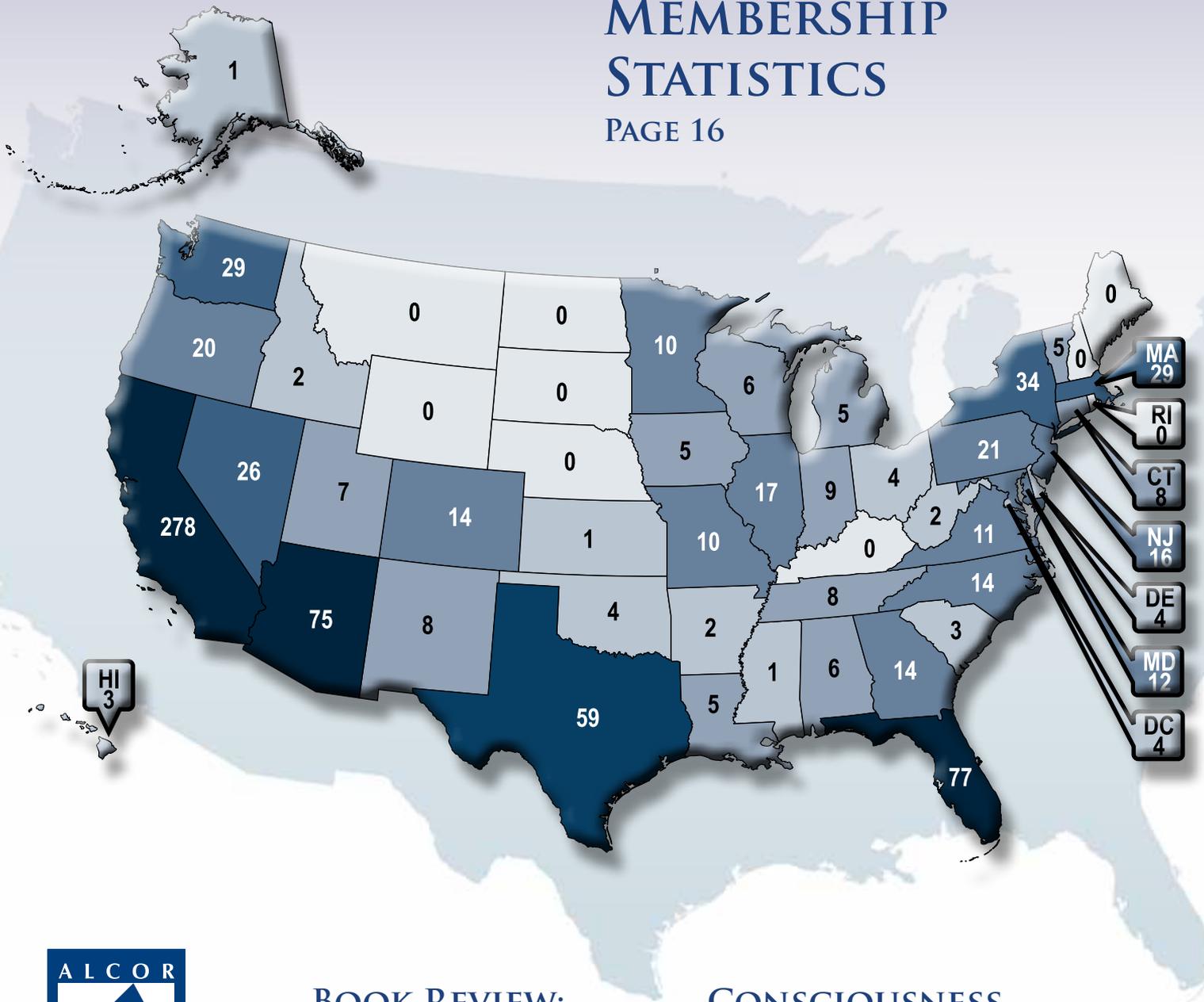


CRYONICS

FEBRUARY 2013 · VOLUME 34:2

MEMBERSHIP STATISTICS

PAGE 16



BOOK REVIEW:
DOES AGING STOP?
PAGE 8

CONSCIOUSNESS,
NATURAL SELECTION,
AND KNOWLEDGE
PAGE 10

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CRYONICS



COVER STORY: PAGE 16

Memberships Statistics

Starting this issue, *Cryonics* will feature a map of the United States with a complete breakdown of Alcor cryopreservation members by state plus the latest numbers on Alcor membership around the world. If you are interested in how many other people have made cryonics arrangements in your state and which states have the highest concentration of Alcor members, head over to page 16-17. See also our brief observations on the geographical distribution of Alcor members on page 18.

8 Book Review: *Does Aging Stop?*

At the recent Alcor-40 conference bio-gerontologist Michael Rose argued that the widespread view of aging as a process of wear and tear is mistaken and needs to be replaced by an evolutionary account supported by experimental evidence. Mike Perry reviews his recent technical co-authored book *Does Aging Stop?* which presents the latest experimental research and modeling that shows the cessation of demographic aging at late age and how this phenomenon could be manipulated to extend the human life span.

10 COOLER MINDS PREVAIL

Consciousness, Natural Selection, and Knowledge

COOLER MINDS PREVAIL is a new column by Chana de Wolf about neuroscience, cryonics, and life extension. The first installment deals with one of the hardest problems in the scientific study of the brain — consciousness — and places it in an evolutionary context.

CONTENTS

- 5 QUOD INCEPIMUS CONFICIEMUS**
Introgenesis and Cryonics
Cryonics magazine editor Aschwin de Wolf's column aims to further the cause of human cryopreservation by debunking misconceptions and offering fresh perspectives.
- 6 CEO Report**
- 13 IN PERPETUITY**
How Uniform are the Uniform Anatomical Gift Acts?
 Keegan Macintosh's monthly column about legal issues surrounding cryonics and life extension.
- 20 FOR THE RECORD**
John Adolphus Etzler: Pioneer Prophet of Radical Abundance
Cryonics magazine resuscitated this essential history column. Michael Perry writes about key events and figures in the history of Alcor, cryonics, life extension, and human enhancement. Mike's first column concerns John Adolphus Etzler, a mostly forgotten early advocate of technological post-scarcity and human enhancement.
- 24 Tech News**
 Tech News is back! Monthly publication of *Cryonics* magazine allows us to report on the latest developments in science and technology in a timely matter again.

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The James Bedford Society



Gifts have played a fundamental role in the cryonics movement since its earliest days. Dr. James Bedford, a man whose extraordinary vision led him to become the first person to be cryopreserved, and the first to make a bequest to a cryonics organization, exemplified the determination of the early pioneers of cryonics. We invite you to follow in his footsteps, and join the James Bedford Society.

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QUOD INCEPIMUS CONFICIEMUS



Photo: Cryo-Care Equipment Corporation on Indian School Road in Phoenix, AZ.
Dr. Bedford's "home" from 1967 to 1969.



IATROGENESIS AND CRYONICS

By Aschwin de Wolf

Wikipedia tells us that iatrogenesis is “an inadvertent adverse effect or complication resulting from medical treatment or advice...” The key word in this definition is “inadvertent.” For example, a doctor who exposes a patient to a bacterial infection by accidentally donning non-surgical gloves is an example of iatrogenesis. A doctor who deliberately administers a lethal dose of an anesthetic is not. One source of iatrogenesis is adverse effects.

