

CRYONICS

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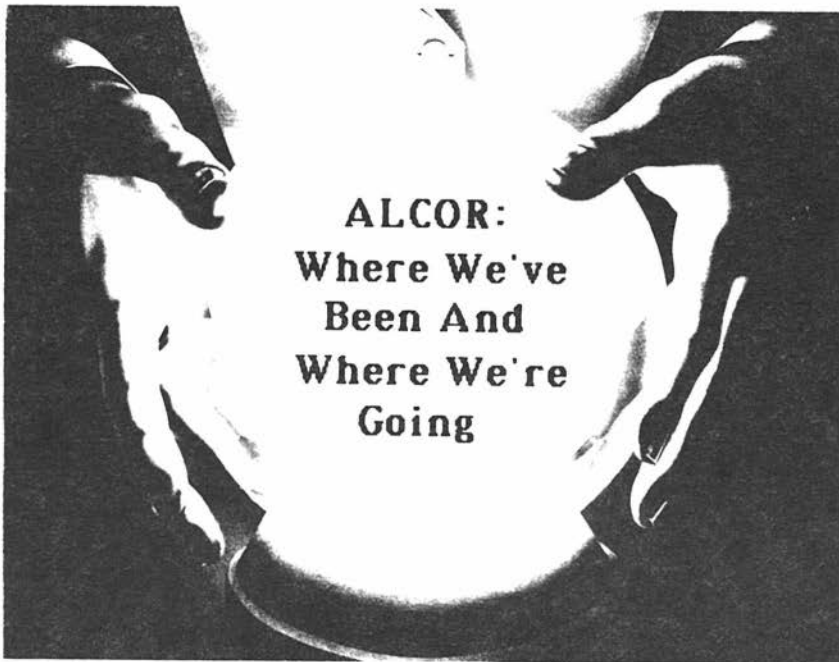
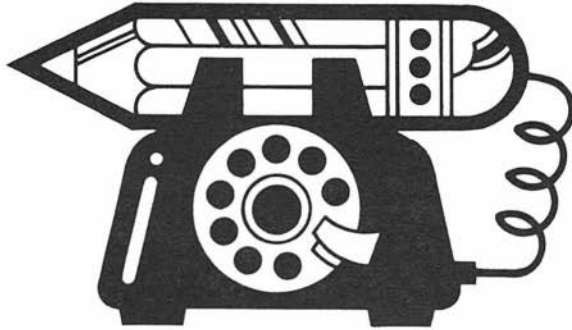
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Editorial Matters

Response to last month's request for new leads who might potentially be interested in cryonics has been good. We received well over thirty names. We will be mailing these people basic information packs and sample issues of CRYONICS magazine. Our thanks to all those who responded. We'd like to urge anyone else out there who's been putting it off to write in. We need growth and we need it NOW. Help us.



This brings us to our second subject: financial support. As those of you who were present at the Lake Tahoe Life Extension Festival no doubt know, ALCOR has been very busy over the past year. We have spent a great deal of time and energy on producing higher quality literature, and we've spent even more time and money on research. We have wrapped up our dog total body washout experiments, and we have also completed the first phase of a far less publicized but far more important project: a basic survey of cryoinjury on a gross, histological and ultrastructural level in cats subjected to perfusion and

freezing protocols currently being employed on humans.

To translate it into simpler terms, what we've done is to carry out perfusions of animals prepared under "ideal" conditions (i.e., no circulatory arrest or long delays between "death" and perfusion and freezing) and perfusions of animals under "normal" conditions (one hour of warm ischemia—i.e., no blood flow, followed by 24 hours of cold ischemia, after which they were perfused and frozen). The purpose of the latter series of experiments was to mimic conditions frequently encountered in human perfusions. We now have a tremendous wealth of information about the effects of cryoprotective perfusion on a physiological level (such as how well the brain and other organs perfuse and equilibrate with cryoprotective agent) which will help us to overcome problems encountered in human suspensions. We also evaluated a wide range of tissues from these animals on a light microscopic level. Kidney, heart, liver, and brain were also examined on an electron microscopic level. For the first time we, as cryonicists, have a firm idea of how much structure is left after application of the particular freezing and thawing protocol we are using. We emphasize that this research is preliminary and the results greatly affected by the kinds of fixation, embedding and preparation techniques we used. It is only a beginning. Much additional work is needed.

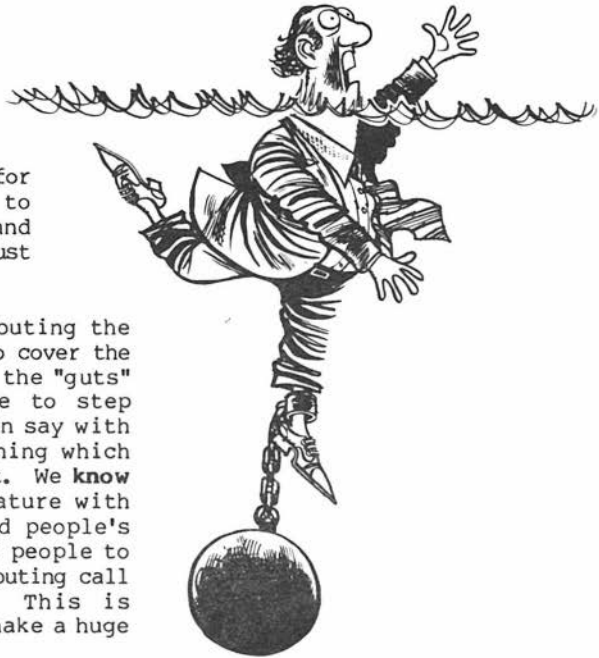
In the next few months we'll be publishing much of the work we presented at Lake Tahoe. We think you'll agree that this is incredibly important basic research. We also think you'll agree that more work, which is so urgently needed, cannot go on without your help. Doing this research has been a tremendous financial drain on ALCOR. Overall we've spent in the vicinity \$25,000 on research in the last 12 months!! An impressive figure for a tiny organization like ALCOR. The real costs would have been much higher if it hadn't been for the help and support of Cryovita, and the time and efforts of our unpaid research/suspension team. If we had been a normal research institution with a fully paid staff, such as a university or government agency, the research we've done in the last year would probably have cost well over a million dollars! Money in ALCOR's hands at this point means **high leverage**.

The research work and literature production have left us drained of cash at a most inopportune time. Why? Because opportunities to grow in terms of membership and promotion have never been better. Right now we have 18 people in our file of pending suspension memberships and another 11 people who have requested paperwork sets during the last three months. While it is never wise to count chickens before they're hatched, we know from past experience that better than half of our "pendings" will make it through to "suspension member" status. And still, interest widens, more requests for information and "hot leads" come in every day.

We need your help. We want to issue an updated and expanded version of our basic information booklet. We have a "vision" of how it should look. If possible we'd like to go to a full color, glossy paper cover. This IS affordable now. Color printing prices have taken a nosedive in the last year, and it is now possible to get 1000 full color covers printed on heavy clay paper for about \$600! We want to improve the layout of the text pages with more lavish illustration and a warmer, more human feel. We also want to increase our press run to at least 1000. We urgently need larger press runs to handle the increasing volume of requests for information. Our first edition of **"CRYONICS: Threshold to the Future"** ("The Blue Book") was a run of 200 copies in 1979 and lasted us three years, our second major run was 500 copies and lasted a little

over 18 months, and our last run was another 500 copies, and it has lasted six months! We are now almost out of Blue Books and will need to run off a few hundred more of what we have already, just to meet commitments for the next few months! If we are to improve our communication skills and reach more people successfully we must have your help and have it now!

If you can help us by contributing the cost of a color cover, or helping to cover the \$1,000 to \$1500 printing bill for the "guts" of the booklet, now is the time to step forward. For the first time we can say with **confidence** that we've found something which seems to work—at least a little bit. We **know** that if we put high quality literature with lots of information in interested people's hands we get members. We even get people to sign up! If you can help by contributing call us or write us **immediately**. This is definitely an area where you **can** make a huge difference.



Chiller Chiller, Grade D Thriller

Elsewhere in this issue is a comprehensive review of the recent CBS TV movie CHILLER. All the vital statistics are there as well as the twists and turns of plot which you may have thought you'd escaped if you didn't watch the show. Our coverage of CHILLER here is really not aimed at dissecting plot or assessing artistic merit or lack thereof. Rather, we'd like to take a minute to treat the phenomenon of a cryonics TV movie as a **news item**.

How was it that a major network came to show a TV movie with cryonics as its theme? At least a partial answer to that question was had by calling up the executive producer of CHILLER, Richard Kobritz of Polar Film (yes, that's right Polar Film!) and asking him that very question. The answer and the answers to some related questions are worth thinking about.

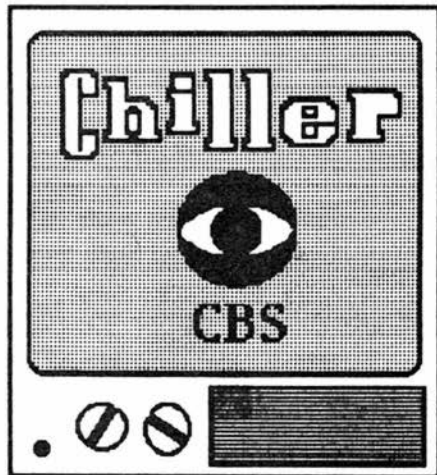
About a year ago CBS expressed an interest in doing a horror movie with an unusual slant—specifically with a cryonics slant (no, we haven't been able to find out WHO at CBS expressed such an interest). Polar Film, a company that has done other horror movies for CBS, was approached. Kobritz of Polar and a screenwriter named J. D. Fiegelson then sat down and "brainstormed" about how to handle the screenplay. They got a clipping/research service to dig them up everything they could find on cryonics. What they found was, according to Kobritz, "a bunch of horror stories. People thawed out and rotted away, people left abandoned in mini-warehouses and a host of unanswered questions about what might happen if this thing really 'worked'." Kobritz said he liked the idea of

doing a story on cryonics because the whole thing (cryonics) seemed so "tongue-in-cheek and bizarre".

The principle problem Fiegelson and Kobritz had with their screenplay was how to address the problem of creating a monster. They toyed with the idea of brain damage, but discarded it as too cliché and too "medical." Kobritz said that what they wanted was something "visceral, something which touched people's deepest fears and emotions." They decided on the soul as the issue to build on. They also felt that to handle the issue in a way people could identify with they would need to put it in a framework that was reassuring and traditional. They chose religion. So, there you have it: all the classic elements of the horror story. The scientist and the rich old woman who rush into uncharted territory guided only by their desire to "control" and go against the natural order of things. What they create is a monster, a creature devoid of a "soul", unblessed by God and free of human values.

