO introduce age-related fees, then your rational response is to join NOW, and THEN WORK TO HAVE THE FEE SCALE INCREASE WITH AGE. Your fees will then remain the same for life, AND you will have transferred your problem to others. I believe that the history indicates that if we do not introduce proper fee scales, then our successor organizations will do so, and your opportunities to join under favorable terms will suffer far more curtailment than if a present organization did so. Apre nous le deluge!