A defining characteristic of contemporary human cryopreservation is that it is not possible to stabilize patients at very low temperatures without producing additional damage. Forms of injury in cryonics include ice formation, cryoprotectant toxicity, and fracturing. The relevance of the concept of iatrogenic diseases to cryonics was first recognized by Thomas Donaldson in his article “Neural Archeology” (*Cryonics*, February 1987). What sets cryonics apart is that cost-benefit analysis favors cryopreservation in a sense not encountered in ordinary medicine. Cryonics is the last hope to save the life of the patient and the alternative course of action is irreversible death.

One could say that the adverse effects of cryonics are a form iatrogenic injury,

but since the major adverse effects of cryonics are known and recognized, cryonics cannot be brought under the rubric of iatrogenesis. But just as medical researchers and pharmaceutical companies allocate resources to developing drugs with fewer or less serious adverse effects, Alcor aims to improve procedures to eliminate these forms of injury. Examples include vitrification agents to eliminate ice formation, intermediate temperature storage to eliminate (or reduce) fracturing, rapid cooling devices to decrease ischemic injury, etc. The ultimate goal is to create a low temperature stabilization procedure that does not induce any additional injury. Such an achievement would constitute true human suspended animation. We would not be able to treat the disease of the patient yet, but could induce biostasis and reverse it without any adverse effects.

There is narrower application of the idea of iatrogenic injury to specific elements of cryonics procedures. For example, if a multi-person team is present at the bedside with a portable ice bath, ice, and a functioning chest compression device, but later analysis of the temperature data reveals negligible cooling, negligence or error may be involved. This is a rather dramatic example and most examples of non-intrinsic iatrogenic injury

in cryonics have a subtler character. Cryonics is particularly vulnerable to iatrogenic injury because of the lack of clear objectives for the individual procedures and the lack of consistent and comprehensive monitoring.

A rather disappointing excuse for permitting additional injury is the view that since cryonics patients will require advanced repair technologies in the future anyway it is not of great importance to minimize adverse effects of the cryonics procedures themselves. Such an attitude encourages recklessness, makes a mockery of the idea of human cryopreservation as medicine, and is not the kind of cryonics that is going to win over scientists, medical professionals, and the educated public. We do not know at which point injury translates into irreversible identity destruction, but we do know that the closer our procedures conform to reversible human suspended animation the less likely it is that we are wandering into that territory.

Cryonics cannot be disqualified merely because it introduces adverse effects. We know it does and we have no choice but to accept this. But an aggressive pursuit of human suspended animation will eliminate these adverse effects step-by-step so a future doctor will no longer need to worry about the effects of the cryonics procedure itself. ■

CEO Update

By Max More



Alcor-40 conference: Based on the feedback, both verbal and written, Alcor's 40th anniversary conference — our first in five years — was a resounding success! 203 people registered but actual attendance was higher since some spouses and others attended without registering. Overall, attendees gave strongly positive feedback on the quality of the talks. Although there was considerable variation in those mentioned as favorite speakers, much more agreement was evident in the least-liked speakers — a fact that gives me some useful feedback for the future. Everyone seemed to enjoy the mixture of research reports, legal and financial discussions, practical advice, and updates on cryonics capabilities.

“As recent membership reports have made painfully clear, we may not grow substantially if we lose almost as many existing members as we add new ones.”

We're pleased that Scottsdale's longest-serving councilman, Robert Littlefield, opened the conference. A few days earlier, along with his wife Kathy, Mr. Littlefield toured Alcor and asked plenty

of questions. His friendly and engaged attitude was confirmed not only by his conference address but by the fact that we hear he has been speaking positively about us to other council members.

Despite the encouraging response, we will *not* plan another conference for next year. Apart from the effort involved in putting on an event, taking a break heightens interest and allows us to keep the content fresh. Records show that paid attendance dropped by 50% between the 2006 and 2007 conferences, so the next will not be until 2014 or 2015. For those who want to re-experience talks — and for the perhaps regretful individuals who missed our first conference in five years — we will be making videos of most sessions available online.

Membership growth: The conference may have given us a small jump in membership. The challenge is to maintain and build on that (7% annualized) growth rate rather than dropping back to 2%. One growth initiative I've mentioned before is a series of YouTube videos addressing common misconceptions about cryonics and answering specific and common questions while motivating viewers to get involved. Following a productive conversation with an overseas member, I'm thinking about how to do this more effectively. I am studying highly successful YouTube videos to glean approaches, styles, and formats that might work for us.

The result may well require me to adjust my presentation style for this format.

As part of this effort, I want to use social media far more than Alcor has done in the past to build awareness of our existence and what we do and to spur interest in getting people involved. We have several members with known expertise in social media. If I can gather and structure their input, we should be able to develop an effective plan. (If you have skills in this area and want to help, please contact me.)

Growth depends not only on contacting new people and getting them interested. It also depends both on getting them started on the sign-up process and ensuring they complete it. Signing up with Alcor is easier now that when I joined in 1986, but there may be room for improvement without giving up crucial requirements. We may be able to borrow from the marketers' bag of tricks (which is backed up by studies in psychology) in creating a “funnel” for sign-up. The idea is to avoid the appearance of a huge, monolithic effort being needed to become a member, replacing this with a funnel with a wide entrance.

Getting people started is crucial (and Associate Membership is one element of this approach), followed by a clear progression of steps, each of which is minimally difficult. We might use a progress bar (such as found, for instance, on LinkedIn which encourages users to complete their profiles) with reminders to take the next step and an estimate

of how doing so would improve the person's probability of being successfully cryopreserved. (Such probabilities would be approximations but can be based on available data.) We could also reinvigorate the old practice (at least in California) of sign-up parties, or else devise other means of social support or peer pressure to encourage applicants to complete the process.

On the communications front, recently I have talked to reporters from Longevity, thedaily.com (for the iPad), the *New York Times*, a producer for a possible science documentary in England, and *Six Mois*.

“At the conference, Sebastian Seung graciously welcomed suggested corrections to the text of his book, which is coming out in paperback.”

Retaining members: As recent membership reports have made painfully clear, we may not grow substantially if we lose almost as many existing members as we add new ones. We have just introduced a discount for members of 20 years standing. I would like to add to this by introducing additional discounts (levels to be discussed) for members of 25 years and 30 years (cumulative, not necessarily uninterrupted). I want it to be clear that loyalty and persistence will be rewarded. And that members reaching retirement age will *not* be faced with inexorably increasing dues. Younger individuals would be more likely to sign up rather than waiting, and intermediate age members would be more likely to maintain their arrangements rather than dropping them “until later.”

Other items: I have had some stimulating and in-depth discussions with several members lately. One of these is with one of our longest-term members. He wants us to do more to fulfill the revival and rehabilitation aspect of Alcor's

mission. We discussed how we might go about developing a buddy system to help revived members re-enter their lives. True, this is not the most urgent part of Alcor's mission, but it is still part of it. It is also of immediate relevance because one very clear source of resistance to cryonics is the fear of waking up in a future world where one is alone and obsolete. Anything we can do to address this with more than reassuring words and hopeful scenarios could help spread acceptance of cryonics and build our membership over time.