CHILLER was produced at a cost of 2.4 million dollars. Enough to give one plenty of pause for thought. Indeed, probably enough to put cryonics on solid footing. 2.4 million dollars is a lot of money. Even today. CBS was reportedly very pleased with the performance of the show as it came in second in the ratings to ABC's **A Right to Kill**; a docudrama about a boy who murders his father (now **that's** entertainment). And this despite the fact that it was preempted in three large population areas (including the entire L.A. basin) until 11:30 pm because of a Lakers basketball game. According to Kobritz, CBS received an unusual amount of mail praising the film, including letters complementing the acting quality, which both Kobritz and CBS say is extremely unusual.

A lot of people saw CHILLER, an estimated 10 million, in fact! A lot more will see it on reruns. It's impossible for us to assess the long-term effects of such a movie. But it is symptomatic of growing media attention being given cryonics. One lesson we can probably learn from it is that fear over the conservation of personal identity (Will I really be me when I'm revived?) is a significant barrier to marketing cryonics. When I asked Kobritz where they finally got the idea for the "pivot" for CHILLER his response was most instructive: "Why, we just asked everybody we knew what bothered them most about the whole cryonics idea." CHILLER was the answer.



ALCOR And The Media

As some of our member have no doubt noticed, ALCOR has been appearing in news stories for the first time. Our "debut" into the realm of the "thirty minute world" came with an Associated Press story which was run sporadically across the country. The AP story covered both ALCOR and BACS/TT with a mention

or two about CI in Michigan. Other stories have included a brief hack job in THE GLOBE and a short piece in a forthcoming issue of NEWSWEEK.

Anyone who's been reading CRYONICS or who has been an ALCOR member for any length of time will probably be suprized to see media exposure like this. Why the change in policy? First of all, I should say that I don't agree with the new media policy, but have agreed to give it a try. Things have changed with regard to public perception of cryonics, and we've a fair bit of evidence that if we get a request for information (a solid request, in other words not an 11-year-old doing a term paper) we can turn that person into an associate member about 30% of the time. Hugh Hixon, co-editor of CRYONICS and ALCOR board member managed to persuade the rest of the board to give media exposure another try. So, we are doing it. It's too soon to tell the results yet, but one thing we have learned is that standards for journalism are lower than we'd ever dreamed possible!

The AP story was 1,500 words long and had an accompanying human-interest piece about ALCOR member Steve Bridge, which was another couple hundred words long. **All of the information for those articles was gathered by phone.** Basically, these people rang up and took our word for everything without ever sending a reporter out to check and see if we were anything more than a phone in a flophouse. This wouldn't be remarkable if it was the NATIONAL ENQUIRER, but we're talking about the Associated Press here. Keep in mind that a local newspaper was recently relieved of responsibility for libel charges because the judge held that the AP (which was the source of the offending story) had a reputation for responsible, factual reporting. We might add that not only did AP not send anyone out to interview, they garbled numerous facts and quoted me as saying things I never said—or would have said.

NEWSWEEK's story should be even worse. The NEWSWEEK reporter doing the story impressed me as without a doubt the most disorganized and minimal mentality I have ever encountered in journalism or even behind the counter of a fast-food restaurant (where now all you have to be able to do is push buttons with pictures of food on them and be able to count). This reporter called no less than four times, each time asking me the same questions over and over again, confusing dates, names, numbers, and anything else you can imagine. It's amazing she could remember our phone number long enough to write it down.

Despite the fact that the reporter's offices are only a short distance from us (NEWSWEEK is based in Los Angeles) she didn't even bother to come out. NEWSWEEK did send a photographer out: another high competence individual who missed two appointments and didn't even bother to call when he missed the second one! Seeing the way the media handles cryonics

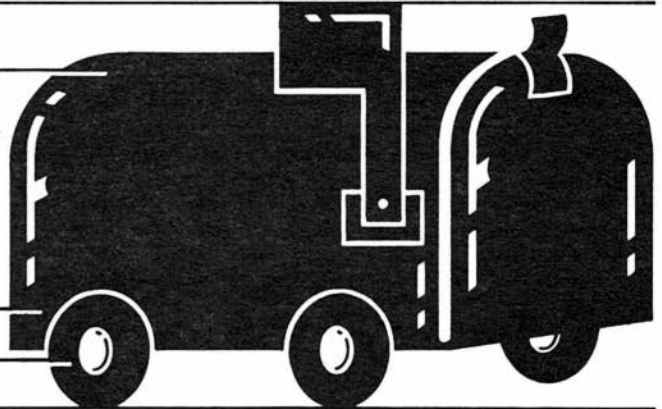


has made us deeply suspicious of everything we read in the papers or magazines. Our general impression at this point is that at least the national level media are chock full of incompetents who don't give a damn about how a story gets done—just so it gets done. When I confronted (and "confronted" is definitely the word to use) her with the fact that she was garbling and screwing up facts and was apparently not even making notes (let alone taping me) she told me "I wouldn't worry about the story too much. The details aren't so important as you might think."

Hopefully we'll have better luck with television and radio where we should have a chance to speak for ourselves, directly to the public. If we get the financial support we need we will be undertaking a major and systematic campaign to reach radio and TV stations across the U.S. We don't know if this will work. But we've decided to give it a try. We'll keep you posted.

In the meantime you can be of help to us by sending us a copy (or the original) of any story or printed item you see about us or about cryonics. THIS IS EXTREMELY IMPORTANT. If it hadn't been for ALCOR member Jerry Searcy in Las Vegas sending us a copy of the AP story we might never have seen it: it didn't run here in the L.A. basin at all. In fact, we often miss things completely because we can't be everywhere or read everything. You can be a powerful help to us by providing feedback on how effective our marketing and media work is. Also, if you see us on a TV show or hear us on the radio, let us know what you thought of it. After all, in most cases you'll be the only ones who care enough to be honest with us and to tell us what areas we need to work on.

***Letters to The
Editors***



Dear Sirs:

Military researchers are attempting to develop powerful X-ray lasers that could deliver more destructive power to distant objects than is possible using conventional lasers. This will be used as a defense against nuclear missiles. The principle is usually referred to as Star Wars.

One of the spinoffs from this technology is expected to be a super microscope that can take holographic three dimensional pictures of the genetic code of a living cell. The results will be important, not only because of the

penetrating power of X-rays, but because X-rays have much shorter wavelengths than visible light and can thus show finer details than can be seen using even the most powerful light microscope. An X-ray laser microscope would also have important advantages over an electron microscope because it would allow scientists to look at live specimens without killing and preparing them in advance.

Dr. Mathews, the physicist in charge of the Livermore project said, "I would guess that we're going to see the first X-ray hologram one or two years from now. It may be rather crude--perhaps showing just the gross internal structure of a cell. But refinements will come rapidly, and eventually, I think, we'll be able to make holographic pictures even of living DNA molecules, the molecules that make up the genetic code."

It is obvious that a microscope so proficient that it could allow us to study the live genetic code would be of immense help in researching cryobiology, aging, and death and resuscitation, among other things. CBS News recently reported that IBM developed a microscope that can actually see atoms. It was developed to allow IBM to see the atoms on silicon chips so that microcircuits can be made more efficient. That should also help advance biology and be useful in the advancement of cryonic interests. There only five of these microscopes in the world.

Progress is being made in the development of research technology and in biology which can be of help to us. Unfortunately, hundreds of millions of dollars were impounded from the National Institutes of Health's (NIH) research budget by the Administration for 1985. That could have repercussions over the next few years as the Administration believes the large number of new projects authorized for the present year will spill over into the coming years as the new projects will take years to complete. A battle is going on in Congress over this issue.

Please write to your two Senators and Congressman asking them to fight the impoundment of NIH funds by the Administration and to vote for a great increase in the National Institutes of Health's research funding. You may want to mention your interest in aging and organ preservation research. If you could persuade your friends to write concerning this issue that would of course be very helpful.

Sincerely,
Alvin Steinberg
New York, NY

Gentlemen:

I have just read the letter from Allen J. Lopp in "Cryonics". Since Mr. Lopp is obviously a working cryonicist, I can only consider his intentions as honorable. However, I do not think that Mr. Lopp realizes the deep emotional feelings that the recipients of non-constructive public criticism may feel.

For my own part, I intend that my actions will help all cryonics organizations equally. I am going to contribute as much as I can financially to all worthwhile cryonics organizations, and I am going to try to raise money from my friends for the same. I think we are all better off with two healthy

cryonics organizations. There is safety in numbers.

I would like to see a national association of cryonics societies founded at once. Such an organization would make a valuable forum for privately discussing any disagreements, until such time as our individual cryonics organizations are more secure and able to withstand internal and external criticism. In addition, such a national association could : 1) Set up standards and keep us dissociated from any fly-by-night newcomers that may hurt our already controversial image; 2) Pool financial resources for nationwide public relations and other problem solving; 3) Establish a national trust fund, to be funded by dues collected from member agencies. If a member organization went broke or was forced out of business by state laws or any other reason, the national association could finance temporary storage of any patients, arrange their transfer to one of the other existing organizations, and redirect any remaining funds or trusts to the new storage organizations, to defray their storage costs.

In the near future, I hope to expose all of cryonics to some very affluent people, and I think I will be able to solve the financial problem that has plagued all cryonics organizations for so many years.

A number of disjointed thoughts come to mind that I would like to write before I close this letter:

My hat is off to Steve Bridge for defining the truth so clearly, in his book review of **Jitterbug Perfume** in the June "Cryonics". His profound statement on the message of the book sums up our biggest single obstacle. ("The biggest message of the book is that death is a rotten thing that needs to be overcome: ...death cannot be avoided by technology alone—immortality has to be of the spirit also.")

I do not think that the experiments that have been, will be, performed by the existing cryonics organizations will be enough to win this battle alone. We will need massive help from the scientific and medical research communities.

Our biggest challenge today is to change the cultural concepts about death. If we do that, all else will follow: the real battle is being fought in the minds of our fellow human beings, here with us now.

I would like to thank all your dedicated people in ALCOR for all the unselfish work that you have done; not only to save yourselves, but others too.

I live for the day when the world will realize the heroic sacrifices and contributions that cryonicists are making for all mankind.

Love to All,
David S. Pizer
Phoenix, AZ

Dear Editors,

In a recent issue of CRYONICS there was an article which addressed Dr. Paul

Segall's low temperature experimentation using hamsters. I feel there are apparently some misunderstandings concerning Dr. Segall's work which should be clarified.

It has become fairly evident that the expertise to reversibly freeze humans will require an overwhelming amount of research. There are an unlimited number of cryoprotectants, drugs, and cooling and warming regimes to be considered and explored. I'm sure you would be the first to admit that successful cryonics will require the cooperation of many experimentalists. Certainly the greater the number of investigators involved in cryonics the sooner the expertise will be attained.

Dr. Segall does not feel that he himself or any other single group of investigators can accomplish the difficult task of reviving a human which was frozen to a point where essentially no molecular motion is apparent. With this in mind one must attempt to interest many other investigators around the world to become involved in cryonics research.

