CRYONICS

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Contents:

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EDITORIAL MATTERS

Do you know some one who can translate well from written Russion to written English? There is a book ("The Philosophy of the Common Task") by a 19th century Russian (Nicholas Fyodorovich Fyodorov: See the September, 1981 issue #14 of CRYONICS for his "cryonics-like" views) which needs translation. The translator cannot be guaranteed fortune--perhaps a certain amount of fame (not to mention self-satisfaction). That is, there is reason to believe that the Arno Press (via Gerald J. Gruman, M.D., Ph.D.) may be willing to publish such a translation as part of their "literature of death and dying" collection. If you can help, contact Charles "Ed" Tandy, President, Prometheus Society, Inc., P.O. Box 663, Laurel, MD 20707.

The article "Steps on the Road to Immortality" which appeared in the November, 1982 issue of CRYONICS was written by Thomas Donaldson. We apologize to Dr. Donaldson for failing to credit him earlier.

CRYONICS NEWS BRIEFS

"CRYONICS" COURSE OFFERED BY CALIFORNIA STATE UNIVERSITY SYSTEM

Reminiscent of the all-too-recent OMNI slur, cryonics has been subjected to yet another critical evaluation with negative results. It seems the academic judgement about whether what we are doing will work or not has already been made. Well, folks, guess what? We've all been wasting our time. We can pack up our bags and go home--or maybe to the nearest astrology or UFO convention. At least, that's according to the 1983 catalog of the California State University at Fullerton. Course #105, which is listed on page 347 of the University's catalog under the "Physics" section, clearly informs us about "Pseudoscientific Theories and Practices: Astrology, UFOs, the practice of cryonics, food fads, etc. The fundamental difference between science and pseudoscience."

Nice to know somebody has figured out a way to prove we're wrong. I'm even tempted to pay my $37.50 just to find out how they did it. Any takers?

MONOCLONALS ON THE HORIZON--OR HERE ALREADY?

In a recent very exciting paper which appeared in the October Proceedings of the National Academy of Sciences Ellis Reinherz and colleagues report on the successful use of monoclonal antibodies to effectively treat Severe Combined Immune Deficiency (SCID). SCID is a fatal genetic disease which results in infants being born without any immune systems. Compromised by total lack of immunity the infants quickly become hosts for a multitude of microorganisms and die. Prior to this recent breakthrough by Reinherz the only treatment for SCID was lifelong protective isolation in a "plastic bubble" after sterile cesearean birth.

The monoclonals developed for treating SCID were actually used therapeutically in a roundabout way. One of the barriers to giving SCID babies new immune systems via bone marrow transplants

is the problem of the new immune system rejecting the patient. This form of rejection (as opposed to the traditional kind where the patient rejects the transplanted tissue) is called "graft versus host" disease (GVH). GVH occurs only because prior to the monoclonal technique it was not possible to exclude mature or activator T-lymphocytes from the marrow. If it were possible to do this, the new immune system would take root, produce new mature T-cells and these T-cells which matured in the new organism would not reject it.

What Reinherz and colleagues did was to develop monoclonal antibodies which were specifically targeted to destroy only mature T-lymphocytes, sparing immature stem lymphocytes which would later repopulate the system with healthy, mature defensive cells. In so doing, these workers eliminated GVH and opened the possibility of lasting cures of SCID. But, the bonanza may not stop there. There are a variety of other diseases which are not currently treatable today because of GVH. Most of the leukemias, and in particular acute myelocytic leukemia could be treated if it were only possible to give the patient a new immune system after first destroying all the malignant white cells. Currently, experimental treatments for acute myelocytic leukemia consists of first destroying the patient's cancer and his immune system by massive cobalt irradiation and then transplanting marrow (and consequently a new immune system) from a relative into the patient. Unfortunately, in about 50% of such cases GVH disease develops and the patient dies. Also, the irradiation and subsequent immunosuppression which are needed to initially eliminate and then control immunity also have many life shortening and unpleasant side effects. More widespread application of the monoclonal technique offers the possibility of avoiding radiation-induced destruction of the cancer by the direct use of monoclonals or at very least the elimination of GVH disease by pretreatment of donor marrow with T-cell specific monoclonal antibodies.

There is also much reason to believe that this technique may be applied in the other direction, for example in inducing recipients of organ transplants to accept their grafts without rejection. To this end, Drs. Mendez and Terasaki of UCLA Medical Center have recently begun a pilot project using highly specific monoclonal antibodies to eliminate AKOT8 or "killer" T-cells from transplant patients and thus hopefully control or eliminate rejection. Application of this technique to experimental animals has resulted in near complete control of organ rejection.

BACS ANNOUNCES GENERAL INFORMATION MEETING

The Bay Area Cryonics Society will hold an orientation meeting designed to introduce newcomers to cryonics. The meeting will consist of a slide presentation dealing with current suspension techniques, an overview of BACS activities and a discussion of BACS research goals. The presentations will be followed by a question and answer session. A nutritious snack will be provided. This meeting should provide a fine opportunity for Northern California cryonicists to acquaint interested friends and relatives with cryonics. Anyone interested in attending the meeting should contact Robert Canfield at (408) 356-0800 from 8am to 4pm. The meeting will be held on Sunday, January 23, from 2 to 4pm at the home of John Day, 7710 Huntridge Lane, Cupertino, CA 95014.

EMERGENCY RESPONSE FUNDING REQUIREMENTS

Art Quaife, President, Trans Time Inc.

Trans Time currently has emergency responsibility for about 100 Suspension Members of the various non-profit cryonics societies. At the time they became Suspension Members, these persons fulfilled all of the legal and financial requirements established by their cryonics society to be placed in suspension upon deanimation. The vast majority of Members took out life insurance policies to fund their suspension.

This raises a problem for both the cryonics society and for Trans Time: if a Member deanimates, how do we know that the funding arrangements made many years ago are still in force? The initial charge for whole-body suspension is about $21,000, or about $11,000 for neuropreservation. Many thousands of dollars must be committed immediately, in chemicals, labor, supplies, and other expenses to get the Donor in suspension. Before responding, we must be assured that previous funding provided is still in force and will pay these bills.

The question is not academic, since Trans Time has already suspended a Member where an insurance policy, that we were assured by the closest relative was still in force, had in fact been allowed to lapse. We know that other policies have also been allowed to lapse, with no immediate notification to the Member's cryonics society.

Thus we must emphasize that Trans Time will normally respond to the deanimation of a Suspension Member, for whom we have emergency responsibility, as soon as we are able to verify that funding arrangements are still in effect, sufficient to cover at least the initial charges for suspension.

Suspension Members will want that verification to occur very rapidly. Methods of having your cryonics society continually apprised of your funding include:

1. Transfer ownership of your insurance policy to the cryonics society. It will be up to the society to then establish billing procedures for you to pay the premiums, but in any event they should soon know if the policy has lapsed or is still in force.

2. Retain policy ownership, but send your cryonics society receipts, or copies of checks, showing that you have paid the latest premium.

3. Establish a joint account (e.g. savings) with your cryonics society, which they agree not to touch during your (first) lifetime.

(Continued on page 13)

QUESTIONS AND ANSWERS ABOUT SOCIETY FEES

I have received several questions about my proposals regarding cryonics society dues and how they should depend on age and state of health. On some points I believe I simply didn't make my ideas clear enough; on the others more discussion seems appropriate. I have therefore prepared some answers and further commentary on this point.

While I do believe strongly that our Entry Fees (if nonzero) and our Membership Dues should depend on age and state of health, I also realize very well that making such a change would be a sharp break with present-day cryonics practice, and we could not expect to do this without very thorough scrutiny of what it would mean.

1. Your articles have suggested that for legal reasons we need at least two organizations to institute dues varying with age. Are there ways for a single commercial or nonprofit organization to carry out a scheme which made readiness fees depend on age while directly contracting with members/customers?

As I understand it, that question suggests that TRANS TIME or the CRYONICS INSTITUTE might charge the customers for readiness in a way which increases with the age (or probability of death) of the customer.