We also discussed ways in which Alcor could do more to store members' personal information so that they can “take it with them.” Our current offering is minimal and perhaps a little outdated, although the underground vaults could remain an option. This member will research existing digital storage options (especially those that are cloud-based) for their cost, reliability, and robustness. I suggested he investigate whether the old Lifepact idea led to anything actionable, and that he might learn something useful from the Quantified Self groups.

On the international front, we are working on deploying a kit in Canada to minimize delays, cooperating with cryonicists in Australia, and preparing for a likely near- to medium-term response in Portugal — one that may be a test of the remote cryoprotection protocol, but as applied to a whole body patient.

Finally, as you saw at the conference, cryopreservation faces the possibility of a competitor in the form of chemical preservation. At the conference, Sebastian Seung graciously welcomed suggested corrections to the text of his book, which is coming out in paperback. Several of us have made suggestions for corrections.

Humanity+ conference: I spoke on chemical brain preservation compared to cryopreservation in San Francisco in on December 1, at the Humanity+ conference. This was organized primarily by long-time Alcor member Natasha Vita-More. Other Alcor members speaking included Aubrey de Grey, Todd Huffman, Keith Henson, and Randal Koene. They were joined by dozens of other

excellent speakers including RU Sirius, James Hughes, David Brin, Kim Stanley Robinson, Annalee Newitz, and Jamais Cascio. The conference demonstrated the diversity of interests in this cryonics-friendly organization.

Finally, let me put a challenge to you: If you were given \$1 million to \$5 million to advance cryonics, how would you spend it? (Other than adding to the Endowment Fund or Patient Care Trust Fund). I would like to hear your ideas. ■

DOES AGING STOP?

By Laurence Mueller, Cassandra Rauser, and Michael Rose,
New York: Oxford University Press, 2011.

BOOK REVIEW BY R. MICHAEL PERRY

The book here reviewed is a technical study on the effects of aging, mainly using fruit flies as a model, since these creatures are short-lived so that research involving many generations is feasible. The findings appear to have relevance to other animal species, including humans.

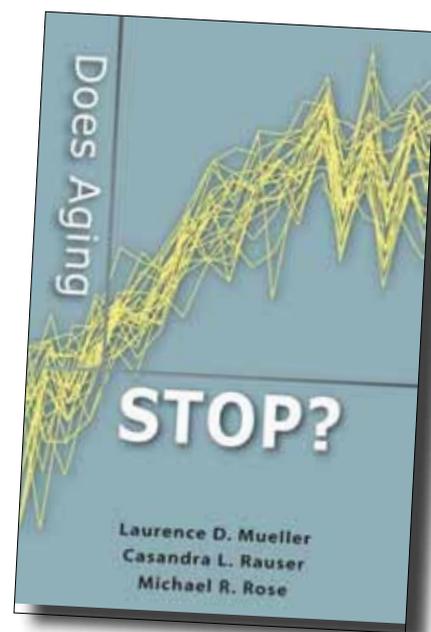
It is customary to think of aging as a process of progressive deterioration, akin to rust, that finally ends the life of the organism. The growing disability and decline in health, it is said, is reflected in an ever-increasing mortality or chance of dying in a given time interval. Not so, say the authors. Instead, though mortality does increase throughout much of later life in organisms ranging from insects to humans, finally but definitely it plateaus or levels off to more or less a constant value—aging stops. After this death still occurs, but at a nearly fixed rate, and the organism in this “late life” period does not experience any additional ongoing deterioration. Aging is not really a “process,” say the authors, but is best understood as a result of decreasing selection pressure as the organism repeatedly reproduces and the need for its continued survival correspondingly diminishes.

The absence of selection pressure, the authors say, means that features of the organism that are both beneficial and not subject to deterioration with time, that is to say are age-independent, persist unchallenged through time, allowing the late life period of little or no further deterioration to emerge. This theory was first developed by William D. Hamilton in the 1960s, and is invoked throughout to

explain the extensive experimental findings based mainly on the life histories of fruit flies.

The work reported with fruit flies (*Drosophila melanogaster*) was long and extensive, covering 18 years and 465 generations, supplemented by a lesser amount of work with a related, also short-lived insect, the medfly (*Ceratitis capitata*). The fruit flies averaged about 14 days per generation and lived up to a little past 100 days. Roughly, the length of generations and maximum life-span of the fruit flies in days equaled these data for humans in years, which thus are scaled several hundred times longer.

As for the results, it is consistently shown that the mortality of fruit flies, measured in terms of a probability density function giving the chance of dying in a short time interval, does not indefinitely increase. Instead it levels off or plateaus in later life, approaching a roughly constant value in which about 15-30% of the flies die per day, the variations depending on such factors as whether the flies have been specially bred for longevity. Though this is a substantial attrition rate, it is significant that it does not change much from this point on and particularly does not approach 100%, contrary to the thinking of earlier times. Instead, following the period of “aging” in which mortality rates rise, there is a period of indefinite if still finite length that the authors call “late life” when the organism does not age any further, though the aging that has already occurred is not reversed. The study was extended to cover fecundity, measured by the number of eggs produced per female fly per day. Here too it was found



that rates plateaued at nonzero values, in this case about 1-5 eggs/day, starting around age 60 days, versus about 50 eggs/day at peak performing ages of 20-30 days. The plateauing, both of mortality and fecundity, was highly insensitive to such effects as whether the particular strains of flies were shorter-lived or longer-lived, or had started out longer-lived and been selectively bred to be shorter-lived.

The authors note that other explanations for the onset of late life than the one they offer (Hamilton’s theory of diminishing selection pressure with time) have been proposed, and detail their considerable efforts to rule out these other explanations. Thus for example, there is a heterogeneity theory: a population of individuals contains some that are more likely to live

long than others due to genetic variations. As the population ages, the shorter-lived variants die off leaving the longer-lived who then drive the mortality to lower levels than would otherwise occur. This hypothesis is carefully tested, however, and the authors find that selection pressure works against heterogeneity by pruning the less fit, enforcing a uniformity that defeats this explanation of late-life plateauing.

hypothesis is considered that the transition from aging to late life occurs so late because of an agricultural diet, to which humans are still imperfectly adapted after some 400 generations or less. Here there are arguments and counterarguments, and the authors caution that more research is needed to test this and some alternative explanations for the lateness of late life. Still, the authors speculate that aging might

simple hypothesis beyond a reasonable doubt. The large amounts of evidence, both experimental and theoretical (using simulations of fly evolution and related calculations) and the thoroughness with which it is treated will be of interest to the researcher, while by the same token this is not a book for the general public. Such a book in turn might include a chapter summarizing the work covered in the

“Aging is not really a “process,” say the authors, but is best understood as a result of decreasing selection pressure as the organism repeatedly reproduces and the need for its continued survival correspondingly diminishes.”

The study was done with flies, though we are naturally more interested in ourselves, and particularly, whether humans like flies have a late-life period of indefinite duration in which aging has ceased. Humans, though, are much longer lived, and even a short-lived mammalian cousin such as the mouse would present formidable obstacles for laboratory research, requiring about a century to carry out a study to the same limit (465 generations, 12 weeks each in this case) as was done with the fruit flies. The authors caution against using human demographic data with the same confidence as data from the carefully controlled experiments they and others have undertaken with insects. The decline in mortality with age nevertheless occurs in other species too, the authors note, so that with humans in particular mortality has been found, tentatively, to reach a constant somewhere in the age range of 90-105, with roughly 50% of individuals (both genders) dying per year from then on. The authors conclude that late life in humans is broadly in line with the Hamiltonian theory, though the details of what is happening physiologically are complex and still not well understood.