Dr. Segall's hamster model was chosen for primarily this purpose. The hamster is a hibernator and can withstand certain low temperature regimes that other mammals cannot. He feels solid state experimentation is most likely to lead to successful results using a Hamster Model. Successful solid state experimentation involving a mammal will demonstrate to the entire scientific community the true potential of cryonics and bring it out of the realm of pure science fiction. His experiments will stimulate many other investigators to become involved in such studies. In addition, his model is relatively inexpensive and can be exploited by other experimentalists more readily. Dr. Segall's experimentation is absolutely crucial for serving as a catalyst to stimulate other investigators to contribute to our knowledge in cryonics. With the cooperation of scientists world-wide perhaps then we can see expertise in cryonics become a reality.

All of us who participate in the hamster experimentation greatly respect and appreciate the wonderful and important contributions that Cryovita and ALCOR make in the area of cryonics, and hope their group can appreciate the importance of our efforts as well.

Sincerely,
Hal Sternberg, Ph.D.
University of California, Berkeley

Man's life, as required by his nature, is not the life of a mindless brute, of a looting thug or a mooching mystic, but the life of a thinking being—not life by means of force or fraud, but life by means of achievement—not survival at any price, since there is only one price that pays for man's survival: reason."

— Ayn Rand
Atlas Shrugged

REFLECTIONS ON A SUSPENSION

by Mike Darwin

During the recent remote stand-by/suspension of an ALCOR member in Madison, Wisconsin we were faced with a new, and at times anxiety provoking situation: the confrontation between cryonics and medical ethics. The issue of where what we're doing fits into a dying patient's medical care is one we've often talked about in the abstract in these pages, but due to the infrequency of suspensions and hospital cooperation, rarely confronted in reality.



A key issue early on was whether or not it would be legally and ethically possible for the hospital to cooperate with us. Would cooperation imply tacit approval of what we were trying to do? Was cryonic suspension something health care providers had any role in supporting? Initially, things looked good for hospital cooperation. But our optimism quickly turned to anxiety when we learned that the hospital "bioethicist" had been brought in to decide if what we were planning to do involved "human experimentation." If it did, then it would as a minimum need approval of the hospital's human experimentation committee and perhaps approval from any local or federal government agencies who might have authority in the matter of human experimentation.

What would the bioethicist and the hospital board decide? Did cryonics constitute human experimentation or merely a postmortem procedure such as an autopsy or embalming? Considering the sad history of bioethics in medicine and the strong inclination of people not "involved" in the problem to make a name for themselves or to "carve out territory" by rendering a negative opinion, there were considerable grounds for pessimism.



As an overlay to the bioethics issue, one of the patient's nurses, a young, intelligent RN whom I'll refer to here as Gary, became extremely concerned about the impact of the procedure on the patient's care and the degree to which the patient was aware of the possible risks of such an "experiment." Almost from the start, Gary was preoccupied by the ethical issue of a possible "successful" resuscitation. What, Gary wanted to know, would happen if the patient reestablished a normal heart beat and respiration as a result of our application of the heart-lung resuscitator? What if she regained or demonstrated signs of consciousness during resuscitation? His concerns have a basis in fact, since patients who have suffered a cardiac arrest do sometimes regain consciousness during CPR and do sometimes spontaneously convert to a normal heart rhythm during resuscitation activities.

Gary was deeply concerned about the "ethical" question involved here. In his estimation, the patient at that point would be legally and morally alive—in other words, still his responsibility as a health care provider and thus once again outside our area of competence and/or control. How did we plan to deal with these issues? Were we planning on "giving the patient anything to stop such recovery from happening?" The corollary question was, of course, if we **were** planning on "giving something" (poisoning with potassium was something Gary suggested) would that be murder?

From our perspective as cryonicists it's easy to find Gary's concerns quaint or absurd. In a clearly terminally ill patient (who in this case had made the decision herself to terminate all life supporting measures—including even I.V. fluids) it would be pointless to proceed with normal resuscitation (i.e., discontinuing cryonics procedures) only to have the patient suffer more deterioration and "die" again a few hours or days later. But Gary, and presumably the rest of the world, might not see it that way.

As a matter of fact, we **have** had patients demonstrate some signs of motor activity during "postmortem" HLR transports. We have had patients swallow, shiver, and demonstrate other motor activity normally associated only with "living" people. Because of this we have, for some time, administered massive doses of medications both to protect the patient from any awareness of resuscitation, cooling, and transport, and to provide protection against cerebral anoxia/ischemia by placing the brain into a coma (this is a standard medical maneuver used to treat anoxic and ischemic brain injury). From our standpoint this kind of action makes both good ethical and practical sense. We know that it is possible to restore a patient to consciousness after death is pronounced and that it would be of no benefit to us or to the patient to do so. (It will become even **more** possible, indeed even probable that our actions could result in restoration of consciousness as our resuscitation and support techniques improve, such as with the application of total cardiovascular and respiratory support with blood pumps and membrane oxygenators.)

From a cryonics standpoint the "ethical issues" are not that we are restoring someone to consciousness or potential consciousness and then proceeding to freeze them. To us, such issues are absurd; after all, the medical profession has the same ability to restore people to life for a few more hours or days in the same situation, but chooses not to do so **in order to let people die and disappear forever!** Does this make them murderers? Rather, the issue to us is protection of the patient from suffering discomfort or damage while trying to save his/her life. We look at administering medications and proceeding with a suspension in exactly the same way a surgeon would view the application of

anesthesia during an operation: as a humane and necessary "extinguishment" of consciousness which works to the benefit of both patient and physician.

Nevertheless, we would be foolish to expect noncryonicists to accept such an argument. We told Gary that there were medications given in the course of the transport protocol that would prevent the patient from waking up and experiencing more suffering. He was not really satisfied with this, and pressed both Jerry Leaf and I for additional information. Gary was also very forthright in questioning us about the limits to which (we felt) he could legally go to in frustrating the suspension, and what in fact we would do if someone did attempt to block suspension of the patient.

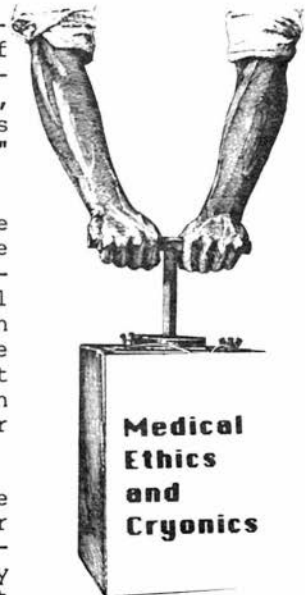
One of our greatest fears was that Gary and the bioethicist would get together. It is hard to assess Gary's motives objectively. At the time (and even now) I feel he was genuinely concerned about the possibility of our procedures inflicting more pain on a patient he could clearly see was suffering and whom he genuinely cared about. I think that Gary also felt a real **alienation** or **displacement** of his role as a health care provider. Over and over again he stated that he was troubled by the issue of **where** his responsibilities left off. What did this cryonics business mean and how did it interface with his duties and responsibilities to the patient?

I learned from talking with other nurses that Gary was a vocal and frequent opponent (often acting as the patient's advocate) of the kind of useless and degrading medical heroics that some doctors will subject and even psychologically coerce their patients into. In his conversations with both Jerry and me, Gary repeatedly brought up the issue of "at what price life?" Was what we were doing really a decent and **human** thing to do? Or, was it a depersonalizing and degrading attempt to defeat death at the cost of the patient's dignity and humanity?

It's not hard to see how people who are not cryonicists could feel this way. Even under the best of circumstances, the physical procedures involved in perfusing and freezing someone are pretty cold, clinical, and easy to interpret as "degrading." In this patient's case there was the added issue of "neuropreservation" which could also be seen in the same light.

As things developed, the bioethicist did not come up with any "hard and fast" opinions. He said that the decision as to whether or not cryonic suspension constituted "human experimentation" and thus merited a full review by the hospital ethics and human experimentation boards hinged to a large extent on whether or not one thought it would work. If the position was taken that what we call a patient is in reality a cadaver, then ethics, at least "ethics in medicine" had little or nothing to do with it.

Since the hospital already had started to cooperate there was substantial medical and ethical pressure for them to **continue**. Moving the patient to another facility would have been extremely trying both logistically and emotionally, especially in view of the fact that



death was a few hours or at most days away. Also there was the question of **finding** another facility that would accept such a "problem." No doubt these were issues that coursed through their minds. Added factors in our favor were that the medical staff had established a reasonable working relationship with us (and felt we were not kooks and that we were scientifically and technically knowledgeable), and the patient and her family had flawless legal preparations, firm intent and a long history of interest in, and commitment to, cryonics.

It could easily have gone the other way if any one of those factors were missing or there was dissent from any quarter to cloud the issue or raise red flags. Had Gary gone to the press, demanded action by the ethics committee or otherwise attempted to derail things, the patient might well not have been suspended under the relatively good conditions she was or even suspended at all.

I have no way of knowing for sure why Gary didn't take the action he was no doubt contemplating, to block the patient's suspension. Perhaps he realized that this was something that this patient and this family wanted. Or, perhaps, in his conversations with us he realized both that we were genuinely concerned about the patient and that we had iron wills which would not abide of easy interference. There was one very tense moment, where Jerry Leaf and Gary squared off, and Jerry, with cool, razor steel in his voice told Gary he would sincerely regret interference with this suspension if he attempted any. That moment was perhaps a test of wills, and we won.

We won, perhaps because we were and are willing to go a step further. For "them", the noncryonicists of the world, interfering with us is born (in most instances) from rather "idealistic" concerns. I am not seeking to minimize here the ease with which we or others can be hurt by misplaced idealism or the so-called good intentions of other people trying to mind our business for us. But I would point out that when push comes to shove it is, after all, a matter of life and death for us. Perhaps at least one of those noncryonicists out there got the idea (maybe for the first time ever) that when push comes to shove we're ready to push and shove—with a vengeance.

Bay Area Update

by Dick Marsh

The Tahoe Life Extension Festival

The stars of the LAKE TAHOE LIFE EXTENSION FESTIVAL were, in fact, the stars. In that clean, mountain air, you could actually see them at night, twinkling serenely — a treat for Bay Area people, who pay for the great advantages of fairly frequent fog by the fairly frequent loss of the night sky.

During the day, the sun was spectacular, the weather stunning, and the lake wickedly blue and green in several shades of each.

If the BACS/TRANS TIME contingent had a star, it was Jerry White, former BACS President. Four times he stood (or sat) before us to bring us information and enlightenment. He gave us:

** "Varieties of Deathism," an audience-participation lecture-discussion allowing us to react to some of the idiot ideas of several otherwise brilliant writers and philosophers about the desirability, inevitability, etc., of death.

** "Heat Flow in the Cryonic Suspension of Humans," a summary of some of Art Quaife's original thinking delivered so coherently and in such simple language that even a technological imbecile like me could understand it.