Unfortunately this seems to me something which has little chance of working. (I DON'T WANT to exclude the possibility that either organization could directly contract with customers, so much as the possibility that they could do that AND charge readiness fees). The problem is, that there are quite a few cases, one of which I even mentioned, of funeral companies or other agencies agreeing to perform some act upon the death of the contractee, charging "insurance style" rates for it, and then being found in violation of the insurance regulations. The case of the company in Tennessee which offered a discount on its funeral services for members of its scheme, and was found to be in violation of insurance laws, is only one. (State ex rel Atty Gen v. Smith Funeral Service, cited in my article)

It is true that close examination of these cases tells us that what was done wrong was not so much to charge rates depending on age, as rather to OFFER A DISCOUNT to those who had joined the scheme. However it is hard to see why anybody would join a Society and pay its dues in the first place unless they received either a discount or some other service. It seems to be an essential part of the scheme that there be an arms-length relationship between the supplier of the service and the ultimate recipient.

I do want to emphasize that the incompatibility is only with the direct charging of READINESS FEES. Either a commercial or a nonprofit organization might easily charge other fees directly.

However I personally feel that THERE SHOULD BE MORE THAN ONE ORGANIZATION IN ANY CASE. The main point of a cryonics society is to act as the agent of the suspendees, with particular reference to the laws against perpetuities, but also in reference to the possible failure or misfeasance of Trans Time or any other commercial or nonprofit agency. At a minimum, having two organizations would keep our suspension funds away from creditors and liquidators if one of the societies collapsed.

Unfortunately it seems impossible to get around the provisions of these laws merely by subterfuges such as not calling the scheme insurance. The Commissioner of Insurance has power to look at the spirit of an arrangement rather than its letter and could quickly decide that a scheme of direct charging was a form of insurance.

2. What would be the actuarial scale of charges which a society should make for readiness?

Briefly, I haven't done the calculations, but I'm working on it. Until I established to my satisfaction that such a scheme was POSSIBLE, I had no incentive to work out its costs. The costs should be comparable to present ones for members who join at about age 30-35, and should not rise as the member ages. Naturally they rise tremendously for those joining at high ages, but this will not affect present members. As an estimate only, it would run from about $50 a year for those under 30, about $100 for those age 35, and increase steeply for those who join at higher ages. These fees would be fixed at the time of joining and would remain the same throughout the subsequent lifetime of the member. I get this estimate by looking at life insurance rates. I do not want these considered firm figures.

3. Do you consider old members to be a liability? If so, what about their suspension fees, which will shortly start to become payable, or their suspension funds?

Yes, I do consider old members to be a liability TO THE CRYONICS SOCIETY. My article was aimed at the cryonics societies rather than at Trans Time or any other commercial society directly, and besides I think I might have explained myself better. So I will restate my arguments, looking at the matter from the perspective of any organization which must physically suspend and store people:

In the first place, I'm not at all sure that the older members are such a benefit. Members of a cryonics society, who are signed up and paying their readiness fees, represent a constant and steady source of income. People who sign up shortly before dying require, in order to be serviced, that the organization servicing them maintain ALL its equipment in readiness for an unknown period of time in order to deal with events which are actually extremely rare: that is, the death of someone whose relatives actually want to get them frozen and actually want to pay for it. Art Quaife, of Trans Time, has written quite acutely about the problems Trans Time would have if it were to depend on "walk-ins"

for most of its income. He has called it the "gambler's ruin" problem, which is precisely that if Trans Time depends for its income upon rare, sporadic walk-ins, then it would easily go broke if a suspension didn't occur for a period of (say) 3 years. I feel that this problem should be balanced against possible income gain from such people. It's true that if you had someone like that ready to be frozen THIS INSTANT, their money would look awfully good. But we DON'T HAVE people waiting to be frozen on our doorsteps every day. Do we really want to devote our time and capital to what is essentially gambling?

Second, partly because I was directing the article at members of a cryonics society, and partly because I simply didn't explain the matter enough, I will say that I specifically DID NOT MEAN that the "physical" organizations should simply cease suspending such people. In fact, I argued (not very clearly, I admit) that if (say) BACS were to institute my proposals, and charge rates increasing with age, that that WOULD NOT dry up the continued flow of elderly customers for Trans Time.

In the suggestions I made, I was talking about the rates charged by the CRYONICS SOCIETY. That is, it would be necessary, if someone aged 70 wanted to join a cryonics society, for them to pay very high actuarial rates. However it would also be part of this proposal that Trans Time would charge them exactly the same as any other customer for the same services: suspension, encapsulation, and yearly storage. Their problem as I saw it, and the reason why one way or another they would HAVE to join a cryonics society, is that they would lack any sort of longterm protection or longterm plan. Sure, their son could pay their storage fees, but what happens when he dies?

My suggestion for how Trans Time (or any other such organization) could be protected in this case would be simply that it would charge a Burial Deposit to cover the cost of burying someone if the bills ever stopped being paid. There need not be any fixed policy on when this Burial Deposit would be assessed, but a good case would exist for one in any case in which the patient, or the person responsible for the patient, hadn't made any longterm arrangements (which is almost synonymous with joining a cryonics society!). As you know, the cryonics society has perpetual existence, while the relatives do not; this would be quite good reason not to assess a Burial Deposit from the cryonics society, so long as they were to make themselves responsible for burial if the suspension fund of the patient became exhausted.

Naturally readers might ask if the arrangements I describe might not cut off the flow of elderly patients. Frankly from past history this looks very unlikely indeed. As of now, most of the people in storage either had NO longterm arrangements when they were frozen, or only got them because Trans Time virtually forced the relatives into making them. They came to be frozen even without longterm arrangements, and the relatives have shown extreme reluctance to make any, EVEN WHILE all cryonics literature, and Trans Time itself, has pointed out that without

longterm funding the entire operation is pointless. I'm suggesting that the cryonics organizations simply allow these people to come, and freeze them, and charge them yearly storage charges and a Burial Deposit. The "physical" organizations will get the financial benefit of freezing and storing them, exactly the same as now.

Some cryonics organizations now add a surcharge for nonmembers. For instance, Trans Time now has a $2000 surcharge. I think there should be no surcharge at all, but there should be a Burial Deposit. But there would be considerable reason for people to still sign up with a cryonics society, because if they didn't they would have merely engaged in an expensive deferral of their burial date. Or to put it in other terms, the surcharge should be assessed, in relation to age, by the CRYONICS SOCIETY, not by the organization which freezes and stores.

4. I'm old and I'm now a member. I couldn't possibly afford high annual dues.

Well, actually no one has asked me this question, but I want to emphasize and explain my point. I am not proposing that we increase the dues payable from anyone who is currently a member. That would be self-defeating, since in the longterm we will ALL be old and have to worry about such annual dues. The problem is that it is much more to the interest of ANY present member of a cryonics society to sign up a young person who will be a member for many years to come before suspension than it is to our interest to sign up people who are likely to die soon. By joining, you have acquired different interests from those who have not joined. You should be looking after those interests.

5. Wouldn't it reflect discredit on cryonics and the cryonics societies if ANYONE suspended were allowed to thaw out?

No, it would not. It would certainly reflect discredit on the cryonics societies if they were to allow a FORMER MEMBER to thaw out, at least without a fight. But that is very much not the same thing: if Walt Disney had been frozen (never having come to us about it) we would not feel responsible if he were to thaw out. Why should we feel responsible if someone else, making no preparations and giving us no help at all, should thaw out?

A major purpose of joining a cryonics society for me, and I believe for almost all cryonicists, was that by doing so I would be banding together with like-minded individuals for mutual aid. This is simply not going to work if we go about feeling responsible for everyone who ever had any connection with suspensions. If a group behaves that way, why should anyone want to join? They could get the benefits of membership just as well by NOT joining, and more cheaply, too. By putting ourselves out like that, we are merely creating an invitation for the public to hold us to ransom.

6. What would be the effect of such an arrangement upon the tax

status of our suspension funds?

I think that has to be looked at. As I mentioned before, it made no sense to look at what it would mean if our dues increased with age of entry unless and until we could establish that our dues COULD increase with age of entry.

However I have thought about this question. It seems to me that it should not have any effect. It is true that we hope to benefit from the research involved in the donation of our bodies, but that does not make the project any less one of research. The American Cancer Society need not prohibit cancer patients from joining, and can even charge them for services rendered. In fact, a foundation remains a charitable foundation even if it confines its eleemosynary activities to the assistance of left-handed female Greek diabetics, and turns down all pleas from anyone else. More to the point, a cryonics society, or in fact any charitable society, is entitled to refuse any donations, and particularly the donation of a body, without having to give any reasons for its refusal.