But the authors pose the question: why does late life in humans begin so late? Moreover, could it be induced to happen earlier, when one's health is much better and mortality much smaller? The

be made to stop earlier by adopting a hunter-gatherer diet like that of our preagricultural, paleo ancestors. In any case, proclaim the authors, “gerontology based on cumulative damage or programmed aging is defunct.” One consequence is that attention must shift, in the fight against aging, from the idea of stopping a small number of forms of cumulative damage, as Dr. Aubrey de Grey has proposed, to recognition of the need to induce late life earlier. The failure to take this latter approach, say the authors, will mean that far too many forms of damage will have to be addressed on an individual basis for any practical antiaging program. As an alternative, the authors propose experimental evolutionary studies in which aging in model species is made to stop earlier and earlier, with corresponding adjustments in the rate of aging, and close study to determine the physiological and biochemical reasons why the changes occur. Such work would step beyond the authors' own, reported in the book, in which the organisms were treated largely as black boxes in monitoring survival and fecundity. The extra effort, they say, should provide superior insight into halting aging in humans.

One thing stressed in the book is that the hypothesis that aging stops was recognized—and resisted—long before it was widely accepted. Indeed, the present volume is largely an effort to establish this

present volume, then go on to cover other topics relating to the aging puzzle and its possible resolution, some of which are yet to be researched. I also think the work of Dr. de Grey, which is mildly criticized near the end, may actually have synergistic value, serving as a useful complement to the antiaging approach advocated here and others that might be attempted.

In any case, the book makes a very persuasive case that aging stops in fruit flies and medflies. It may also stop in humans, but if so it is at such an advanced age, with so high a final mortality, as to be of little benefit. Could human aging be stopped at an earlier age where the mortality would be much lower? And does abandoning the agricultural diet of the past 10,000 years have a significant chance of bringing this about, as the authors very tentatively suggest? To me the jury is still out—more evidence is needed—though admittedly I am skeptical. Our paleo ancestors generally did not live as long as we do. When causes of death such as infant mortality, childhood diseases, malnutrition, predators and adult diseases are taken into account, I still don't see strong evidence that their aging stopped much earlier than ours. An earlier halt to aging will surely take more than a simple change in diet, one would think. As usual, further investigation is called for. ■

CONSCIOUSNESS, NATURAL SELECTION, AND KNOWLEDGE

By Chana de Wolf



This is the first entry in a new series of short articles about neuroscience and its implications for the field of human cryopreservation and life extension. In this article I discuss the relationship of the brain to consciousness and knowledge acquisition before venturing into more specific and practical topics.

What is consciousness? Most of us understand the word in context, but when asked to define it we are suddenly at a loss for words or at best we offer a description that seems wholly inadequate. Scientists, philosophers, and religious scholars have debated the source, meaning, and nature of consciousness for all of recorded history. But with the rise of neuroscience over the past few decades, it now seems as though explaining the nature and mechanisms of conscious experience in neurobiological terms may be an attainable goal.

“Calling his idea Neural Darwinism, Edelman explains that the brain is a selection system that operates within an individual’s lifetime.”

The recent work on consciousness by neuroscientists has left certain philosophers more frustrated than ever before, including the likes of Thomas Nagel and David Chalmers. They suspect that consciousness may be quite different and separate from the brain circuitry proposed to underlie it.

Consciousness has appeared to be a strange and undefinable phenomenon for a very long time. Daniel Dennett captured the feeling very nicely in the 1970s:¹

Consciousness appears to be the last bastion of occult properties, epiphenomena, immeasurable subjective states — in short, the one area of mind best left to the philosophers. Let them make fools of themselves trying to corral the quicksilver of “phenomenology” into a respectable theory.

Consciousness no longer appears *this* strange to many researchers, but the

philosophers just mentioned continue to hold that it may not be reduced to brain processes active in cognition. A common philosophical complaint is that any neurobiological theory of consciousness will always leave something out. What it will always leave out is the feeling itself — the feeling of what it is like to be aware, to see green, to smell flowers, and so on (Nagel 1974; Chalmers, 1996). These are so-called qualia — the experiences themselves — and these are what are important about consciousness. The philosopher making this argument may go on to conclude that no science can ever really explain qualia because it cannot demonstrate what it is like to see green if you have never seen green. Ultimately, they argue, consciousness is beyond the reach of scientific understanding.

By contrast, neuroscientists take for granted that consciousness will be domesticated along with the rest of cognition. Indeed, this work tends to assume that neuroscience will not only identify *correlates* of consciousness, but will eventually tell us *what consciousness is*. By and

1 Daniel C. Dennett, “Toward a Cognitive Theory of Consciousness,” in *Brainstorms: Philosophical Essays on Mind and Psychology* (Montgomery, VT: Bradford Books, 1978).

large, these neuroscientific efforts have been directed toward cortical regions of the brain, cortical pathways, and cortical activity. This is due, in part, to the prevalence of clinical studies of human patients with region-specific cortical lesions that are correlated with deficits in specific kinds of experiences. This tendency to focus on the cortex may also reflect the common knowledge that humans possess the highest level of consciousness of all animals and have proportionally more cortex than our closest relatives (and — so the supposition goes — therein lies the difference in levels of consciousness).

“An important element of Edelman’s theory that consciousness is entailed by brain activity is that consciousness is not a “thing” or causal agent that does anything in the brain.”

Another theory of consciousness, offered by Dr. Gerald M. Edelman, aims to resolve this “divorce” between science and the humanities over theories of consciousness. The premise of Edelman’s theory is that the field of neuroscience has already provided enough information about how the brain works to support a scientifically plausible understanding of consciousness. His theory attempts to reconcile the two positions described earlier by examining how consciousness arose in the course of evolution.

In his book on the topic, *Second Nature: Brain Science and Human Knowledge*, Edelman says:

An examination of the biological bases of consciousness reveals it to be based in a selectional system. This provides the grounds for understanding the complexity, the irreversibility, and the historical contingency of our phenomenal experience. These properties, which affect how we know, rule out an all-inclusive reduction to scientific description of certain products

of our mental life such as art and ethics. But this does not mean that we have to invoke strange physical states, dualism, or panpsychism to explain the origin of conscious qualia. All of our mental life, reducible and irreducible, is based on the structure and dynamics of our brain.

In essence, Edelman has attempted to construct a comprehensive theory of consciousness that is consistent with the latest available neuroanatomical, neurophysiological, and behavioral data. Calling his idea Neural Darwinism, Edelman explains that the brain is a selection system that operates within an individual’s lifetime. Neural Darwinism proposes that, during neurogenesis, an enormous “primary repertoire” of physically connected populations of neurons arises. Subsequently, a “secondary repertoire” of functionally defined neuronal groups emerges as the animal experiences the world. A neural “value system,” developed over the course of evolution and believed to be made up of small populations of neurons within deep subcortical structures, is proposed to assign salience to particular stimuli encountered by the animal in order to select patterns of activity.