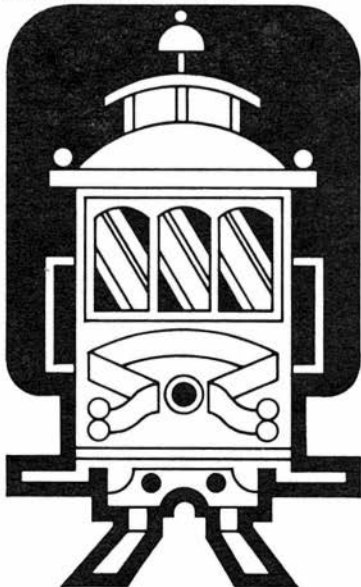
** "Memory and Identity," a panel discussion in which Jerry participated along with Eric Drexler, Mike Darwin, and Saul Kent. This lively, illuminating, and at times heated discussion on a topic fundamental to the life-extension disciplines was a feature of the Saturday evening banquet and drew many non-panelists into the fray.

** "Trans Time: 13 Years of Progress," a brief informative historic overview which could have been deadly but which Jerry brightened and humanized by sharing the platform with approximately a half dozen other Trans Time members. A floor show beats a lecture any day.

But Jerry White was not the only Bay Area cryonicist on the program. In addition, there were also the following:

** Paul Segall, whose talk "Strategies and Techniques in the Life Extension Sciences" was stimulating and informative despite problems with the video equipment.

** Harold Waitz, who told us about "Reviving Perfused Ice-Cold Hamsters." Like Paul, Frosty did his thing with warmth and style, but he had better luck than Paul with the video. As noted below, Frosty will give a talk dealing with the same data as he discussed in his Tahoe Talk — the effects of glucose and glycerol in a blood substitute -- when he appears before the Cryobiology Conference in June.



** Your UPDATE editor, whose talk "High Tech/High Touch/Hibernation" was an attempt to apply to cryonics the insight of John Naisbitt in Megatrends that for every advance in high tech, people will need and demand a compensating advance in "high touch" — i.e., in activities involving the personal, feeling, imaginative side of living. The talk was an adaptation of an article which originally appeared in CRYONICS under the title "Why Keep On Living?"

** In addition your UPDATE editor also filled in for Ron Viner filling in for Jack Zinn on "BACS: Recent Developments." (They were really scraping the bottom of the barrel when they got to me. Then I almost blew it by having a coughing fit.)

Besides all this, BACS/TRANS TIME people had the pleasure and growth opportunity of mingling with ALCOR/CRYOVITA people, South Florida people, and unaffiliated people. Not sure whether or not

there was anyone there from Michigan.

We also gave ourselves to drinking in the beauty of Tahoe — and drinking, eating, and floorshowing at Harrah's. All this plus river rafting and horseback riding.

True, I have limited my comments to what BACS/TT people did. But this is natural since the BAY AREA is my beat. People from elsewhere, especially Southern California, were numerous and extremely active, and made enormously impressive contributions to the program.

But there are two very special people I cannot and will not ignore. These are Fred and Linda Chamberlain. These two generous people, in addition to preparing and delivering excellent and lavishly illustrated talks for the Festival, single-handedly organized it, made arrangements for the meeting facilities and for the recreational events, prepared and released the publicity, designed and oversaw the printing of the programs, managed the finances, and did all of those pesky little things necessary for producing an event of this kind that most of us don't even notice and simply take for granted.

What they did in making this Festival a reality was a heavy and creative piece of labor. . . a true labor of love.

Thanks, Fred and Linda.

(The name of Fred's talk was "Life Extension and Personal Computers." As an avid computer user, I was fascinated, although the first few minutes of the talk are slightly vague in my memory because I was still coming down from the excitement of just having delivered my own talk and was not able to listen with total concentration for a couple of minutes. But I was soon hooked.

The name of Linda's talk was "The Cholesterol Controversy and Monoclonal Proliferation." As a lover of life and health, I was equally fascinated. I was even able to adjust to the slight feeling of dislocation that I experienced as a result of being disabused of some of my preconceptions about diet.

Finally, to sum up the festival as a whole, I repeat a remark I made in BAY AREA UPDATE a year ago about the 1984 Life Extension Festival: "If you could have attended the Festival but did not, you made a big mistake."

Santa Rosa Exhibit: Neither a Bomb nor a Bomb

In Britain a "bomb" is a great success, a hit. In the United States, a "bomb" is a failure, a flop. Overall, the FUTURE SHOWCASE held on May 17-19 in the Main Pavilion on the Santa Rosa Fairgrounds was somewhere between these two, but perhaps closer to the flop alternative. The BACS/TRANS TIME booth, however, while not as good as the one we had in San Francisco (described in last month's UPDATE), was more than presentable.

We did not have the cryocapsule — too expensive to ship to Santa Rosa. But we had a continuous display of slides and videotape, as well as wall prints, handouts, and literature for sale.

We also had another heroic performance by BACS Vice President Ron Viner,

who was in the booth all day for three days, with the rest of us only occasionally helping out.

On our sign-up sheet of interested fairgoers, we had only 20 names. But this is not bad in view of the dismally low attendance at the expo overall.

One undeniably good feature of the expo was that the management donated the booth space to BACS and TRANS TIME.

BACS Growing

But all is not dismal. BACS is steadily growing. Last month we picked up a well-known cryonicist as a new full member. He is Norman Folker, whose financial column, "Dealing for the Future," appears monthly in THE IMMORTALIST. In addition we acquired six new associate members.

Marketing Methods

Still, we need money. So we have formed a Marketing Committee. It consists of the present BACS officers -- i.e., President Jack Zinn, Vice President Ron Viner, and Secretary Paul Segall -- and has as its charge developing and approving new marketing projects and deciding how profits should be split in cooperative ventures with TRANS TIME. All decisions will be by unanimous vote.

What will BACS be marketing (besides suspensions)? Mostly educational material in the form of books and videotapes. And how are we doing with these? Well, we have recently sold still more copies of attorney Jim Bianchi's legal forms manual. These have gone to three educational institutions -- Chicago Loyola, Valparaiso (Indiana), and Arkansas State (our first sale in the deep South) -- and to the San Francisco County Library.

The first two of these are Catholic institutions, providing further evidence for Jack Zinn's hypothesis, developed in UPDATE last month, that Catholics are particularly open to cryonics.

Marketing Marches On

Dr. Hal Sternberg will be dropping by Florida soon to look into Saul Kent's obviously very successful methods of marketing. Saul Kent has recently told Jack Zinn that he has found that a mailing usually needs to be sent out approximately seven times to be an effective marketing device. Jack will proceed on this basis. Meanwhile, perhaps Hal Sternberg can acquire still more marketing secrets from The Great Life Extender and Life Extension Products Marketer.

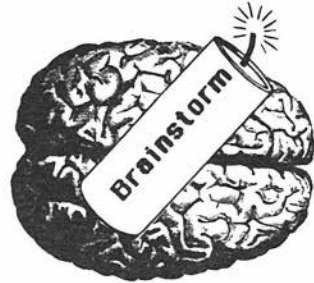
In addition to mailings, of course, quality control and product improvement are important. Therefore, Jim Bianchi is working on a loose-leaf edition of his legal forms manual. This will allow easy replacement of obsolete material.

Also important: placement of the manuals. So Jack will be placing the manual, on consignment, with Larry Lake Law Books. This very prestigious law book store is located one block from Hastings College of the Law in San

Francisco.

Brainstorming Sessions

But money — or its lack — continues to be a problem, both for BACS and TRANS TIME. Therefore, at TRANS TIME'S April 28th meeting, Jerry White led a brainstorming session to come up with new ideas for raising it. Nearly 100 revenue-raising ideas resulted. All that remains is to put the best of these ideas into practice.

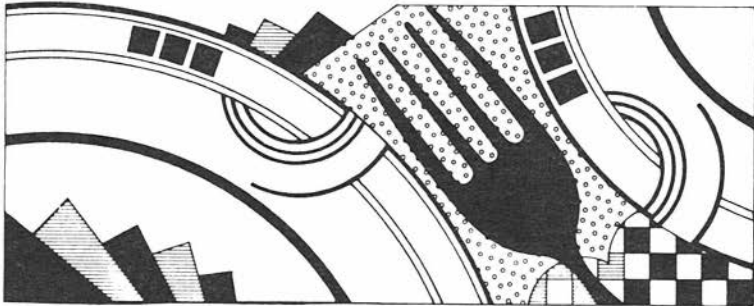


Well, TRANS TIME? We're waiting.

(Since writing the above, I have had word from Jack Zinn that another brainstorming session has been held which has yielded 132 additional money-making ideas, making a total of well over 200. Among these: Jack Zinn's offer to manage a Nevada brothel.)

Cryonics Dinner List Expanded

This latest brainstorming session was held in The Good Earth Restaurant in Palo Alto during one of our cryonics dinners.



You may remember that these were described in last month's

UPDATE as semiregular events at which cryonics leaders in the Bay Area get together in an unstructured situation to eat, discuss mutual problems, and improve communication. So successful have these dinners been that now all BACS members — associate, full, and suspension — have been invited to participate.

Furthermore, the restaurants involved will hereafter be selected and publicized two months in advance. This will facilitate advance planning by the diners, probably increase their number, and save postage and labor by obviating the necessity for weekly mailings.

Upturn in the Financial Situation!

Now word has come in that a BACS member in Phoenix, Arizona, has agreed to buy 1,000 shares of TRANS TIME stock at \$15,000. This welcome offer comes from an experienced businessman who has agreed to help us in our marketing efforts by providing consultation. This admirable gentleman has also



offered to invest \$10,000 in the TRANS TIME building fund and to pay for a BACS-TRANS TIME ad in The Wall Street Journal.

I think we're going to survive. Change that to prosper. But we still need all the help we can get. Send us your suggestions. We'll add them to our brainstorm list. If they're hot, we'll act on them.

TRANS TIME Stock Offer

One of the best ways you can help, of course, while at the same time helping yourself — if you qualify — is by taking advantage of the TRANS TIME stock offer made on July 24th and publicized at the Tahoe Life Extension Festival. 5,000 shares of no-par-value common stock have been offered at \$15 a share to the first 35 qualified purchasers. These will be available until May 24, 1986, or until the offer is withdrawn.

Details of this offer are available from TRANS TIME, INC., 1507 63d Street, Emeryville, CA 94608, (415) 655-9734.

The proceeds of this securities sale will be used to replenish working capital, obtain our own facility, pursue research and development, carry on promotion, purchase new and upgrade old equipment, improve the salaries of our highly trained but at present grossly underpaid personnel, and hire additional highly qualified workers at competitive salaries.