There is a possibility that the tax status of our suspension funds would be improved so long as we simply never accepted body donations from nonmembers under any circumstances at all. Donation of a body would involve, in this view, the concurrent donation of enough funds to allow its swift collection, and suspension would be one of the advantages the society offered to those who had benefited the society by their lifelong support.

One of the major points I made, and I'd like to repeat it here, is that from the past history of insurance it is quite simply a very poor idea to set up a scheme like cryonics in which the services are received by the SICK, and then to try to assess everyone, including the WELL, equal fees. Any organization which tries that is going to see all of its WELL members evaporate to greener pastures, and hordes of SICK join up with alacrity. Fees will then have to rise to pay the increased cost; the entire capital cost of the program will have to be paid by those using it, and in terms of cryonics, where so few cryonicists die in any given year, both the societies and the commercial companies ultimately go under due to gambler's ruin. I don't like that prospect, and I feel that the current charging schedules greatly contribute to currently unstable finances among all the cryonics groups and companies. We'd do much better to go after a steady source of income from Suspension Members, rather than hold ourselves out to suspend anyone who comes to us.

Thomas Donaldson

CRYONICS SCIENCE REPORTS

MEDICARE, MEDICAID, OLD FOLKS HOMES, AND US

One of the leading unsolved problems in practical cryonics is the problem of how we can protect our suspension funds from the depredations of the State. Cryonicists probably all know of horror stories in this regard, of people all of whose money was exhausted in terminal care or care in a nursing home; almost every cryonicist will also know of the problem here, which is fundamentally that no state aid will be forthcoming until the person receiving it is destitute, and how can destitute people pay for their suspensions?

I personally would like to see a great deal more legal work by cryonicists on systems to protect us in this event. Moreover the extent of preparation by most cryonicists against this possibility, which objectively considered is far more important than any sudden accident, remains ridiculously low. Even though granting a Power of Attorney allowing our guardians to bankrupt us will probably work, we need to actually implement such protections, and besides there may be much stronger protections available after detailed legal preparations.

A recent set of 3 articles in the NEW ENGLAND J OF MED (HL Smits et al, 1982 (307) 855-62; N. Rango, 883-889; BC Vladeck, 889-890) give us some perspective on this problem from the viewpoint of doctors and medical administrators (who are not, of course, themselves in immediate need of institutional care). The dominant tone of all of these articles is very much that of civil servants: wanting to increase regulation and control the market. While this seems disputable, the facts described are fairly clear.

Rango's article, in the midst of policy prescriptions, gives us a good idea of the actual conditions prevailing in nursing homes. During the 60's the number of nursing homes grew rapidly, with many speculators involved, and eventual scandals about abused and neglected patients and fraud. Federal laws brought in stringent regulation. The states tried to limit the number of nursing home beds they would support, since they were financially liable for their patients. States enacted "certificate of need" regulations by which an organization could only construct a nursing home with state approval. In 1979 only 3 states had not enacted such laws. States could also limit the fees payable to the nursing home; they each use differing combinations of these two methods to limit the number of beds available. The effect, of course, is that not enough beds exist to meet demand, operators can provide poor service in a protected market, and waiting lists are long, getting into a nursing home involving delays as long as 4 years.

Statistical studies (R Gibson, HEALTH CARE FINANC REV. 1980 (2)(1) 1-36; M Meiners, AM HEALTH CARE ASSOC J. 8(2) (1982) 20-22) show that almost 50% of the cost of nursing homes comes

directly out of the pockets of its consumers. Medicare pays for only about 2 percent of total expenses and private insurance only 1.5%. Average cost per day ranges from $50 to $100; middle-income people such as cryonicists may lose all their money. Since demand is so great, operators can refuse to admit patients; it is advantageous for them to admit private patients who pay more and patients who need little care rather than a lot of care. The cost of care means that once admitted, now destitute patients will have nowhere else to go; they become a profitable "cash crop" for the operators.

Vladeck, in his book UNLOVING CARE (1980) argues that the operators of proprietary nursing homes typically provide worse care for their inmates than do nonproprietary homes. The efforts by the states and the Federal government to keep costs low may also cause poor care: it appears that many state governments explicitly regulate the fees a nursing home may charge, and Medicare and Medicaid pay doctors at far less than the rate for private practice.

The article by Smits provides an interesting empirical counterpoint to this other work summarized by Rango. What Smits has done is to present several test cases to Medicare reviewers. These reviewers decide in each case whether or not a patient shall receive the nursing home benefit. Different states vary considerably in the extent to which Medicare funds nursing homes. It seems that Hawaii is the best state of all for this, with 691 days per 1000 elderly persons funded. In any case, Smits found very marked differences in the willingness of different reviewers to cover nursing home with Medicare. Three out of 18 reviewers covered very few cases, almost 50% of the reviewers covered most cases, but NOT THE SAME ONES! The reviewers agreed on only two out of 9 cases.

Inconsistent coverage can hardly demonstrate the merits of a state-run health plan such as Medicare. Unfortunately the Smits article was low on suggestions for how a patient might best increase their chance of coverage; however from it we can derive some principles. Skilled nursing care should be involved, whether unnecessary on medical grounds or not. Bandage wrappings on an amputation stump are perferable to elastic stockings, and heparin is preferable to warfarin. Pain should be controlled by injections rather than oral medication and feeding should be by nasogastric tube, rather than other procedures involving a higher quality of care. The patient should be very fully documented.

We knew many of these facts already; the interest of these articles is more to fill out our understanding and give us ideas about the general scale of the problem. The current median age for cryonicists lies between 30 and 45. I believe it would not be too soon for us to start detailed thinking about our own preparations, whether the eventual founding of a cryonics nursing home or other intermediate arrangements which will mitigate the problem we find for ourselves. Current funding of anti-aging research, and current public attitudes to it, do not suggest that

we can expect medical help to arrive in time for ourselves. It is an overwhelming certainty that anti-aging research will have much more status and money by the time we are old, but status and money unfortunately do not imply immediate effectiveness. In fact, aging research will probably overtake cancer research by 2000, but just as now, cancer still happens and must be prepared for.

SIDE EFFECT OF VITAMIN E NO. 6742

The following item may be of particular interest to any older cryonicists who are taking the drugs discussed. A recent report in NUTRITION REVIEWS (40 (1982) 180) tells us of some important interactions between Vitamin E, Vitamin K, and anticlotting drugs such as warfarin.

The article cited is a case report of an airline pilot who suffered from heart disease and high blood lipids. The man was also taking high doses of Vitamin E, up to 1200 units of Vitamin E per day (that is, 1.2 grams per day) for several months. He came to hospital because of bruise marks on his skin and blood in his urine. As medication for his heart problems, he took warfarin, the anticlotting drug, at doses of 3.25 mg per day.

When the Vitamin E was discontinued, the bleeding stopped. The man and his doctors agreed to undertake a controlled study (on him) of the relations between warfarin and Vitamin E, and the study showed that Vitamin E would considerably increase the effect of the warfarin and thus cause hemorrhage.

Vitamin E seems to increase our need for Vitamin K, the vitamin involved in blood clotting. Anticoagulant drugs increase the need for Vitamin K still more, to a level at which (with normal intakes of Vitamin K) those taking both drugs incur a significant risk of dangerous hemorrhage.

This relationship is a new discovery in humans, even though some scientists have noted that chickens need increased Vitamin K when taking high doses of Vitamin E. A recent article in the BRITISH MEDICAL JOUR (24 Jul 1982, p.274) by the Standing Advisory Committee on drug interactions, concerning interactions with warfarin and other anticoagulant drugs, does not mention any possible relation with Vitamin E at all. The connection is made much more important by the fact that Shute and others have campaigned for Vitamin E as a treatment in heart disease.

MICROWAVES AS A TREATMENT FOR HYPOTHERMIA

One of the (many) problems in actually reviving suspension patients consists of the simple cost of even the best of present techniques if applied to a human patient. A leading example is the likelihood that any whole body revivals would have to use microwave rewarming techniques, at least until something better

comes along. Yet the cost of an apparatus to rapidly rewarm a whole human being using microwaves quickly becomes out of the question not just for existing cryonics groups but even for any real, present-day research laboratory. If such a device were to get funded, the reasons for funding (at least in any near future) could certainly NOT include the possibility of whole-body revivals of frozen human beings.