For example, when the response to a given stimulus leads to a positive outcome the value system will reinforce the synaptic connections between neurons that happened to be firing at that particular moment. When a stimulus is noxious, the value system will similarly strengthen the connections between neurons that happened to be firing at the time the stimulus was encountered, thus increasing the salience of that stimulus. When a stimulus has no salience, synaptic connections between neurons that fired upon first exposure to that stimulus will become weaker with successive exposures.

Importantly, the mapping of the world to the neural substrate is degenerate; that is, no two neuronal groups or maps are the same, either structurally or functionally. These maps are dynamic, and their borders shift with experience. And finally, since each individual has a unique history, no two individuals will express the same neural mappings of the world.

This brings us to the three tenets of Edelman’s theory:

1. Development of neural circuits leads to enormous microscopic anatomical variation that is the result of a process of continual selection;
2. An additional and overlapping set of selective events occurs when the repertoire of anatomical circuits that are formed receives signals because of an animal’s behavior or experience;
3. “Reentry” is the continual signaling from one brain region (or map) to another and back again across massively parallel fibers (axons) that are known to be omnipresent in higher brains.

Edelman thus believes that consciousness is entailed by reentrant activity among cortical areas and the thalamus and by the cortex interacting with itself and with subcortical structures. He suggests that primary consciousness appeared at a time when the thalamocortical system was greatly enlarged, accompanied by an increase in the number of specific thalamic nuclei and by enlargement of the cerebral cortex — probably after the transitions from reptiles to birds and separately to mammals about a quarter of a billion years ago. Higher-order consciousness (i.e., consciousness of consciousness), on the other hand, is due to reentrant connections between conceptual maps of the brain and those areas of the brain capable of symbolic or semantic reference — and it only fully flowered with hominids when true language appeared.

Regarding language and its relationship to higher-order consciousness, Edelman explains:

We do not inherit a language of thought. Instead, concepts are developed from the brain’s mapping of its own perceptual maps. Ultimately, therefore, concepts are initially about the world. Thought itself is based on brain events resulting from the activity of motor regions, activity that does not get conveyed to produce action. It is a premise of brain-based

epistemology that subcortical structures such as the basal ganglia are critical in assuring the sequence of such brain events, yielding a kind of presyntax. So thought can occur in the absence of language....

The view of brain-based epistemology is that, after the evolution of a bipedal posture, of a supralaryngeal space, of presyntax for movement in the basal ganglia, and of an enlarged cerebral cortex, language arose as an invention. The theory rejects the notion of a brain-based, genetically inherited, language acquisition device. Instead, it contends that language acquisition is epigenetic. Its acquisition and its spread across speech communities would obviously favor its possessors over nonlinguistic hominids even though no direct inheritance of a universal grammar is at issue. Of course, hominids using language could then be further favored by natural selection acting on those systems of learning that favor language skills.

Such a theory is attractive because it does not simply concentrate on conscious perception, but it also includes the role of behavior. We do well to keep in mind that moving, planning, deciding, executing plans, and more generally, keeping the body alive, is the fundamental business of the brain. Cognition and consciousness are what they are, and have the nature they have, because of their role in servicing behavior.

“The recent work on consciousness by neuroscientists has left certain philosophers more frustrated than ever before...”

An important element of Edelman’s theory that consciousness is *entailed* by brain activity is that consciousness is not a “thing” or causal agent that *does* anything

in the brain. He writes that “inasmuch as consciousness is a process entailed by neural activity in the reentrant dynamic core it cannot be itself causal.” This process causes a number of “useful” illusions such as “free will.”

Edelman’s theory of consciousness has further implications for the development of brain-based devices (BBDs), which Edelman believes will be conscious in the future as well. His central idea is that the overall structure and dynamics of a BBD, whether conscious or not, must resemble those of real brains in order to function. Unlike robots executing a defined program, the brains of such devices are built to have neuroanatomical structures and neuronal dynamics modeled on those known to have arisen during animal evolution and development.

Such devices currently exist — such as the “Darwin” device under development by The Neurosciences Institute. Darwin devices are situated in environments that allow them to make movements to sample various signal sequences and consequently develop perceptual categories and build appropriate memory systems in response to their experiences in the real world.

And though Edelman recognizes that it is currently not possible to reflect the degree of complexity of the thalamocortical system interacting with a basal ganglia system, much less to have it develop a true language with syntax as well as semantics, he nevertheless suggests that someday a conscious device could probably be built.

More ambitiously, Edelman also thinks that contemporary neuroscience can contribute to a naturalized epistemology. The term “naturalized epistemology” goes back to the analytical philosopher Willard Quine and refers to a movement away from the “justification” (or foundations) of knowledge and emphasizes the *empirical* processes of knowledge *acquisition*. Edelman is largely sympathetic towards Quine’s project, but provides a broader evolutionary framework to epistemology that also permits internal states of mind (consciousness). ■

HOW UNIFORM ARE THE UNIFORM ANATOMICAL GIFT ACTS?

By Keegan Macintosh



“SECTION 11. PERSONS THAT MAY RECEIVE ANATOMICAL GIFT; PURPOSE OF ANATOMICAL GIFT”

Thus begins a very important section of a very important piece of legislation. Except it isn't actually legislation at all, though it does look the part. It is the *Revised Uniform Anatomical Gift Act* (2006) [“UAGA”]. UAGA is *model* legislation, and in that form it does not have the force of law.

The model act continues:

- (a) An anatomical gift may be made to the following persons named in the document of gift:
 - (1) a hospital; accredited medical school, dental school, college or university; organ procurement organization; or other appropriate person, for research or education;

Crucially, this section tells us under what, if any, authority we may direct that a cryonics service provider take custody of our bodies after legal death. Whether on plain meaning, or act-specific definition, cryonics service providers are not hospitals, medical or dental schools, colleges or universities. In some circumstances, Alcor and/or Suspended Animation behave like organ procurement organizations — insofar as brains are organs — but that term is defined in UAGA so as to require designation by the Secretary of the US Department of Health and Human Services. Subsection 2 (not reproduced

above) is specific to organ transplantation, and subsection 3 pertains to eye banks and tissue banks, neither of which are good “homes” for a cryonics service provider.

“Alberta’s Human Tissue and Organ Donation Act only permits body donations to university medical, dental or related health programs.”

So, for the time being we are left with “or other appropriate person, for research or education.” It isn't much — but it's home, and on that point at least one court agrees, namely the Court of Appeals of Iowa in *Alcor Life Extension Foundation v Richardson*.¹ But wait — how does a court in Iowa even begin to consider the meaning and effect of UAGA if it isn't really law? Well, because the Iowa Legislature looked at the model uniform act, decided it liked it (mostly), and made it into state law. In fact, the Iowa Legislature made some changes to the model, but it left in the “other appropriate person” clause, and that is very good, because when Alcor sued Orville Richardson's brother and sister for custody of Orville's body, the Court of Appeals of

Iowa agreed that Alcor was an “appropriate person for research” for the purposes of Iowa's UAGA.²

Thus, we can see how important these words are. As the name implies, UAGA is an attempt to promote uniformity in an area of law which could otherwise vary considerably from state to state, making the procurement and transfer of life-saving organs and other tissues for transplant very difficult. So the Uniform Law Commission³ came along and drafted UAGA for enactment in all states. Of course, this process is voluntary on the part of the states, and does not require wholesale adoption of the model act without modification — and that is where potential for trouble creeps in. Human cryopreservation is obviously not the intended subject of the act; even generally, gifts for research and education are only a secondary focus. In most states (Arizona being a conspicuous exception) there is no cryonics lobbyist at the table when state legislators are deliberating whether and how to enact the newest incarnation of UAGA; hence, they are not thinking about us or our unique interests when they consider whether to pass the model act with the words “or other appropriate person, for research or education” intact.