TRANS TIME'S future financial prospects are excellent. BACS suspension members have in total allocated millions of dollars to fund their eventual suspensions, but in recent years there have been far fewer suspensions than statistically anticipated. Thus we expect an increased rate of suspensions in the future. The financial consequences of this are obvious.

Recent marketing activities, discussed in BAY AREA UPDATE, have been effective. Our participation in two future-oriented expositions has brought in new members. Our sale of videotape rights has flourished around the world.

Our hamster suspension project, headed by Dr. Paul Segall and Dr. Harold Waitz, has gained substantial momentum through an order of magnitude increase in funding during the past year.

We are streamlining our operation and raising additional cash by liquidating surplus and obsolescent material.

All in all, despite some problems, we have remained financially viable, and the prospect of our future financial health is excellent. If you qualify as a purchaser under the terms of this new stock issue, you would do well to seriously consider adding TRANS TIME stock to your portfolio.

Racing With Senator Cranston?

Do you think you can run faster than Senator Cranston? Don't be so sure — no matter what your age. The Senator holds (or, at least, until recently held — not sure which) the world's record for men over 55 in the 100-yard dash.

In any case, you may soon have the chance to find out how you compare.

In October, it seems very probable that BACS in cooperation with AGE, the American Aging Association, will be sponsoring a foot-race open to all as a feature of their annual meeting. Two divisions are planned: a 5K run and a 100-yard dash, with trophies for winners in a number of age groups.

There is good reason to hope that Senator Cranston, a sizzling sprinter, will enter the 100-yard event. His performance will presumably give the lie to the nasty rumors that he is growing old.



Your UPDATE editor will enter the 5K (3.1 miles). His performance will prove beyond any doubt that he is well over the hill.

Breakthroughs in the Wonderful World of Hamsters

For the first time, a glycerolized hamster has been revived, after which it survived for 24 hours! Scientists Harry Waitz and Paul Segall at BPRD (BioPhysical Research and Development) have successfully perfused a partially blood-substituted hamster with an 0.3 M solution of glycerol dissolved in their Extra-Cellular Type Blood Substitute. They allowed the glycerolized solution to remain in the animal's cardiovascular system for 15 minutes while the beast was below 4 degrees C, and then removed the glycerol, replaced the blood, and revived the animal.

The 24-hour survival which the animal then experienced is as long as that of any other hamster perfused in BPRD's work. This indicates that the glycerol may have added no additional toxicity and, in fact, may have helped.

BPRD has already brought a hamster down to minus 11 degrees C, warmed it, replaced the 0.3 M glycerol solution in its cardiovascular system with blood diluted in blood substitute, and observed its heartbeat resumption, which eventually accelerated to 60 beats a minute. Unfortunately, however, the hamster did not survive.

This marks the beginning of experimentation in cryoprotected blood substituted whole animals, something never before done in history. Despite the failure of the animal to survive, Harry and Paul's near-success has encouraged them to continue their whole body solid state suspended animation at sub-zero temperatures. When an animal frozen below the ice point is revived -- and lives -- the public may begin to take notice.

Meanwhile, BACS/TRANS TIME/BPRD scientists have been invited to summarize their hamster work at the Cryobiology Society meeting on June 18-21 in Madison, Wisconsin. Dr. Waitz, for example, will discuss his findings about the effects of glucose and glycerol in blood substitutes as he did at the Tahoe Conference. Perhaps the growing respect which the Ph.D.'s and M.D.'s in the Cryobiological

Society have been obliged to pay to these cryonic scientists will grow a bit more as a result of their exposure at the Madison meeting.

Italian Television Sits Up and Takes Notice: Cryonics in Rome?

Experiments conducted by Paul and his colleagues in cooperation with the Federation of the American Society of Experimental Biology (FASEB) have been given television exposure in both San Francisco and Rome, Italy. Both KRON-TV in San Francisco and RAI Television's Channel 1 in Rome have broadcast footage of experiments conducted at BPRD as well as a taped segment with Art Quaife made at TRANS TIME.

Was the footage a success in Rome? Well, Paul was flown to Rome at the station's expense for a broadcast appearance. Dr. Raymond Martinot of France, who froze his wife and stored her in the basement of his castle, and Dr. Ralph Nelson, an expert on the hibernation of bears, were also interviewed in the broadcast.

So effective was the delivery of the cryonics message to Roman television audiences that Dr. Antonio Monaco, a gynecological surgeon in Salerno, was motivated to visit TRANS TIME in Berkeley for more information. Dr. Monaco is now formulating plans for instituting a cryonics service in Rome.

Is this a trickle or the beginning of a flood?

Staying Young

Meanwhile, BPRD scientists are beginning experimentation in an Aging Research Program. A quick look at some highlights:

** These experimenters will compare mice placed on low tryptophan diets at three weeks of age with those placed on the same diets at three months of age as well as with controls.

** They will study the effects of the anti-thyroid agent PTU on development and aging. This substance has been shown by workers in the laboratory of Dr. P.S. Timaras at the University of California to reversibly inhibit growth in rats for periods of up to four months. BPRD scientists will test whether this drug can delay maturation and aging in mice and, if so, how effective it is compared with nutritional restriction.

** They will study the effects of high selenium diets, already known to retard aging in mice, on their reproductive aging.

** Graduate student Greg Cole of UC-Berkeley's Department of Physiology-Anatomy, working with BPRD, has had telephone conversations with Dr. Jeremi Czaplicki of Poland, who has published experiments in which fetal thymic extracts have dramatically slowed aging in rats, mice, and guinea pigs. Greg will meet with Dr. Czaplicki in Poland this summer in order to explore this phenomenon further.

Perhaps the happy day is a bit closer when aging and death will be eliminated entirely and cryonics will be merely a quaint historical memory.

Live and Let Live in the Life Extension Movement

In the June issue of CRYONICS there was a letter from Al Lopp criticizing the previous month's edition of BAY AREA UPDATE. Al wisely and graciously acknowledged, in his very well written critique, that the content of that particular issue of UPDATE was essentially Paul Segall's and that Dick Marsh's contribution was primarily to serve as a channel. I have my own opinions about Al's views of Paul's research, but I don't intend to express them. I think that Paul Segall can much more effectively and appropriately deal with Al's criticism than I can. Perhaps he will do so. I don't know.

But I do want to say — and have for some time — that I am very often saddened by the hostility, suspicion, and rivalry that I see among the various cryonics organizations. For God's sake, gang, aging and death are the enemies, not some other cryonics organization. Disagreements are inevitable, and mutual criticism is useful and desirable, but can't we find ways of working together more effectively and harmoniously?

A few years ago, when I first got involved in cryonics, I was stunned when I came up against the dissension, at times almost stupid and vicious, in the ranks of cryonicists. I had assumed that cryonicists would be so keenly aware of the overwhelming difficulty and importance of our mutual task — the elimination of aging and death — that we would be united and mutually supportive at all times.

But I see that I was mistaken. What a pity. However, I have not given up hope. Most of the many cryonicists I have met are beautiful and intelligent people, just as I had assumed they would be, and I am confident that eventually we will come together. When we do so, we will get aging and death on the run, accomplishing jointly what we shall surely fail to do so long as we continue as we are.

Peace.



CHILLER: Frosting An Old Tale

Hugh Hixon Reviews The CBS Made-For-TV Movie

The CBS Wednesday Night Movie for 22 May was a horror flick with a "cryonics" theme. In no noticeable way did it deviate from the tried and true creepy-crawly formula developed in over half a century of grade-D popcorn sellers. In fact, it is so standardized that any negative effects it has on cryonics are very likely to be minuscule.

The Plot: In a here-and-now cryonics facility, several monitor systems contrive to fail at the same time. A man frozen 10 years previously thaws to the point where reanimation must continue. The original cause of death was

cancer of the liver, which can now be dealt with by a liver transplant and immunosuppression with cyclosporins. The suspension was done at the behest of the man's mother, who was determined that her son should not be untimely ripped from this life. Since she is **quite** wealthy, she was able to have a clandestine suspension done. Needless to say, the reanimation comes as a considerable shock to a number of people, including the minister and family friend who conducted what he had been led to believe were last rites. The minister fills the part of ethical/religious counselor. The mother also has an adopted daughter who has the part of the beautiful virgin.

Anyway, modern medical technology comes through, along with a chorus of "It's a miracle..."s. After a prolonged period in a coma, the sleeper wakes, a rather violent process which reduces the (female) physical therapist present to the screaming meemies. On awaking, his eyes are blood-red, a condition which vanishes immediately thereafter, so that it cannot be confirmed. Clearly a Sinister Sign. Shortly, he is taken home, where he is greeted by the assembled family servants, and by his dog of 10 years past. The dog barks at him and refuses to associate with him. Another Sinister Sign. That night, while he is shivering under his blankets (In fact, he shivers his way through the whole movie. (Sinister Sign #3)), the dog jumps a fence, enters the house, and attacks the man in his bed. He kills the dog, apparently without injury to himself. (SS #4).

Returning to a normal life, he reassumes leadership of the family business. Upon finding that a considerable portion of the profits have gone to charitable interests as a matter of long-standing family policy, he proceeds to lambast everyone in sight and fire the old family friend who has been running the company. (SS #5) He then contrives to induce a fatal heart attack in said old family friend, and then goes home, to reassure his doting mother that he will indeed rehire the man first thing in the morning. (SS #6.) Next morning, he reports the finding of the body to his mother with all appearances of sincere grief. (SS #7.) Moving on, he then proposes to the beautiful woman who is his senior executive for the charitable contributions that she assume a higher-paying (horizontal) position directly under him. After some fencing around, she comes to his hotel room.

Break to: Next morning, the minister, in possession of a bounced company check for a large contribution comes to the woman's office to inquire



about the check. She is in the process of leaving the company, with some expedition. She informs him of the change in company policy, while presenting only one side of her face to him. He accidentally sees the other side. She has been brutally beaten, and is terrified of the resurrected man. (SS #8.) Minister then proceeds to talk to mother, to imply that something may be amiss with her son. She dismisses this as nonsense. Meanwhile, the man is looking out the window, at both the minister and his mother, and at his beautiful stepsister frolicking in the swimming pool. (SS #9.)

The minister then returns to his church, to ponder and pray. Thus, he conceives that, if the body and mind are separated from the soul at death, are they necessarily reunited upon reanimation? He concludes on evidence available to him that this may not be the case. Walking in the park late at night to marshal his thoughts, he is confronted by the reanimated man, who has been stalking him. He is warned not to speak to the man's mother again. The minister and he spar around a bit, and he tells the minister with relish that on the "other side," there is nothing. Following the man to accuse him of being without a soul, the minister contrives to get his coat caught in the man's car door. With a ghoulish smile, illuminated by the greenish instrument panel lights, the man proceeds to drag the minister along the road until he finally breaks free. Then the car returns to finish the job.

Cut to: The hospital. The mother comes rushing in to see her old friend, the minister. In very bad shape, he tells her that her son is responsible. She leaves, being questioned on the way out by an investigating police officer as to whether the minister said anything useful. No.