Cryonicists might therefore take some interest in a recent article in CRYOBIOLOGY (19 (1982) 428) whose author, CJ Gordon, studies the notion of using large microwave heating devices to warm human victims of severe (not solid-state!) hypothermia. Up to now doctors have used warm-water baths to rewarm victims of hypothermia, but this causes uneven warming and causes low blood sugar levels and rise in the blood pressure. Microwave heating might allow a far more rapid and safe rewarming.

In his work, Gordon used 2450 megahertz microwave radiation inside a rectangular waveguide to rewarm mice from body temperatures from 17 degrees C up to 30 degrees C. The mice were cooled within the apparatus and then warmed by microwaves as soon as they had cooled to the desired hypothermia. Warming rates ranged from .04 degrees/sec up to .65 degrees/sec.

Some mice showed lack of coordination immediately after cooling and microwave rewarming, but all recovered within 1/2 hour. The microwaves caused burns to the base of the tail in some animals. Within 1 week after treatment, 12 out of 19 mice had lost their tails because of these severe burns. On the other hand, only one of the 19 mice died, and that mouse seems likely to have died from cold exposure rather than microwave rewarming as such.

When Andjus and Lovelock (J PHYSIOLOGY 128 (1955) 541) used microwaves to reanimate rats from -6 degrees C, they used warming rates only about 2% of those used in Gordon's study. They attained 100% survival in animals heated with microwaves, compared to only 20% survival in animals heated by conduction.

Gordon feels that the burning off of the tail comes from local "hot spots" forming in the radiation field, and that rotating or shielding the patient ought to prevent this. From a cryonics standpoint, the most interesting fact suggested by this article is the existence of a constituency for research and construction of fast microwave rewarming devices for human use. Metropolitan hospitals in Northern states might reasonably keep one such device on hand, which would mean that cryonics groups would eventually (don't hold your breath!) have access to them for their own use.

QUERCETIN AND FLAVONOIDS

Both quercetin and the flavonoids are substances common in fruits and vegetables also high in Vitamin C, such as black currants, tomatoes, lettuce, apples, or onions. Quercetin usually occurs in

the outer skin of fruits and vegetables, while inner portions remain free of quercetin. The flavonoids, on the other hand, play a prominent part in the list of chemicals contained in juices such as orange juice. Some have suggested that these substances, particularly the flavonoids, may help absorption and/or use of Vitamin C. It would therefore interest immortalists a lot to know what their effects on longevity may be.

A recent paper in EXPERIMENTAL GERONTOLOGY (17 (1982) 213) by E Jones and RE Hughes gives us the results from a lifespan study of such chemicals. They fed three groups of mice respectively with a control diet normal in its constituents, a diet high in flavonoids (from blackcurrant juice, and a diet high in quercetin; they maintained this diet for the whole lifespan of the mice, and then waited to see what the resulting lifespans turned out to be.

Their experiment had two significant results. First, they found a quite significant reduction in the lifespan of the quercetin-fed animals. This loss of lifespan applied primarily to the male animals. On the other hand, they also found that flavonoids from blackcurrant juice had an equally significant effect increasing the lifespan, particularly of the oldest-lived females.

In absolute terms neither of these substances caused either large increases or large decreases. The decrease due to quercetin, for instance, was about 10%, and the increase from flavonoids also about 10%. Of course we would not refuse an increase of 10%. Perhaps the most interesting implication of this article, however, is not the possibility of a new lifespan drug, but rather the lesson it gives us about selection of lifespan drugs in general. As it turns out, quercetin is a powerful antioxidant (J Kuehnau, WLD REV NUTR DIET 24 (1976) 117). It has other properties also, and in particular has high ability to cause mutations in cells receiving it. The lesson is not that antioxidants as such are harmful, but rather than for ANY substance we might take for aging, we need at least one lifespan experiment on at least one species of mammal before we can really consider it as a drug for our own use....and even then, of course, we should be prepared to watch as scientific work develops and abandon the drug at any sign of adverse effects.

(Continued from page 3)

4. Establish an irrevocable inter vivos trust, with your cryonics society as beneficiary. An irrevocable trust will likely have tax advantages to you and your estate; consult your attorney.

It is in your interest to insure that your cryonics society can rapidly verify that your current funding is adequate. Use one of the above methods, or ask your cryonics society about acceptable alternatives. At present Trans Time is strongly recommending such guaranteed funding; in the future it may become a requirement. Act now, be safe, and beat the rush!

CRYONICS, EARTHQUAKES, AND SURVIVAL

by Michael Darwin (Federowicz)

Earthquake safety and survival is a major problem which confronts cryonics operations in California. Small quakes occur several times a year, while a medium-sized quake causes a fair amount of damage in a small area every few years. However, the true nervousness about earthquakes is due to the predictions by seismologists that major quakes will happen sometime in the next decade or two in Los Angeles or San Francisco or both, causing extensive damage, loss of life, and disruption of services. Frozen patients stored at Cryovita near Los Angeles and at Trans Time in the San Francisco-Oakland area are especially vulnerable to earthquake damage--frozen bodies are brittle and sensitive to shaking, and they are dependent on the continued availability of liquid nitrogen (LN_2). The odds on this disaster occuring are apparently very high; yet, until recently, cryonics leaders have given very little attention to the problem.

Since cryonicists are already confronted with many certain problems which demand immediate action, their reluctance to deal with a problem as seemingly massive and beyond their control as earthquakes is perhaps understandable. The attitude toward earthquake safety among most California cryonicists (as well as among most other Californians) could be characterized as being basically the attitude of most people toward global environmental catastrophe, nuclear war, or other massive disasters over which control is next to impossible: they prefer to remain optimistic, hoping it won't happen, and they try not to spend too much time thinking about it. Perhaps "ignorance is bliss" attitudes are understandable in the large majority of people who are not oriented toward future planning and survival; but this is the very kind of situation in which cryonicists should be way ahead of the rest of the population. In any case, there is a difference between these other disasters and an earthquake. The former are global and result in the demise of high-technology civilization, while the latter produces only local effects which will eventually be repaired and healed by the rest of the intact "civilization organism." It then becomes a matter of planning to get through the initial event and the social disorder which follows. As it turns out, there are a number of relatively simple things which can be done to minimize the risk of succumbing to a major earthquake or its aftermath.

Most of this report will focus on what has been done to deal with the risks and dangers that exist at Cryovita Laboratories, which is located in Fullerton, on the east side of the Los Angeles suburban area. While much of this strategy is aimed particularly at Cryovita's needs, other storage facilities in California now and in the future could benefit from most of the suggestions. Indeed, many of the suggestions apply to protecting storage facilities from natural disasters almost anywhere. For instance, organizations in Florida and Michigan could benefit from these precautions when designing disaster plans to cope with fire, tornados, and hurricanes.

Perhaps the first consideration in earthquake survival is picking the right location for the storage facility. Clearly, situating your building over or adjacent to a known fault would be a big initial mistake which might make any subsequent planning nearly worthless. The

first and most obvious place to start then is with the question: how close to a major fault is the site and what will be the expected kind of damage at that location? Information such as this may be obtained from the California State Department of Mines and Geology, which has just released an excellent and comprehensive 135-page study of damage possibilities in Southern California in the event of an 8.3 (on the Richter Scale) earthquake.[1] Maps and charts are included which characterize the shock likely to be received in a certain area according to five grades. The three most severe are: Strong shock--minor damage; Very strong shock--fall of chimneys and cracks in the walls of buildings; Extremely strong shock--partial or total destruction of some buildings, especially in areas of high ground water with high potential for ground failure. This consideration of ground water is just as important as distance from a fault. Areas with high ground water are subject to a potentially catastrophic phenomenon known as soil liquification. This effect occurs when large amounts of mechanical energy are injected into wet soil. The soil is momentarily converted into a semisolid gel which allows structures to collapse. topple, or completely disintegrate. Soil liquification is the principle source of both damage to surface roads and of structural collapse during seismic activity. It is extremely important to make sure that your location is not cursed with a high water table.