Now, section 24 of UAGA does state that “[i]n applying and construing this

² *Ibid* at 725.

¹ 785 NW (2d) 717 (Ill Ct App 2010).

³ <http://www.uniformlaws.org>

uniform act, consideration must be given to the need to promote uniformity of the law with respect to its subject matter among states that enact it.” But of course, the force of that section depends on whether or not it was itself legislated with the rest of the Act. However, assuming it was, this provision still cannot outweigh clear evidence of a legislature’s intent to diverge from the model by removing or materially altering particular language. That is to say, if the “other appropriate person” clause is left out of one state’s enactment of UAGA, a court has no discretion to read it in.⁴ Where the uniformity provision does help is if Alcor ever has to go to court again in a state with a UAGA substantially similar to Iowa’s — then the Iowa case should carry significant persuasive force.⁵ Happily, a majority of states’ UAGAs contain the “other appropriate person” clause, unaltered.⁶ A few others have adopted different language that is equally or maybe even more applicable to cryonics

organizations,⁷ and two states may even provide *additional* points of entry for cryonics service providers.⁸ However, nine states present problematic aberrations from the mold. In Oklahoma, the State Anatomical Board gets to designate who is an “other appropriate person.”⁹ Likewise, the Virginia Transplant Council is in charge of authorizing “other appropriate persons” in Virginia,¹⁰ and in the District of Columbia this is the domain of the mayor.¹¹ The remaining six states lack the “other appropriate person” clause entirely, and any other equivalent entry point: these are California, Florida, Maryland, New York, Texas, and Washington.¹² It is a little surprising to see some current (and in Texas’ case, future¹³) hubs of cryonics activity on this list.

At this stage, I feel I should point out that anatomical gift legislation is only one mechanism for making legal provisions for transference of custody of one’s body after legal death. The other (arguably more traditional) method is the “final disposition of human remains” method. Thus, the mere fact that a state’s anatomical gift legislation does not permit donations to cryonics organizations doesn’t rule out

legally enforceable cryonics arrangements. The nine states mentioned above all have some statutory provision for the disposition of human remains route, though Florida stands out for lack of clarity. Maryland and Oklahoma both provide the right to direct the disposition of one’s body after death.¹⁴ Written preferences are likewise binding in California, District of Columbia, New York, Texas, and Washington, which states also provide the right to designate a person who will supersede the spouse or next of kin’s default authority to control disposition (though they would be bound by the decedent’s written instructions in any case).¹⁵ Virginia allows for designation in writing of a person who will control disposition (over a surviving spouse or other next of kin), but the relevant statute does not expressly state that the decedent’s instructions are binding — though it could be argued that it is implied.¹⁶ Florida’s statutes are not explicit as to who controls the disposition of human remains after death, nor whether written preferences of the deceased are legally binding, though case law has generally supported this result.¹⁷

4 UAGA’s choice of law provision (section 19) states that a document of anatomical gift will be valid if it is executed in accordance with either (i) the law of the forum (i.e. the UAGA where the document is sought to be used), (ii) the law of the state/country where it was executed, or (iii) the law of the state/country where the person was domiciled, had a place of residence or was a national when the document was executed. However, the *interpretation* of the document of gift is governed by the forum law. That is to say, a document of anatomical gift to a cryonics service provider which is formally *valid* in the forum by merit of its validity under the laws of the state/country where it was executed, etc., may yet be *ineffective* under the laws of the forum.

5 The *Richardson* decision also included a tentative, but nonetheless authoritative finding that Orville’s payment to Alcor to preserve his body, and less-than-perfectly-altruistic motives did not move the transaction outside the legal category of “gift.” Again, this finding and the uniformity provision should go a long way to deciding the issue if it comes up again in another state.

6 For ease of reference: Alabama, Alaska, Arkansas, Arizona, Connecticut, Georgia, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, West Virginia, Wisconsin, Wyoming.

7 Minnesota replaces “other appropriate person” with “non-profit organization in medical education or research.” Minn Stat § 525A.10. Delaware, Illinois, and Pennsylvania still use language from older incarnations of the UAGA, which lack “other appropriate person” but define “any bank or storage facility” in such a way that so long as the cryonics service provider is recognized as a permissible donee in its home state, it should qualify under the Delaware/Illinois/Pennsylvania statutes. 16 Del Code § 2712, 755 ILCS § 50/5-10, 20 Pa C S § 8612.

8 Alcor’s own lobbying efforts resulted in the inclusion of the comparatively broadly defined “procurement organization” in Arizona’s ARS §36-850; Missouri has provision for “cadaver procurement organization[s]”. Mo Rev Stat § 194.255.

9 63 OS §2200.11A.

10 Va Code § 32.1-291.11

11 DC Code §7-1531.10

12 Cal Health & Safety Code § 7150.50; Fla Stat § 765.513; Md Code, Est & T §4-509; NY PBH Law §4302; Texas Health & Safety Code § 692A.011; RCW § 68.64.100.

13 Comfort, Texas is home to the Timeship project.

“Whether on plain meaning, or act-specific definition, cryonic service providers are not hospitals, medical or dental schools, colleges or universities.”

However, even if the nine states whose anatomical gift statutes apparently preclude

14 Md Code, Health §5-509; 21 OS § 1151.

15 Cal Health & Safety Code §7100.1; DC Code §3-413; NY PBH Law §4201.2(c); Texas Health & Safety Code § 711.002; RCW § 68.50.160.

16 Va Code §54.1-2825.

17 Fla Stat § 497.005(37) sets out an apparent order of priority in a definitions section, without elsewhere stating that that priority grants any particular rights; § 732.804 uses permissive language instead of imperative. See also *Leadingham v. Wallace*, 691 So (2d) 1162 (Fla 5th DCA 1997).

donation to cryonics organizations still provide legally enforceable final disposition rights, mightn't a document that uses language around "anatomical donations" for this second purpose present somewhat of a red herring? For example, Alcor's success in the *Richardson* case relied in part on the fact that Iowa's UAGA takes precedence over its final disposition provisions, which would have favoured Orville's brother and sister to control disposition.¹⁸ But when an anatomical gift under UAGA fails for lack of a valid donee, the gift doesn't fail, but passes instead "to the appropriate procurement organization" (which would not include the cryonics service provider).¹⁹ Would this aspect of UAGA prevail over the cryonicist's clear intent, just because he or she used the words "anatomical donation"? This result seems inconceivably formalistic, but illustrates the (potential) problem with blending legal categories. On the other hand, because we cannot necessarily control which anatomical gift legislation will ultimately apply to us (as it will be the law of whichever jurisdiction we die in, whenever that happens to be), a hybrid, one-size-fits-most solution has clear utility.