Meanwhile back at the house: The man is in the process of starting in on his stepsister. Mother comes in to confront man, and discovers them, and realizes that her son has indeed been reanimated as a soulless monster. Stepdaughter disappears, and mother announces she will call the police. Man turns to pick up a gaffing hook from near a stuffed fish. (They are in the house's den.) He then stalks his mother into the cellar (where else?), and after a bit more dialogue, she contrives to lock him in the walk-in freezer and turns on the booster cooling system.

The police come, and enter the freezer with drawn guns. They find him, apparently frozen to death. One officer leaves for assistance, while the other checks more carefully. **Suddenly, his eyes open, blood-red, and he seizes the officer by the throat and lifts him off the floor!** The cop drops his gun. Mother picks up gun, and with commendable resolution and two-handed stance, puts two slugs in her beloved offspring. After he quits thrashing around, she goes over to touch him, and he has a last go at mayhem and expires, unsuccessful.

Meanwhile, back at the cryonics facility: It is late at night. Inside, only a single guard is on duty. Suddenly, everything begins to leak. The guard gets on the emergency phone amid the chaos. **They're all coming out!**

COMMENTS:

The problem that will bother the general public most is the pivotal point of the movie. If a person is reanimated, where will their soul be? Obviously, the makers of the film took the cheap shot. They wanted a creepy-crawly, and that is how they got it. For myself, I'm not going to get involved except to

say that this is a matter of faith that will one day be subject to experimental verification.

As to the role of religion in this production, its function is simply to raise that frisson of horror that can be evoked from any populace that has undergone some religious orientation. The choice of religion here is purely dependent on the target audience. In Islamic countries, a mullah would have been the religious advocate, and an explanation in terms of djinn and demons would have been invoked. In China, it would have been a Taoist priest carefully naming the possible evil spirits and demons of that religion. In the animist parts of Africa, a friendly witch doctor would have conducted his investigations and enumerated the malevolent spirits of the family's deceased enemies. In the case at hand, Christianity was the goat. "From ghosties and ghoulies and things that go bump in the night, may the good Lord deliver us."

Medical scenes: The revival scenes in the hospital have been seen by at least one person familiar with operating room procedures, whose reactions have been reported to this reviewer. He was OUTRAGED! This reviewer has participated in six cryonic suspensions, and didn't see much he recognized, either. How well it will fool people who have gotten their knowledge from an indeterminable diet of hospital TV dramas is a separate subject.

Cryonics scenes: These are so at odds with the reality the reviewer has been immersed in since 1977 that one scarcely knows where to begin in criticism. From a cryogenic engineering standpoint, the storage containers are a vile obscenity, a heat leak so monstrous that significant savings could be made in refrigeration costs by packing the containers in sawdust. The alarm system. Ahhh, yes, the alarm system. An expensive collection of flashing lights that a competent controls engineer would junk immediately. It doesn't work, and when it doesn't work, it doesn't indicate that it isn't working. If there were a label on it proclaiming parentage from a legitimate engineering firm, the producers of this film would be sued for slander. And there would be an out-of-court settlement. But then, it wasn't built by engineers. It was built by Hollywood prop men to look convincing, and to appear to fail, in order to move the plot along. In this respect, it performed its function. As to a management that would accept such a system... Their putative reputations were also sacrificed to the plot.

I don't know if any cryonics organization was consulted on this movie. In any event, it's irrelevant. The genre of this film required that the writer, producer, and director firmly ignore any conflict of the plot with reality. The object of this movie was not cryonics. The object was to produce a stupid, murderous, sociopath to titilate an audience of known preferences. And to sell the products of over a dozen advertisers. (Women's make-up seemed to be the most common type, but there was something for just about everyone.) (To give some idea of its relative importance in the scheme of things, however, in the Los Angeles area it was bumped from an 8:30 PM slot to an 11:30 PM spot for a live LA-Denver basketball game. LA won.)

This reviewer does not watch, or go to, movies very often, and would switch off or walk out on one of this type if by some mischance he found himself there. Nevertheless, over the years, he has caught a few trailers of this type. The plot is very simple. Create, by some means or other, a stupid, dangerous thing or person. (A few years ago, demonic possession was the vehicle. Before that, it was Egyptian mummies. Or flying saucers. Or matter transmitters, or medical



cures gone wrong, etc. etc., etc. The producers of **Frankenstein** had things well in hand, and **The Texas Chainsaw Massacre** was exceptional only in its messiness and low budget.) Release said deadly peril on a supine and unsuspecting populace, which it proceeds to slaughter its way through in gory detail. Kill the critter. Imply that somewhere out there, there's lots more of them, **waiting**. A subrequirement that this reviewer has always found particularly offensive is that all the victims do is scream, or cower in a corner, and wait for the axe to fall. A domesticated turkey would raise more fuss in like circumstances.

My opinion is that the world is full of weapons, waiting to be picked up and used. Heavy firearms are preferred, but objects both sharp and blunt are not to be despised. (I also realize that people often conform to the scream-and-cower mold. The Speck killings, of infamous memory, come to mind. Nine nursing students in Chicago, taken out one by one to be slaughtered like bunny rabbits. Art imitates reality.)

There is one bright thing in all this. That is the mother of the reanimated man. Anyone who sees her in her desire and determination will recognize that she is one of us. I commend her character to anyone stricken with the urge to write a cryonics screenplay.

Credits:

Writer: J.D. Fiegelson
 Director: Wes Craven
 Producer: J.D. Fiegelson
 Executive
 Producer: Richard Kobritz, Polar Film

...and of course, CBS, are responsible for this profound and thought-provoking production.

Note: Complete copies of the following paper are available immediately from ALCOR for \$5.00, including postage & handling.

Prospects and Applications for Genesis and Ultra Mass Production of Sub-Millimeter Machines, Devices, and Replicating Systems

by Conrad Schneiker

PART 3 OF 3

COMPUTER AIDED HEURISTIC DESIGN, ARTIFICIAL SELECTION, AND ARTIFICIAL LIFE

There are several ways to design a desired molecule or molecular complex. Two extremes are ab initio design using quantum mechanics, and trial and error.

In many cases involving large and complex molecules, the former is computationally impossible, and the latter would take far too long. This is analogous to tradeoffs in search problems in Artificial Intelligence (AI), suggesting similar approaches (Barr & Feigenbaum, 1982). The first step is to examine the structure of the problem. (Only individual protein molecules will be considered here.) In cases where existing technology is inadequate for designing a molecule from scratch, it may be better to start out with one or more that perform, or almost perform, the desired function. Knowledge of structural and functional subunits (Ulmer, 1983), information about the boundaries of the corresponding genetic code sections, knowledge of the desired molecular mechanics (Mitchell, 1981, 1982), symmetry considerations (Kilkson, 1970), etc., may be used to develop estimates of the sizes and locations of regions for which a given class of modifications may give better than average odds for generating a useful improvement. Then one or more computers, controlling thousands or millions of Very Large Scale Integration (VLSI) chemistry systems (see previous sections), could search the space of transformed molecular structures to simulate evolution by (artificially intelligent) tinkering (Jacob, 1977). If the available equipment is partitioned among different search strategies, this process would function as a combinatorially implosive algorithm (Kornfield, 1982), thereby greatly speeding up the evolution rate.

Much greater parallelism may be possible for special problems where genetic recombination could be used and where molecular-scale test indicators (voltage-sensitive dyes, bioluminescent systems, etc.) can be developed. This would allow generation and testing of structures to be done within biological cells or more specialized biological cellular automata, allowing trillions or quadrillions of individual parallel processes to operate, greatly speeding up artificial evolution. This approach would not be guaranteed to ever work in any specific case. However, if it succeeded even a small fraction of the cases, it could still solve many problems that would otherwise be impossible due to complexity or other reasons.

By analogy with the immune system, similar techniques might be used to develop basis sets of molecules, which would be randomly combined in order to generate a much larger set of molecules with a desired range of properties. These might include (color-, phonon frequency-, electromagnetic frequency-, conformation-, etc) sensitive molecules for use in distributed memory systems or other applications.

The heuristic and Monte Carlo approaches to molecular design suggest the possibility of generating artificial life forms, which could teach us a lot about the principles governing the origin and evolution of living forms. A very simple "evolution machine" using a stirred-flow chemical reactor for this purpose has been designed to study the origin of life on Earth (Kuppers, 1979). Such evolution machines could be generalized to other initial conditions. They could use other starting materials (such as sterile biomass), a variety of energy inputs (chemical, heat, electricity, electromagnetic or particle radiation, etc.), and they could be linked into networks with variable computer-controlled artificial (selection) environments. Ideas concerning the genesis of life and various mechanisms of evolution discussed in Axelrod and Hamilton (1981), Boyse and Cantor (1978), Conrad (1982b), Eigen (1971), Eigen and Schuster (1979), Eigen and Winkler-Oswatitsch (1981b), Eigen, Gardiner, Schuster, and Winkler-Oswatitsch (1981), Fox (1973), Gottlieb (1982), Holland (1976), Jantsch (1980), Kilkson (1969, 1975), Lewin (1982c), Miller (1975),

Moore (1956), Oparin and Gladilin (1980), Price (1974), Rada (1981a, 1981b), Scott (1979), and Wassermann (1982), may be useful for such projects. The new molecular structures that such attempts produce might be valuable components for new types of microtechnology (MT) products. Hybrid processes, where genetic information might be stored in computers and would be coupled to physical systems via special electrochemical or photochemical transducers could also be experimented with.

ARTIFICIAL INTELLIGENCE AND BRAIN SCIENCE

Advanced MT systems should make possible full large-scale hardware implementations of various artificial intelligence (AI) or brain models such as proposed in Albus (1981), Andrea (1977), Ashby (1964a,b), Edelman and Mountcastle (1982), Hinton and Anderson (1981), and Kent (1981). Ten-micron-sized or smaller MT robots bearing sensors would also make it possible to stimulate and monitor chemical and electrical activity at thousands of locations in living brains simultaneously, greatly expanding our knowledge of their operation. Likewise, thousands of similar MT robots could carry out exceedingly detailed and extensive micro-anatomical mapping and chemical characterization of neural pathways and synaptic connections. Since the complexity of the brain's connective topology greatly exceeds the capacity for genetic specification, one need not be concerned with individual connections *per se*, but much more with general or statistical patterns, and with simple iterative connection programs which can generate randomly perturbed structures for complex functions (Von Foerster, 1964). Much of the brain's structure involves iterated modules with stochastic patterns of local connections (Edelman & Mountcastle, 1982). Starting with primitive animals and working up to human brains, the parameters characterizing these structures can be identified, as could the major chemical communication paths. With this data, MT construction systems could build approximately equivalent factors or roughly isomorphic structures in other technologies for further experimentation. It would take a lot of work and will be a very difficult task. However, advanced automation for parallel mass production of large numbers of realistically complex, experimental, artificial brains or other structures would greatly accelerate progress.