There are at least three other important considerations in selecting your site. First, are there secondary hazards nearby which could destroy the facility in the event of an earthquake? Obvious candidates for this kind of disaster would be a liquified natural gas plant or a munitions factory. Second, what is the character and density of the local population? Putting a facility in a heavily urban area would greatly add to its likelihood of destruction from subsequent civil disorder. Locating in an area of primarily single family dwellings or light industry would seem to be a more favorable choice. Finally, it is necessary to select a structure which is solidly constructed with earthquake safety in mind. The use of older brick and cinderblock construction buildings should be avoided if at all possible. The ideal structure would be of steel-reinforced concrete with wooden cross supports in the ceiling and relatively light ceiling and roofing materials to provide for maximum give and minimum weight in the event of collapse.

With these general considerations in mind, let us know examine the specific situation of Cryovita. Cryovita is fortunate to be located in an area which is considered least likely to be damaged by earthquakes from either the San Andreas or the Newport-Inglewood faults (see map on page 19). Cryovita is in suburban Orange County in a low density residential and light industry area which is free from any significant amount of ground water. The building in which Cryovita is housed is of recent steel-reinforced concrete construction with a wood-beam supported ceiling, using low weight construction materials. In these respects Cryovita is in about the best possible location for withstanding a major earthquake. Cryovita is also located directly on a major highway running through the Los Angeles basin which should also

1 Earthquake Planning Scenario For A Magnitude 8.3 Earthquake On The San Andreas Fault In Southern California (Special Publication 60)

be subject to relatively minor damage from seismic activity.

While the building is of recent, solid construction, it is not equipped with a sprinkler system or elaborate fireproofing. There is a serious risk of fire from electrical and natural gas connections in the case of severe structural damage. The front offices of the laboratory are glass walled and can probably be expected to shatter during severe sesmic activity, which will present a security problem in the post-quake period. A considerable risk of fire is further present in the form of flammable liquids (especially alcohol for cooling baths) and corrosive reagents (acids and chemicals used for perfusion and research.)

With these risks and strengths in mind, it is now time to consider a plan for dealing with a major earthquake, with particular reference to the steps we have taken at Cryovita. The most serious and catastrophic risks to be encountered are collapse of the structure and fire. At Cryovita we have all patients stored in stainless steel dewars with back-up aluminum dewars stored at an alternate location. These back-up dewars are kept in "earthquake boxes"--heavy wooden crates to protect the fragile and easily punctured skin of the dewar. In the future we hope to add additional protection against structural collapse by jacketing the stainless steel dewars in similar heavy wooden or steel cages or boxes. The only reason this has not already been done is due to cost. Even with the dewars exposed, stainless steel has a higher tensile strength with a great deal of resistence to puncture. Vacuum valves and other delicate connections are already heavily hardened and protected against damage. Dewars are always maintained on overload casters and allowed to roll freely in order to dump any seismic energy which may be communicated to them.

A factor well worth considering in selecting cryogenic dewars is holding time. It is simplistic to assume that just because a patient and dewar make it through an earthquake the trouble is over. Quite the contrary. Several state studies indicate that a major earthquake of 8.3 magnitude or larger would leave the Los Angeles basin paralyzed and seriously disrupted for as long as several weeks. Electrical power will be available only on a scattered basis and roads may be badly damaged. This means that liquid nitrogen production will grind to a halt locally, and that supplies of LN_2 will be difficult or impossible to bring into the city. Having dewars with holding times in the range of months and keeping them topped off regularly will be of critical importance. Cryonics personnel should be mindful of the fact that others will not consider the continued maintenance of frozen "corpses" be be a very high priority when triage is being actively practiced with human beings who are still "clinically" alive. We will be on our own, <u>totally on our own without hope of significant help from anyone or any agency outside our own control</u>. We should also remind you that many cryonicists may themselves find cryonics to be their bottom priority in the event of a major disaster. The immediate objectives of staying animate, caring for sick or injured loved ones, and helping friends and neighbors out of the rubble and out of the area will probably be of more pressing concern than the welfare of comparative strangers who are cooling their heels or heads in liquid nitrogen. Dewars with long holding times reduce the pressure to get liquid nitrogen and allow personnel to cope with more immediate problems such as security and personal survival. To this end we have selected an MVE A-2542 for storage of neuropreservation patients. With current load, immediately after fill the dewar has a holding time of approximately 100 days. The dewar is filled

every 30 days, and even if disaster struck immediately before a fill was scheduled, the dewar would still hold LN_2 vapor temperature for at least 60-70 additional days. A low temperature (-50°C) mechanical freezer is also kept on the premises in the event that LN_2 supplies are exhausted. A 2,200 watt, 16 amp emergency generator in good working order is already in the laboratory in case of a power failure during a human perfusion. It could supply the electricity for other necessities in case of an emergency or , at last resort, for running the mechanical freezer to maintain neuro-patients.

Planning for fire is another important task for any earthquake plan (or indeed for <u>any</u> facility's emergency preparedness), yet it is difficult to have a great deal of confidence in any fire plan unless the building is equipped with an automatic sprinkler system. Unfortunately, Cryovita does not have such a system or the $10,000 necessary to install one. Of course, in an earthquake a sprinkler system is only as good as its water supply, and it is quite possible that underground pipes and pumping stations will be disrupted by the seismic shocks. It thus becomes extremely important to have a fire plan which is augmented by regular fire drills. Such a plan is now in operation at Cryovita and has been reviewed by fire department personnel. Our plan includes maintaining patient dewars no more than a few feet from our overhead steel-curtain door, which opens to the driveway outside of our bay. All dewars are on quality, easy-glide casters and the pathway between the doorway and the dewars is always kept free of obstructions. This means that the patients are never more than ten feet away from being out of the building and on the other side of a reinforced concrete wall, safe from any blaze. Dewars should always be arranged so that, in a modest amount of time, a single individual can evacuate the entire facility with a minimum of effort and risk to himself. Storing patients near easy exit is essential in any building which is not protected by automatic sprinklers. It is also prudent to store back-up dewars at another location, so that in the event of fire or other damage resulting in vacuum loss (but not resulting in immediate LN_2 boil-off) patients can be transferred. Of course, good ability to fight a fire with plenty of CO_2 and/or dry chemical extinguishers which are not dependent on well water is also of great importance.

After danger of fire, security is the next most important issue to consider. Security implies the presence of one or more individuals at the storage facility and the incentive for them to remain there-- or for that matter, to come there in the first place. Incentive means that Cryovita must represent a source of at least basic necessities: food, shelter, fresh water, and possibly electrical power. Most of Orange County should be provided with electrical power within a few hours after the end of seismic activity. Orange County obtains most of its electrical power from the San Onofre nuclear plant and the Huntington Beach steam plant, neither of which is expected to sustain much damage. Even in a more serious situation, we have the previously mentioned generator and the fuel to run it for some time. Cryovita is already extremely well provisioned with potable water supplies in the form of plastic-bottled perfusate water and distilled water for laboratory use. It would seem prudent to provide an extra 20 or 30 gallons of chlorine-treated water to further support the needs of several individuals up to a month. At this time, we have enough dry or specially

packaged food supplies on hand to feed two people for 30 days. We also have halazone tablets for treating contaminated water, canteens, tools, a shovel for burying feces, flashlights and batteries, blankets and bedding, and enough other survival and comfort items to support four or five people for several weeks. Medical supplies are already in great supply at the laboratory, and the capacity is available to treat anything from a minor cut to a major thoracic or abdominal wound.

A further consideration in the case of a devastating earthquake is that the laboratory will need to be protected against looters. High quality weapons and ammunition are now present at the laboratory to defend against intrusion. Objectively, Cryovita is unlikely to be a prime target for looting. Industrial bays are low priority compared to grocery stores, shopping centers, and pharmacies. No operation staffed by one or two people could hope to withstand the determined onslaught of large numbers of looters. However, defensive weapons should allow us to confidently maintain a low profile, while neutralizing any threat we encounter on a chance or occasional basis. For fire safety, the ammunition has been stored in heavily armored containers with tight seals and moderate fire resistence, and they have been placed at the opposite end of the building from the suspension patients.