As a Canadian, my interest in UAGA was actually initially focused north of the border. I noticed that Cryonics Institute's standard issue emergency necklace has "UNIFORM ANATOMICAL GIFT ACT" on the back, and I wondered what Canadian medical personnel might make of that, since we have no such named legislation. However, the intent of CI's "Uniform Donor Form"²⁰ is fairly clear, and the majority of Canadian provinces have broadly empowering legislation for making "human tissue gifts."²¹ This is especially good because English-Canadian common law never developed the deferential approach taken by US judges to decedents' preferences for final disposition — such

preferences were only ever considered morally binding on executors and next of kin, and not legally so.²² However, Alberta's *Human Tissue and Organ Donation Act* only permits body donations to university medical, dental or related health programs.²³ This limitation expressly refers to "a body donated under this Act" as opposed to "any tissue, organ or body donated under this Act," so it could be argued that Alcor neuropatients may still be transferred using the anatomical gift mechanism — but this may not reflect the intent of legislature, and as such may not be a sustainable reading. Unfortunately, this would mean that Albertans (or at minimum, Albertan whole-body patients) are hit doubly — they have no legally binding mechanism for transfer of custody of their bodies to their cryonics organization under either the anatomical gift or final disposition route.

"As the name implies, UAGA is an attempt to promote uniformity in an area of law which could otherwise vary considerably from state to state, making the procurement and transfer of life-saving organs and other tissues for transplant very difficult."

So, more than most, Albertan cryonicists might want to reconsider the wisdom of where they live [insert standard legal disclaimer]. That said, while other readers may think themselves lucky to live in a state or province I didn't mention, laws change,²⁴

and I have just learned all-too-personally how many fifty states are to monitor. We must each be vigilant in ensuring our various cryonics legal documents are valid for their intended purposes. ■

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18 *Supra* note 1 at 727.

19 *Uniform Anatomical Gift Act* (2006), § 11(c)(4).

20 <http://www.cryonics.org/documents/Uniform.html>

21 These are largely derived from various iterations of the *Uniform Human Tissue Gift Act* proposed by the Uniform Law Conference of Canada.

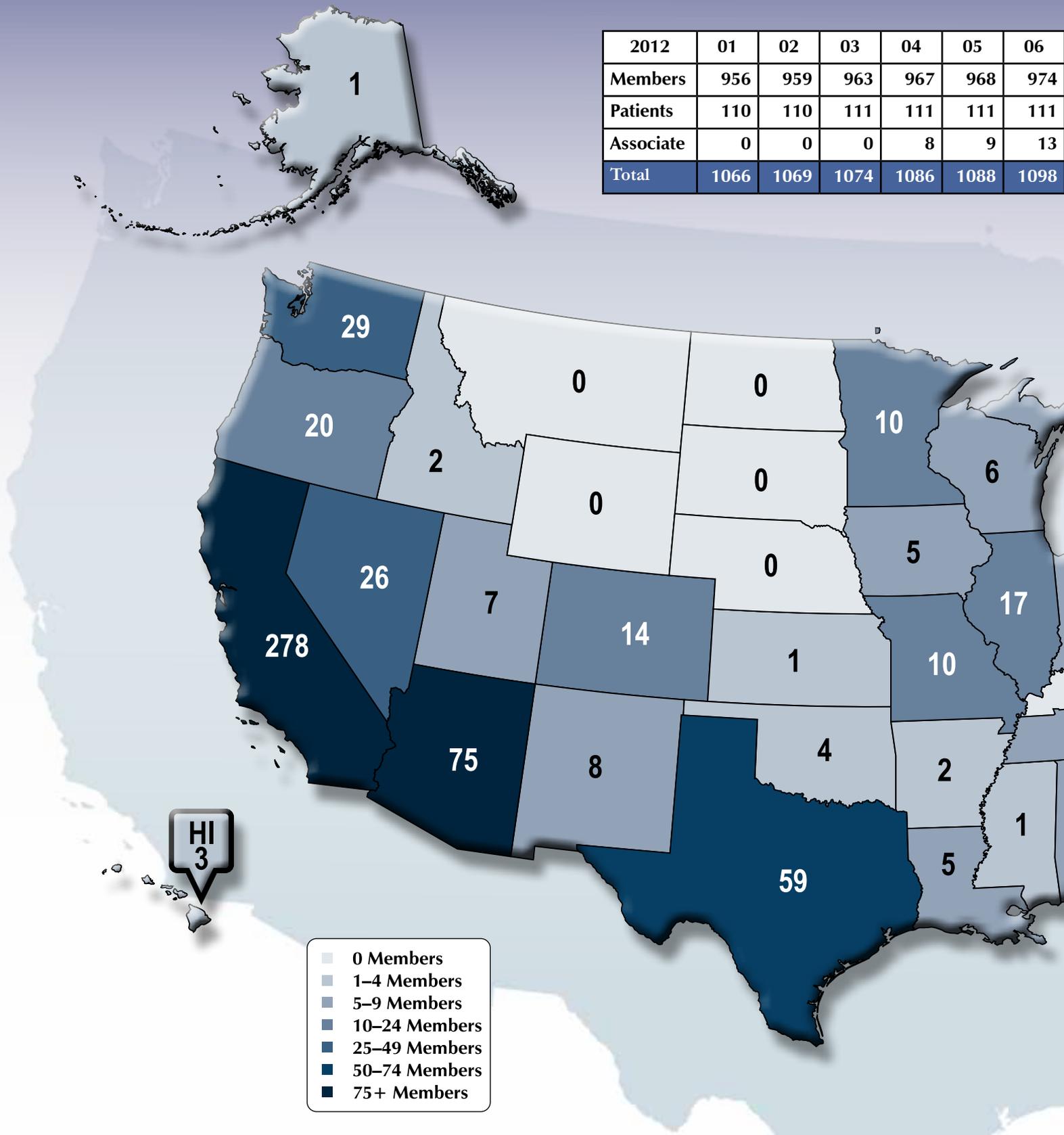
22 Quebec and British Columbia are the only provinces which provide statutory rights to direct disposition of one's own human remains: art 42 CCQ and *Human Tissue Gift Act*, RSBC 1996 c 211 s 4.