Eventually, systems with numbers of parts, numbers of interconnections, amounts of memory, and operating speeds greatly exceeding those of the human brain could be constructed. The availability of experimental hardware of such power should have an extraordinarily positive effect on our understanding of the brain and the further advancement of both "mainstream" AI and bionic (brain science) AI, to say the least, not to mention its effect on more traditional computer science. Even the current level of AI and computer science could lead to large quantities of useful idiot savant systems. As AI systems reach and surpass the quantitative and qualitative realms of whatever it is that we associate with sentience, or are used in conjunction with human brains in order to extend their capacity, a number of ethical questions will arise; by careful planning, the prudent application of technology should make it possible to avoid objectionable situations.

The above considerations suggest that one of the primary goals of near-to-intermediate term AI should be the genesis of Artificially Replicating Microtechnology (ARMT) or advanced Multiple Stage Production Microtechnology (MSPMT). To this end, AI based computer aided design, computer aided manufacturing, and computer aided testing could be developed as expert systems

around databases incorporating every known natural and artificial MT device technology and their corresponding functions. Such a project might start with simpler and increasingly faster systems of biological cellular automata (or something better) in order to generate a greatly increased base of computing power for developing more difficult levels of MT. In the medium term, biological cells may provide a useful medium for replicating the computing and control functions of ARMT or MSPMT, while the mechanical and packaging functions may be bootstrapped in nonbiological technologies later, on both smaller and larger size scales. This seems, perforce, an optimal long term bootstrapping strategy for AI, and this sort of problem, by virtue of its size, complexity, and knowledge-intensive nature, seems well suited to AI. A similar approach may be seen in the invention of life, where replicators evolved capabilities for generating relatively advanced protein-based computing machinery, leading to skeletal hardware, leading to more computing machinery, eventually leading to the development of natural intelligence.

In the distant future, using mature replicating Molecular Microtechnology (MMT), it should be possible to construct artificial (human level) brains that operate at least 10^7 times faster than your brain. Rather than waiting for humans to develop this very advanced level of MMT, several decades might be saved by using bulkier and slower replicating biological cellular automata technology, when it becomes available, to develop and eventually implement artificial brains that were merely 10^3 times as fast (and perhaps 10^3 times as big) as yours. Mass producing 10^6 such brains in parallel could in turn probably result in the development of mature replicating MMT within another year. If 10^6 artificial brains of 10^7 the speed of your brain were then mass produced by advanced MMT replicators and were augmented with sufficient MMT-based memory, their thinking capacity in one hour would exceed that of ALL the scientists that have EVER lived. In one day, most of the scientific thinking that might otherwise have been done by unaided scientists in the 21st Century could be done, although without benefit of experiments. What they could accomplish at the end of one week, then one month, and then one year would be a matter of pure speculation. **Clearly, the prospect of ARMT- or MSPMT-generated AI hardware greatly limits our ability to predict the future state of science and technology beyond, say, about 40 years, other than to say things could be far, far more advanced.**

AEROSPACE

The development of MT should permit the performance of advanced light sails (Drexler, 1979) to be improved substantially. By forming a mesh with submicron holes and using micron-scale quarter-wave infrared radiating elements, it should be possible to make light sails with accelerations of several gravities in high intensity light beams (Drexler, 1982a).

The use of MT teleoperators, VLSI (bio)chemistry systems, and other MT tools, coupled with high bandwidth communications systems could allow thousands of researchers to execute thousands of experiments on the Space Shuttle or its successors by remote control. This would greatly leverage its scientific and engineering capabilities and greatly increasing public participation in space activities. Likewise, thousands of mini Lunar Rovers could be operated on the moon, for exploration, fun, or profit.

The self-replicating factory concept proposed for the moon (Long & Healy,

1980) could become feasible sooner if biotechnology (using natural ARMT) were applied to a resource base consisting of carbon- and water-rich asteroids. This might be far less expensive since several such Earth-approaching asteroids require less total energy for payload delivery than the moon and have a wider variety of raw materials which may also be processed using biotechnology. The remote-controlled environment of an asteroid farm/greenhouse for harvest during Earth approaches would reduce the cost of human operations in cis-Lunar space and beyond.

MILITARY AND ECOLOGICAL DEFENSE

Mass production of advanced derivatives of greatly miniaturized (insect-sized to invisible) MT versions of both precision guided weapons (including cruise missiles) and more conventional ordinance (Gosch, 1982) could be powered many ways: biochemically (like flies), by fuel cells, by solar and electric lights, by electromagnetic fields near power lines, etc., and by combinations of these. Intercontinental audiovisual remote piloting capability, using worldwide MT ground or satellite communications, with broad-spectrum onboard sensors, would permit individually targeted, speedy, remote weaponry to be used in large numbers on a global basis, **all with no (direct) risk to the operators.** Such a **capability should make conventional war obsolete**, greatly reducing the loss of human life. It has the added advantage of being useful following a nuclear war, when ships and ports, aircraft and airports would be lost, rendering conventional war ineffective. Non-lethal and nonexplosive payloads may be used, including MT robots, sensors, communicators, communications relays, etc., which may also be directed at non-human targets such as electronic equipment, fuel systems, etc. These could be carried over large distances by self-propulsion, mini-ICBM's, satellites, winds, birds, or unwitting tourists. **Being small in size (in the cm to mm range or less), these would effectively be Stealth devices.** With such technology, **the iron and bamboo curtains may someday be dissolved.** Similar devices could identify and eliminate all rabid animals and stray animals dangerous to humans.

IMPLICATIONS FOR SUPPORTING R&D

The potential payoffs for developing ARMT are so large that every field of research should be reexamined in light of its potential for contributing to the development of ARMT and vice versa. A few areas not mentioned elsewhere in this paper are mentioned below.

As an example, the development of a pulsed X-ray laser for making miniature X-ray holograms of large molecules and small cells would be one of the most valuable tools for advancing our knowledge in molecular science, biochemistry, biophysics, molecular biology, and for MMT in general. This implies that the national labs doing implosion-based fusion research should include the development of coherent pulsed X-ray sources for molecular and subcellular X-ray holography as a priority on a par with scientific breakeven for fusion. The scientific, engineering, and economic merits of such a generally valuable tool clearly warrants such an effort. In the meantime, the current military x-ray lasers which are powered by nuclear bombs should be made available for general scientific use whenever they are tested (Robinson, 1982).

POLITICAL AND ECONOMIC IMPLICATIONS

The ultimate impact of MT on the world can be tremendous, with great possibilities for good or ill. Since the aim of this paper is to encourage MT R&D, detailed discussion of the latter case is omitted so as not to become a self-fulfilling prophesy (Drexler, 1982a). A forthcoming book on MMT treats the subject of MMT capabilities, perils, and precautions at length (Drexler, 1983b, 1986). I highly recommend it; it is by far the best reference on MMT.

The great dream of the late mathematician John Von Neumann was, in effect, to produce a special form of chain reaction that would generate a population explosion of gadget-building gadgets, with each new generation of gadgets incorporating a significantly more powerful computer than the previous generation (Von Neumann, 1966; Burks, 1970; Berry, 1974). After a period of very rapid growth, the resulting computing power would be absolutely staggering, vastly exceeding current worldwide computing capacity by factors of thousands or millions, and of extraordinary value for solving many important scientific and engineering problems that lay far beyond our current computational grasp.

As soon as we discover ways to apply this principle to MT factory systems, thereby multiplying them and their products into the thousands, then millions, then billions, then trillions, etc., we might bring about exponentially declining costs for some useful MT products, particularly those involved with energy, computing, or communications. Thus, some basic quantity of them could be made available to every person on Earth. Concurrent development of large quantities of micro-scale scientific and engineering sensors, scanners, teleoperators, etc., should soon thereafter yield great advances in molecular biology and medicine, literally saving and extending billions of lives from premature death due to starvation, malnutrition, cancer, or old age. **With levels of support comparable to the U.S. national budgets for high energy particle physics, fusion power R&D, or similar long-term programs, prototype versions of such MT systems should be feasible by the end of this century or earlier, possibly generating a tremendous worldwide increase in standards of living and quality of life, and on a scale unmatched by even the industrial revolution. Many more less dramatic, near-term, and much simpler, applications of precursor MT technology in the meantime are likely to have tremendous scientific, commercial, and medical value. Realizing these prospects represents the ultimate in welfare, social security, and foreign aid programs, assuming human rights are upheld in the process—and the developers of ARMT should have more than sufficient military power to insure this is the case if they so desire.**

This scenario neglects at least three important factors which should be noted in the spirit of an environmental impact statement. One, it doesn't account for the increasing levels of irrationality, disregard for human rights and life, violence, terrorism, corruption, incompetence, and general revival of authoritarianism and facsism that is spreading around the world, both overtly and covertly. Two, ARMT could make possible invisible, efficient, rapidly multiplying molecular replicators having no natural enemies and which feed on organic material (such as people). Human life might also be eliminated by directly destroying critical parts of the food chain, or indirectly via worldwide toxic pollution. It has been argued that these two reasons are grounds for deliberately slowing the development of MT. However, further considerations suggest otherwise, although with some precautions. Current technologies of oppression, à la Orwell/1984, and destruction à la nuclear war and advanced

biomedical war, are so advanced (especially if one remembers to include individual and global forms of secret recombinant-DNA-based, biochemical weapons with genetically selective or other targeting), that the added capabilities of ARMT are for practical purposes, effectively nil. Also, the wisdom and actions of those in de facto power is widely variable; the tendency is more to the negative, all things considered. Hence, **delaying ARMT development means that its vast capabilities will fall into relatively worse hands, while delaying a vast array of potential benefits.** Indeed, the political and economic implications of a world where there could be more than enough of the essential necessities to go around and where every person on Earth could own their own compact set of production machinery for satisfying the majority of their material needs is enormous (Drexler, 1983b). It would greatly reduce a major cause of war (resource shortages, potential and actual) and a major cause of governmental growth (confiscatory redistribution of limited resources for and to political interests). Since these two factors lead to increasing governmental suppression of human rights, their reduction could eliminate major barriers to a more libertarian world order. Hence, **those components of ARMT and MSPMT systems which could bring about such dramatic progress in productive capability without the dangers associated with replicating MMT should be pursued with the utmost vigor for humanitarian reasons.** By designing ARMT systems to always work with prefab modules or otherwise processed materials and never with raw biomass (which would be more difficult anyway), and other techniques, the dangers of accidental runaway replicators may be avoided for a while. **The longer term problem of intentional ("Mutually Assured Destruction") or accidental military MMT replicators and other machines can only be solved by starting work on a worldwide detection, early warning, and "immune system" defense.** Because development of MMT machines can be carried out secretly virtually anywhere on Earth, in space, or undersea, **any attempt to halt or regulate development of military MMT systems seems futile.** A world government with total symmetric (open and public) monitoring of all laboratories in the solar system, and especially of all government operations, might be an excellent idea if it weren't so improbable. Given the military potential of ARMT and MSPMT, **it would be very dangerous to fall behind in any arms race based on them. Also, it is needed for defense against biochemical warfare.** Delay is uneconomic too, since the possibility of exponential production should make it the only arms race to ever really pay for itself when all the hidden costs are included. As noted earlier, ARMT or MSPMT seems essential for really significant progress in life extension to occur in our lifetimes. This brings us to the third factor. While the dramatic consequences of an exponential nuclear fission chain reaction in are generally appreciated, most people don't seem to appreciate the tremendous impact that rapid exponential production of computing capabilities (when uncoupled from human labor requirements) could have on the field of AI.