To assure adequate staffing for the laboratory in the event of a disaster, it is necessary to have concerned and knowledgeable staff members in residence no more than a few miles away or within the facility itself. At this time, three knowledgeable and capable staff members live within several miles of Cryovita, at least one being within easy walking distance. At some time in the future, Cryovita may have a full-time caretaker in residence, which should further strengthen the prospects for good security in the event of an earthquake.

Besides improving the physical protection of the dewars, there are only two major things left to do to complete Cryovita's emergency preparedness. Flammable liquids should be removed from the facility as soon as possible. At this time investigations are underway to determine if convective cooling of patients is an acceptable alternative to alcohol cooling. Corrosives in glass need to be overcased in plastic containers and stored in an area remote from patients.

Summary

The most immediate and important thing to realize about earthquakes is that they, just like death, are things over which we have more control than we might expect. We may not be able to stop them from happening, but we can greatly affect the outcome for ourselves by confronting the likelihood of their occurrence and preparing accordingly. It is NOT possible to prepare for every contingency. If a large enough quake occurs and luck is not with us, the facility could collapse and burn. The possiblity of this is not likely, and it should under no circumstance prevent us from taking action where we can and should.

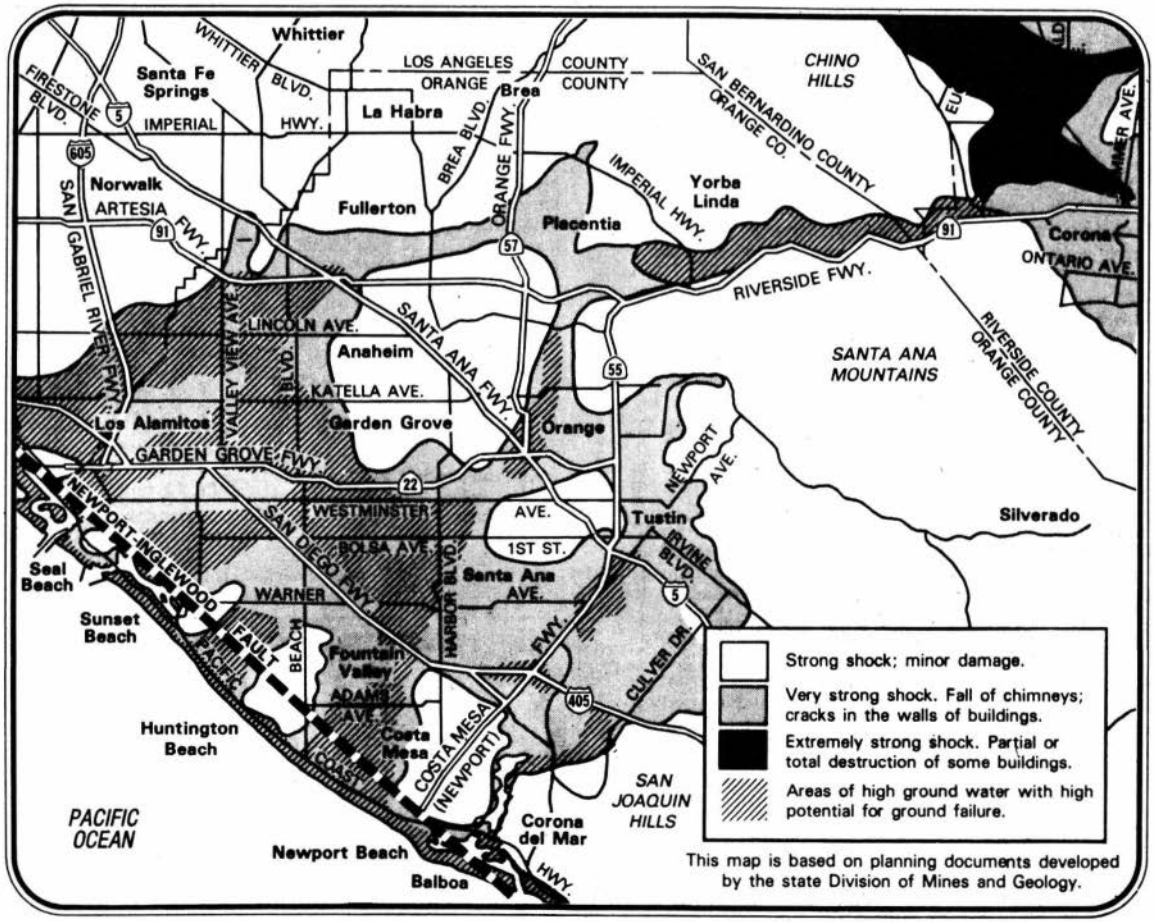
The biggest things Cryovita has going for it are its location and its concerned personnel. The laboratory is in an area which is generally thought to be likely to receive only moderate damage. We are fortunate to be located in an upper middle class area of low density housing. If we take these advantages and further prepare our facility to handle a worst case of extended lack of access to LN_2, as well as the possibility of some stuctural collapse, then we are very likely to make it through "the big one" with both our lives and the lives of our sus-

pension patients intact. To a great extent our survival hinges on an awareness that it is up to us. But then cryonicists have had to deal with that knowledge all along. Now we just have to extend that knowledge into action in more areas of our suspension planning. Something can be done.

POSTSCRIPT

It is important to point out that Cryovita does not maintain backup dewars for whole body patients at the time of this writing. We hope to be able to acquire backup whole body capability in the future.

The discussion of security measures taken in this article should be considered illustrative rather than exhaustive. In fact, since this article was written a number of changes in security at Cryovita have been made, including hardening the facility further to protect against casual intrusion in the absence of a disaster. Detailed discussion of these security measures would obviously be counterproductive and compromising.



Broken line shows route of Newport-Inglewood fault. Shaded areas indicate severity of shocks.

CRYONICS POLL RESULTS -- PART III

by Steve Bridge

This final section of the poll results concerns your opinions on cryonics issues and your predictions for the future. For clarity, we will repeat the introductory statistical information given last issue.

66 polls were returned to us, but the total number of answers is larger for many questions because of multiple responses. For some questions, the answers of the respondents have been divided into three groups:

S = Suspension members (41)
M = Members of a group, but not signed up for suspension (16). (referred to as "members" in the text)
N = Non-members (9)

15. *What do you think is the most important issue confronting cryonics today?*

	S	M	N
A. Need to lower prices	4	3	
B. Need to expand membership	11	5	2
C. Need to increase technical capability and standards	14	3	
D. Need to expand research	19	7	4
E. Need for co-operation	7	1	2
All	1		
No Answer	1		

Other (S): Need to stay in existence --2
Need to be financially strong --2
Need to demonstrate high probability of success.
Need to change approach to optimism based on facts and give up childish, unreasoning optimism based on ignorance. Need to approach cryonics from a technically sophisticated and realistic standpoint.
More publicity to become a familiar social element.
Legal obstacles.
Marketing expertise.
The disagreements and dissents within our ranks.
Location in a low probability earthquake area.

Other (M): Public relations.
Public acceptability.
Need to educate public.

Other (N): Stay in existence.
Lack of scientists and scientific knowledge.
Need to stop fighting with the Cryobiology Society.
Need more technically and professionally qualified people.

Comments: Research especially needed on high pressure freezing.
"A" will lead to "B."
"A" must occur without loss of standards to be effective (hard problem!)

15. (cont.)

Once a vertebrate form of life is "brought back," many barriers will be publicly broken down.
Need universities to do more research. When technical problems are solved, people will be breaking down the doors to join.

16. *What suggestions do you have for reaching potential new members?*

Just about everyone had something to say for this question. This was also the place that anyone who had any leftover suggestions used. Not all of the suggestions deal directly with getting new members, but we are printing all of them as they are given. We hope all cryonics groups take notice.

TV and print media advertising and publicity --8
Increased use of free radio and TV interview time --3
Publication of research --3 (ed.: after we have some exciting results, of course.)
Publicize progress in the field --2
Favorable, positive publicity --2

(Ed.--All of this publicity takes a lot of time and people, of course. We would be delighted to have more people willing to work in this area. There is plenty that could be done.)

Succeed in organ preservation or whole animal preservation and revival--6
Freeze a celebrity --3 (One suggestion was to organize a campaign for contributions for a celebrity freeze-fund.)
Get Durk Pearson to write about cryonics or mention it on Merv --2
Advertise for tours of cryonics facilities.
Heavy P.R. campaign by personable people, not the current lot. (Ed.--But how do we get "personable people" unless the "current lot" goes out to find them?)
Advertising in unusual magazines like Fate.
Advertise "Info on avoiding Death, satisfaction guaranteed. Send $2.00." (Ed.--This does not exactly constitute truth in advertising.)
Write to letters sections of various hobby magazines, suggesting connections of cryonics to the hobby. (Ed.--Readers, this is up to you. Write to those hundreds of magazines you read.)
Most current cryonicists heard about it and got involved right away. They did not have to be sold. In our present situation we cannot hope to convert many; rather a low level, low cost publicity to reach the others out there. CRYONICS magazine is great for interesting people.
A best-selling novel and resultant film, for mass appeal.
Lectures and advertising at universities and libraries.
Guest speakers at university classes on Death.
Approach libertarians.
Science fiction groups. (Ed.--We've tried it and had no luck at all. See CRYONICS, November, 1981, page 8.)
Participation in health fairs and shows.
Paperback books detailing cryonics and the nature of death, which are revised every couple of years. (Ed.--maybe Cryonics: Threshold to the Future will eventually develop into such an item.)

16. (cont.)

Increased mailings. (Ed.--We have recently sent out one such mailing to 250 names; but this is expensive and time-consuming. Any volunteers?)
Hire a good salesman.
Professional marketing survey with subsequent advertising campaign.
Cryonics can be hard to find for interested people. Advertise under "cryonics" in Yellow Pages. (Ed.--Yellow Pages has recently accepted "cryonics" as a heading, and we are now listed in the Los Angeles directory.)
Marketing agreement with the funeral industry.
Holding public forums. (Ed.--This is in progess in L.A. area.)
Our growth has mostly been through personal contacts --"constant dripping" on people who have read about cryonics in a newspaper and expressed interest.
Find a way to lower costs or otherwise make cryonics more financially feasible.
Change pricing policies to attract people who are healthy and who won't be expected to die for some time.
Drop neuropreservation option.
Discuss non-freezing issues with public, such as controlling aging process and increasing intelligence.
Take people one step at a time. 1st, health; 2nd, life extension; 3rd, cryonics.
Present as theory, not as fact; outline possibilities and potentials.
Emphasize scientific facts supporting cryonics; explain fallacy of cryobiologists' views.
Increase "respectability" of cryonics.
"Human potential" movement like est. (Ed.--"Use one" or "become one?")
Older, more experienced leadership in management of cryonics organizations. (Ed.--Volunteers?)
Better organization.
More medical support.
To fight against religious ideas. To explain they are legends built by man to live happily despite the prospect of physical death, and that the world has been built without a creator.
To enhance credibility, all members of cryonics organizations should be motivated to get education, training, and even professional licenses in cryonics-related fields. E.g., everyone could qualify as a nurse's aide or EMT. (Ed.--Would the person who wrote this suggestion please write an article for us explaining the benefits and giving advice on how easy or difficult it is to do?)
Better communication with current members who are not signed up. Organizations should send out facts on new research, etc., and not just minutes and treasurers reports.
Leave all dead bodies laying around for years.
Butterfly nets, hypnotism, brainwashing, kidnapping?

17. *How would you describe death?*

A. long deep sleep --2
B. absence of being --54
C. blackness --5
D. a step into another existence --3 (one signed up, two not)
Don't know --2

Note: All of the "C" answers were a double answer with "B".

Other: Biological disintegration.
Cessation.
The worst thing imaginable or possible.
Complete and utter non-existence.
Irreversible cessation of life functions.
The end of life, never to see relatives.
Body food for worms.
Don't know. Like to meet someone who does.
Termination of the electric currents in our nervous system, that are our mind, our soul, etc.
Possibility of alternative worlds via probability continua (i.e., in some worlds we die, in some we don't.)

18. *What do you feel are the chances of cryonics or suspended animation working for you?*

	S	M	N
A. Very high	2		
B. Fairly good	9	5	1
C. Possible	27	8	3
D. Highly unlikely	2	3	5
Unsure	1		

General attitude seems to be cautiously optimistic.

Several pointed out that it may depend on how soon they are frozen. Later freeze = better chance.

Note: Many of the "M" group and at least one of the "N" group still plans on being frozen after they have made arrangements.

19. *What age do you think you will be when you are frozen?*

	S	M	N
150	1		
100+	6		
90-99	5	2	
80-89	8	7	
70-79	7	5	1
60-69	3		
50-59	1		
40-49	1		
?	4	2	1
No answer	4		7

Suspension members are more optimistic about their chances for a long life before they are frozen.

Many of the "N's" indicated that they did not plan to be frozen.

Accidental death before year 2050 --1 S.

20. *How long do you expect to stay frozen before being revived?*

Years	S	M	N
1,000	1		
500	1		
300	1	2	
200-300	1		
200	5	2	
150	2		
100	10	5	1
50-99	5	2	
25-49	4		
0-24	1	1	
until 2050	1		
A few hundred years	3		
Depends on how soon frozen	1		
Unsure	2	3	1
No answer	2	1	7

This is a pretty wide range of answers, but most are fairly optimistic.

300 years or longer --8

200-299	8
100-199	18
Less than 100	21

21-A. *What is your prediction of a date for the development of true suspended animation?*

Date	S	M	N
2100-2200	6	4	2
2050-2099	9	4	2
2000-2049	14	5	2
before 2000	6	1	1
2100-2300	2		
Mid 1980's (for pets)			1
No answer	3	1	2

Most common answer was 2050 --13.

34 answers between 2000-2050. This seems overly optimistic to me.

High of 2200.
Low of 1990.

21-B. *Date when someone frozen today could be revived?*

	S	M	N
3000	2		1
2400-2999			
2300-2399	3		
2200-2299	7	3	
2100-2199	11	5	2
2050-2099	7	2	2
2000-2049	4	3	1
Before 2000		1	1
Distant future	1		
20-200 years	1		
Never	1		
No answer	3	1	2

Most common answer was 2100 --12.

Wide mid-range. 31 answers between 2050 and 2200.

High of 3000.
Low of 1990.

Question: If the "M's" and "N's" are so optimistic on this, why aren't they signed up?

21-C. *Date when prevention and reversal of aging become a reality?*

	S	M	N
3000	1		
2500		1	
2200	1	1	
2150-2199	3		
2100-2149	6	3	3
2050-2099	4	4	1
2000-2049	21	5	2
Before 2000	1	1	2
No answer	3	1	1

Most common answer is 2100 --11; but midpoint is about 2030.

32 answers from 2000-2050.

High is 3000.
Low is 1987.

22. *How much injury do you believe is done with existing perfusion and suspension techniques?*

	S	M	N
A. Permanent and irreversible		1	1
B. Severe, but potentially reversible in distant future	32	12	4
C. Severe, but definitely reversible	10		2
D. Moderate			1
E. Insignificant			
No answer		3	1

This question may have not been worded well, since it elicited very little diference of opinion. It is possible that material published in our magazine and others has simply made everyone cautiously steer to the middle on this question.

23. *Do you expect any memory loss or other specific damage as a result of freezing?*

	S	M	N
Yes	24	10	8
No	6	3	
Don't know	3		
Hope not	1	1	
No answer		1	1

Two people noted that recent experiments are hopeful signs that memory can survive freezing.

Comments:
Don't want to be revived if much memory loss --2.
Intellectually -Yes;
Emotionally -No.

END OF PART III.

NEWEST SONG RELEASES FROM . . . GEEZER GUS AND THE LIVERS

By Geezer Gus

Hi, folks. Just for fun we are bringing you the latest songs from that great new imaginary group, THE LIVERS, whose life-ist music has been topping the fictional charts for the last several months. The Livers want to help tune you in to the Funtastic new age of man, a time not too many decades from today when life will be deathlessly care free. The present selection will appear in the Livers' forthcoming figmental album, "Living It Up", scheduled for release soon at an immortalist record shop near you. (All selections copyright by the author.)

The lyrical style of the first selection is somewhat coarsely matter of fact; but the refrain rises in power to emphasize the joys of working at . . .