Relatively advanced AI may be one of the most valuable and relatively early consequences of ARMT due to the absolutely incredible increases (by many orders of magnitude) in hardware capability, coupled with various methods of modeling brain structures and functions. This should soon lead to advanced AI and AI-based tools, even without greatly increased theoretical progress.

Barring a nuclear holocaust, the driving pressure of military and economic competition should eventually lead to ARMT on all scales, spanning the submillimeter, micron, and molecular domains; however, it should be possible to push MSP or biological cellular ARMT systems relatively faster, permitting applications to AI-based immune systems before dangerous general purpose MMT replicators are developed. This will also permit the construction of military

intelligence computer and AI systems of enormous, exponentially increasing power. Continuing the current arms race is then going to be very interesting as nuclear weapons would take on an increasingly peripheral role due to the likely construction of machines with a thousand and then a million times as many (functionally equivalent) components as the brain, each operating about a million times faster, with far larger machines to follow. The augmentation of the human intellect with machines of such great problem-solving potential would offer another possibility for solving world problems.

CONCLUDING REMARKS

Although the current world situation is fraught with menacing trends and increasing danger, the potential for greatly accelerating improvement of the human condition seems distant and yet brighter than ever before. I am optimistic about the possibility of eventually realizing some of the more noble hopes of humanity.

POSTSCRIPT

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Comments, suggestions and further references are always welcome. Please address them to:

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[Please note: Many entries below have not been cited in the text above, but are included for the benefit of readers who may be interested in more information about related topics falling outside the scope of this paper.]

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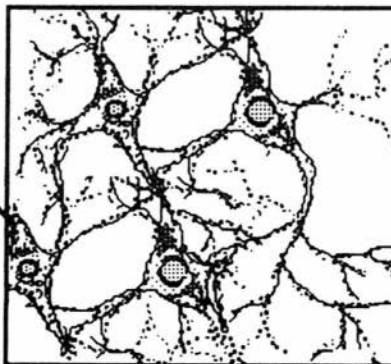
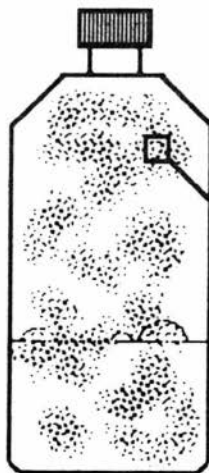
Science Updates by Thomas Donaldson

Culture Methods For Brain Tissue

If we want to study the effects of any treatment such as freezing or ischemia on brain tissue, it would be helpful to have means to keep living assemblages of brain cells **in culture**. Because a tissue culture will be far better defined than tissue samples taken from a living body, we can determine much more accurately the effects of the treatments we have given.

In the '50's and '60's scientists worked out ways to support tissues such as lung, kidney or liver in totally defined media. However, they only began to learn how to keep alive **neural** tissue in totally defined media in 1979. P.D. Honegger, et al, published a paper defining a medium for culturing fetal rat

"If we want to study the effects of any treatment such as freezing or ischemia on brain tissue, it would be helpful to have means to keep living assemblages of brain cells in culture."



brain cells, and other scientists worked out similar methods for other neural tissues.

Before this work neurologists had cultured brain cell tissue in **horse serum**. Serum is hardly a well defined substance chemically. Commercial sera often demonstrated great variations. Furthermore, serum often contained deleterious factors (of unknown nature), and brain cells cultured in serum usually died after about two days.

A recent paper in NEUROSCIENCE AND BIOBEHAVIORAL REVIEWS (8, 301-334 (1984)) by H.J. Romijin, et al, from the Netherlands Institute for Brain Research presents a totally defined medium which sustains cerebral cortex tissue for as long as 23 days in vitro. After a period of 23 days the tissue gradually degenerates.

Romijin and his co-workers studied different media very thoroughly. Their paper is long and exhaustive, but very worthwhile. I won't describe the exact composition of their "final" media here. Fundamentally they achieved their results by the time-honored method of hard work: try everything until you find something which works. They do include considerable discussion of theoretical and practical reasons for each of the many constituents of their medium.

The importance of a defined medium for culturing brain tissue consists precisely of the fact that it gives a **well controlled** environment for testing the effects of many different treatments on the brain. For instance, we could use this solution to test the effects of ischemia and various drug treatments for it. A drug given to a whole animal might cause many other effects on the blood serum and environment of the brain cells. Other organs, including the vascular tissues themselves, might also respond to the drug, creating a cascade of reverberating effects. To piece out exactly why a drug or toxin has its effects we need to know what it does to single isolated systems. We can control all of this in a defined medium. Drugs to aid brain repair, protect brains from injury due to freezing, and assist memory should also become much more testable.

Yearly Rhythms Aren't Controlled by the Suprachiasmatic Nucleus

One of the leading subterranean issues in aging research is the question of **clocks**. Recently scientists have done substantial work showing that animals of many different kinds have internal rhythms which their bodies will follow in the absence of all external cues. We know about such rhythms from our own lives. What is important and new in the work of the last 20 years or so on biological rhythms is the realization that these rhythms will persist even when the animals have no external clues to tell them about the passage of time.

These clocks are of significance to aging research not because they are **known** to relate to aging but because the hypothesis that aging itself depends on some sort of biological clock explains a great deal about the aging process. There must exist some internal process which tells us to pass through puberty and after that to become old. How could our bodies know they are 40 years old when they reach the age of 40?

Our daily rhythms of eating and sleeping provide a leading example of

biological rhythms. A great deal of work has actually located the clock which controls these rhythms. It is a brain region called the **suprachiasmatic nucleus** (SCN for short). When an experimenter surgically removes this brain region treated animals will lose their independent daily rhythms. They eat and sleep at irregular times, without periodicity.

However, it's an entirely different issue as to whether or not the SCN is the clock of **aging**. At first, scientists thought the SCN controlled all biological rhythms. However, evidence persisted that it was not the whole story (B. Rusak and L. Zucker PHYSIOL REV., 59, 449-526 (1979)).

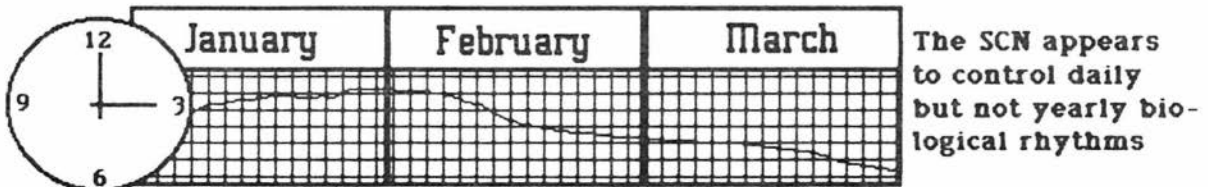
A recent article in BRAIN RESEARCH presents us with the best available evidence that the SCN does not control all biological rhythms. It follows that if we want to search out a clock of aging, we'll probably have to locate these other clocks and attempt modifications of **them**.

John Dark, Gary Pickard, and Irving Zucker, at the University of California at Berkeley, give evidence in BRAIN RESEARCH (332, 201-207 (1985)) that the SCN does not control the **annual** cycle of the hibernating ground squirrel. These animals show a regular yearly rhythm in their body weight. Dark et al have shown that this rhythm isn't changed in **most** squirrels even if their SCN is surgically removed.

Briefly, their experiment consisted of removing the SCNs from a group of squirrels. They tested for successful surgery in all cases by autopsying the animals after killing them. Several enzymes (such as **horseradish peroxidase**) allow neurologists to actually trace the wiring connections within a brain. The authors used these enzymes to verify that their test animals did indeed lack an SCN. They also used **controls**, on which they had done every part of the operation up the point of removing the SCN.

One important point of studying a yearly rhythm is that of verifying that the rhythm either does or does not persist. Unfortunately, to do this we must follow the animal through several cycles, since a cycle one begun can continue even though the initiating parts of the brain are gone. These authors therefore watched their squirrels for up to 3 years. Previous work had not gone on long enough to prove a convincing case. These authors took care to see to it that the squirrels had enough time to lose their rhythms if they were going to do so.

We might even argue that in human beings, at least, the clock of aging is more likely to be an annual clock than a daily one. The meaning of this experiment is that we probably won't find the aging clock in the SCN, but in some other brain region. This is unfortunate because the SCN is currently the only identified biological clock. It's fortunate because a proof of the **existence** of another clock is a first step towards finding it.



JULY-SEPTEMBER 1985 MEETING CALENDAR

ALCOR meetings are usually held on the first Sunday of the month. Guests are welcome. Unless otherwise noted, meetings start at 1:00 PM. For meeting directions, or if you get lost, call ALCOR at (714) 738-5569 and page the technician on call.

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The JULY meeting will be held at the home of:

(SUN, 14 JULY, 1985) Brenda Peters
(SECOND SUNDAY) 8150 Rhea
Reseda, CA

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

The AUGUST meeting will be at Cryovita Laboratories:

(SUN, 4 AUG 1985) Cryovita Laboratories
4030 N. Palm, #304
Fullerton, CA
Tel: (714) 879-0414

DIRECTIONS: Take the Orange Freeway (Hwy 57) to Imperial Highway (Hwy 90), and go west through Brea on Imperial Highway. Palm St. is the third stop light after Brea Blvd. (If you cross the railroad tracks and Harbor Blvd., you've gone too far.) Cryovita is in the small industrial park on the northeast corner of Palm and Imperial. To enter, turn right (North) on Palm, and take the next right into the complex. 4030 is in the back, on the right. Park in the right rear parking area.

The SEPTEMBER meeting will be at the home of:

(SUN, 1 SEPT 1985) Mike Darwin and Scott Greene
(SECOND SUNDAY) 350 W. Imperial Highway, #21
Brea, CA
Tel: (714) 990-6551

DIRECTIONS: Take the Orange Freeway (Hwy 57) to Imperial Highway (Hwy 90), and go west through Brea on Imperial Highway. 350 is about one mile from the freeway, and in the third block beyond Brea Blvd., on the south (left) side. If the gate is closed, park on the streets curve to the east and a blind hill to the west at this point.

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