THE ROCKY MOUNTAIN FREEZER COMPLEX

Well I got tired of the rat race and my dull routine --
The bull and the hassle and the whole damn scene.
So I saved up my money and I went out west,
And I got me a job at THE ROCKY MOUNTAIN FREEZER COMPLEX!

The Roc-ky Moun-tain Free-zer Com-ple-ex!
The Roc-ky Moun-tain Free-zer Com-ple-ex!
Yeah they give me good pay, and they give me good SEX
'Cause I got me a job at the Rocky Mountain Freezer Complex.

It's in the middle of nowhere in the side of a hill,
Where everything's peaceful and everything's still.
No missle can hit it 'cause it's buried too deep.
It's just me and the ladies and the people we keep.

Down in the freezer complex they're keepin' their cools.
They're takin' it with 'em all their diamonds and jewels.
I keep 'em at minus two hundred degrees,
And I get money, women, whisky and some day a free freeze!

The Roc-ky Moun-tain Free-zer Com-ple-ex!
The Roc-ky Moun-tain Free-zer Com-ple-ex!
All you people out there must be nervous WRECKS,
But I got me a job at the Rocky Mountain Freezer Complex.

Well the robots went on strike and it really looked bleak.
I even had to work four hours last week.
Yeah I never seem to know what will happen next,
But I really dig workin' at the Rocky Mountain Freezer Complex.

Mrs. McClellan's in the third row top
And in the forty-second row we got her great grand pop.
In the thirty-seventh row we got her bulldog Jacques.
Her anaconda's in the ninth row, ninety-ninth box!

The Roc-ky Moun-tain Free-zer Com-ple-ex!
The Roc-ky Moun-tain Free-zer Com-ple-ex!
All you people out there must be breakin' your NECKS,
But I got me a job at the Rocky Mountain Freezer Complex.

We got ten thousand people give or take a few,
And we get a couple more in every day or two.
We bring 'em in and then we simply put 'em away,
Check ev'rybody's status then we play all day!

They never seem to argue or to take much time.
They bathe in liquid nitrogen and seem just fine.
So I play handball, tennis, ping pong, pool and swim all day
With Annabelle, Anita, Kim, Annette and Rene!

The Roc-ky Moun-tain Free-zer Com-ple-ex!
The Roc-ky Moun-tain Free-zer Com-ple-ex!
Yeah I kicked off my hex, and I'm no longer vexed
'Cause I got me a job at THE ROCKY MOUNTAIN FREEZER COMPLEX!

* * * * * * * * * * * *

Our second selection is from someone employed at a slightly more skilled line of work. This bouncy song expresses the honest joy of a special kind of tinkerer, the

BODY MAN

Oh I'm your bod bod bo-ody bo-ody man.
I'll take your gene blueprint and make a new plan.
I'll shorten or heighten, contract or expand --
I'm your body man.

Why live in a body that you got by fate?
I'll give you a body to make you feel great!
I'll flatten your stomach and cover your pate.
I can hardly wait!

Yes I'm your bod bod bo-ody bo-ody man.
I'll make you a body like nobody can.
Molecular details are at my command --
I'm your body man.

Back in the old days, some people were sad.
They had to make do with whatever they had.
The hand that fate dealt them was sometimes quite bad.
They were far from glad.

But here in my gene shop I put it all right.
I make luscious beauties from hideous frights.
A tweak of the genome will bring you delight,
Almost overnight.

Yes I'm your bod bod bo-ody bo-ody man.
I'll take your gene blueprint and make a new plan.
No problem's too small and no problem's too grand --
I'm your body man.

Oh you can grow feathers or live in the sea,
Or burrow the deep earth, or swing from a tree.
Reshaping your body's no problem for me --
Just you wait and see!

'Cause I'm your bod bod bo-ody bo-ody man.
I'll take your gene blueprint and make a new plan,
And after you see me, you'll be a new man!
I'm your body, yes I'm your body, yes I'm your body man.

* * * * * * * * * * * *

The next song is a more serious one, sung in a slow, quiet, but firm tone of voice, with controlled power in the refrain portion punctuating and emphasizing the preceeding statements. Like certain other songs, it relies on creating a sense of moral pressure which is intended to sweep the listener into a frame of mind which is accepting of the central messages being purveyed. But what better messages to hear about than those originating in that future enlightened time,

THE NEW AGE OF MAN

It's a new age of man.
It's much better than when we began.
We control what we do with our lives:
It's a new age of man.

In the time that is gone
The people did not live long;
All the lovely ladies turned
Into hideous monsters.

And the men, they were men,
But they didn't stay that way then:
The strongest heart
Soon returned to the sand.

We don't die anymore!
We have sealed shut Death's dark door.
We control what we do with our time:
It's a new age of man.

In the world as it was
You could die for a cause
That another man
Thought you should die for.

With your life not your own
It was easy to be a drone.
Diversity
Didn't fit in the plan.

We're not slaves anymore!
We have sailed to Freedom's shore.
We control what we do with our lives:
It's a new age of man.

Our lesson is learned:
We will never return
To the dark ways
Of ages before.

It's a new age of man.
It's much better than when we began.
All of time, all of space in our hands
It's a new age of man.
It's a new age of man.
It's a new age of man. . . .

Our fourth song changes the pace considerably, bringing us to Bowser-ish sounding refrains at times, with a bouncy, almost circusy melody at center stage. It starts with a relatively quiet preamble and then permanently switches gears. Although the lyrics may seem somewhat inane, remember that many inane songs are not only fun but also popular and successful!

FROZEN WOES

All of her woes 'n'
Troubles are fro-ozen;
All of her woes 'n'
Troubles are fro-ozen....

We had a life, and it was nice
But then she had to go into the ice.
I said goodbye, so long, I'll see you again.
Don't know where and it's for sure that I do not know when but

All of her woe woes 'n'
Troubles are fro-wozen.
All of her woe woes 'n'
Troubles are fro-wozen.
All of her wo-oes 'n'
Troubles are fro-ozen
Frozen many centuries from her.

I got the news, and I was blue
That she would not live more than a week or two.
I looked straight at the doc, and here's my reply:
There's no damn way that I will ever let my baby die! so

(Same refrain as above)

And now she waits for her return
But there is one thing that I think I've learned:
We'll meet again, and I'll tell you why:
My babe and I have got a love that truly cannot die! oh

(Same refrain as above, with various modifications).

* * * * * * * * * * * *

The next song is intended to elicit visions of epic struggles and classical heroes. The refrain is sung slowly in a big, powerful voice conveying the emotional meaning attached to the words by the female vocalist; the last line of the refrain is more subdued but heroically confident. The body of the song is also sung with big, deliberate sounds, appropriate to an epic type of setting. The song conveys the message not only that heroes can die, but that there is a way out of death.

KNIGHT

He is fro-ozen.
He is fro-ozen.
But someday . . . he . . . will . . . re . . . turn.

My knight in shining armor,
He was the strongest man.

He conquered every harbor,
Our hearts at his command.

Our men, they were the strongest in the world,
But he was stronger still.
His hand was faster than a flashing sword,
Unmatched was he for skill.

Then one day, as he was laughing in the fray,
An arrow found his side,
And as we watched in shock and in dismay
Our knight began to die.

(Refrain, same as above)

We bound his wounds up firmly
As Hell was raining down;
We took him on a journey
From battle's raging sound.

And when we got to the Castle of the Mind
Our Merlin cast a spell
To save our knight from any more decline;
He knew the science well.

(Refrain, same as above)

And someday, when the battle takes my breath
A blow may find its mark.
My men will pluck me from the maw of death,
They'll save me from the dark.

Then I too will be resting in the cold,
Awaiting my return.
And though I wait for centuries untold
My knight's fate I will learn.

We'll be fro-ozen.
We'll be fro-ozen
Together. We . . . will . . . re . . . turn.

Yes someday, my knight again will open eye,
And breath will fill his chest.
He'll cast the mighty gates of Hell aside,
The victor over death!

Then I too will be standing by his side
And loving him again,
Our love enriched in depth and also pride;
We'll greet our cheering men.

We'll be li-iving!
We'll be li-iving!
Together, for . . . e . . .ver . . . more.

ALCOR LIFE EXTENSION FOUNDATION
4030 NORTH PALM #304
FULLERTON, CALIFORNIA 92635
(714) 738-5569