23 SA 2006 c H-14.5 s 3.

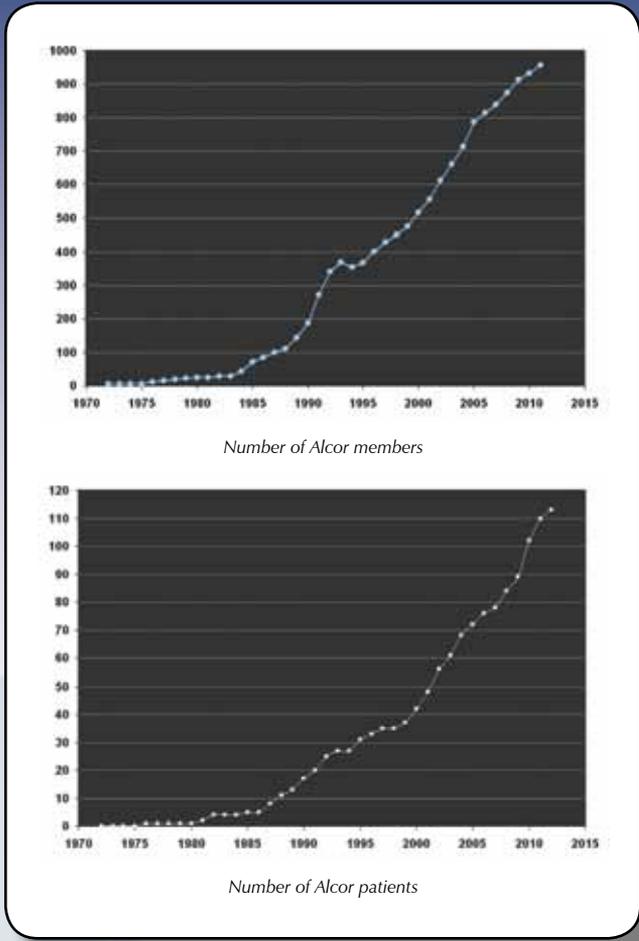
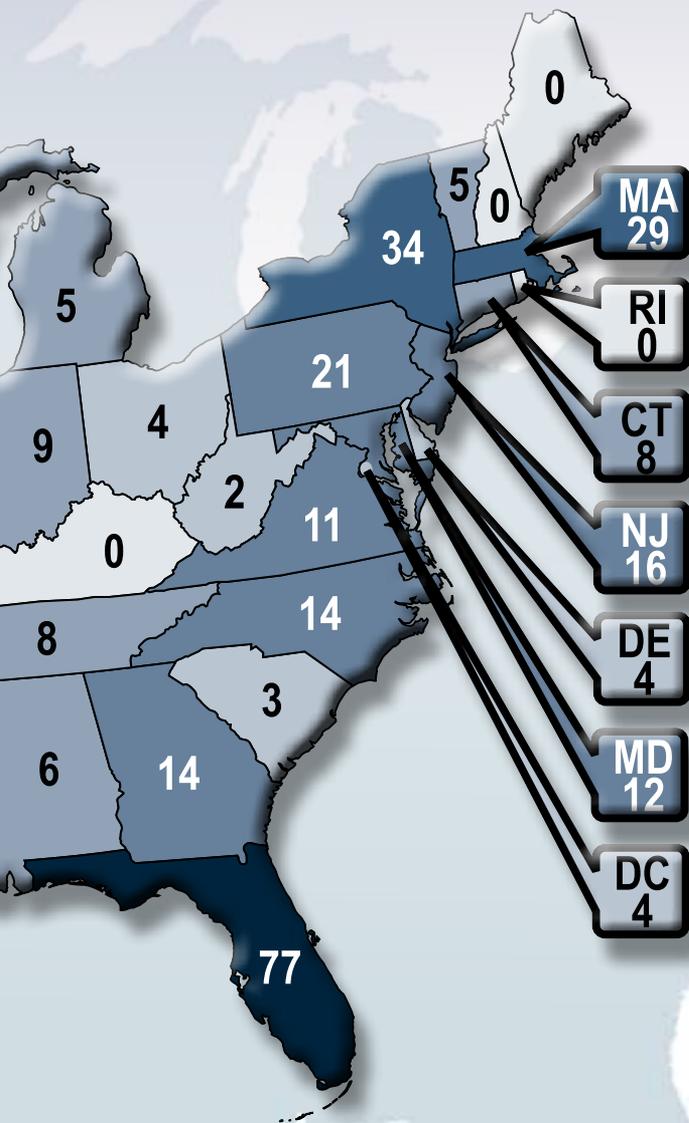
24 For example, the 2006 revision of UAGA was introduced in the Pennsylvania Legislature this year.

Membership Statistics

2012	01	02	03	04	05	06
Members	956	959	963	967	968	974
Patients	110	110	111	111	111	111
Associate	0	0	0	8	9	13
Total	1066	1069	1074	1086	1088	1098



07	08	09	10	11	12	
974	975	975	982	976		976
112	112	112	112	113		113
16	20	21	24	30		30
1102	1107	1108	1118	1119		1119



International

Country	Members	Patients
Australia	11	2
Canada	42	2
Denmark	2	0
France	1	0
Germany	5	0
Israel	0	1
Italy	1	0
Luxembourg	1	0
Mexico	4	0
Manaco	2	0
Netherlands	2	0
New Zealand	2	0
Portugal	4	0
Spain	2	1
Thailand	3	0
United Arab Emrits	1	0
United Kingdom	24	2
TOTAL	107	8

OBSERVATIONS ON ALCOR MEMBERSHIP STATISTICS

By Aschwin de Wolf

This issue of *Cryonics* sees a change from a simple ½ page basic summary of Alcor membership to a full page overview which includes the distribution of Alcor cryopreservation members by US state and the international distribution of cryopreservation members. The new format also reflects Alcor's new approach of including both patients and associate members as Alcor members.

The last time Alcor published cryopreservation member numbers by state was in the 2nd quarter issue of *Cryonics* magazine in 2009. A casual comparison of membership by state of 2009 and 2012 reveals a picture that is roughly the same but also shows interesting changes. The 5 US states with the most Alcor members are still California, Florida, Arizona, Texas, and New York; but Florida replaced Arizona in second place. Interestingly, Arizona is the only state of the 5 that has *lost* members (from 77 to 75), despite the general increase in Alcor membership, the fact that Alcor is located in Arizona, and Alcor's encouragement for older members to move to the Phoenix/Scottsdale area. First-place California remains a hotbed of cryonics and life extension activity and more than 25% of Alcor members live in the state. The whole West Coast is a popular area among cryonicists and now all three western coastal states (California, Oregon, and Washington) are represented in the top 10. New York remains a state with a lot of members with cryopreservation arrangements but, oddly, little local activity going on (a review of the history of cryonics in New York will appear in an upcoming issue).

When we look at the rest of the list the number of Alcor members becomes smaller and the increase or decrease in

membership can often be attributed to a single cryopreservation, a whole family making cryonics arrangements, or a family moving to another state. No one likes the idea of being the only Alcor member in a state but there are now three US states with just one Alcor cryopreservation member: Alaska, Kansas, and Mississippi. There are nine states with NO Alcor cryopreservation members at all: New Hampshire, Kentucky, Maine, Montana, Nebraska, North Dakota, Rhode Island, South Dakota, and Wyoming.

If we look at the international distribution pattern of Alcor members we see that the overwhelming majority live in the US, followed by other (mostly) English-speaking countries such as Canada, the United Kingdom, and Australia. Presumably this primarily reflects the greater availability of cryonics writings in English and the reduced need to translate and modify Alcor contracts, but cultural factors may play a role here as well. For example, cryonics and suspended animation are popular technologies in Japanese graphic novels and animation but there are currently no Alcor members in Japan.

The US and international distribution of Alcor members can hint at demographical and cultural characteristics of Alcor members (and cryonicists in general) but a full characterization of Alcor members will require doing a comprehensive membership survey. In fact, Alcor has done this on at least two occasions in the past (see *Cryonics* October 1982; October 1989) and the impression that Alcor demographics has changed quite a bit since its early days warrants doing a new survey. Learning more about our current members may also assist in Alcor's marketing efforts and improvements of the magazine. ■

Update

My article 'Chemical Brain Preservation and Human Suspended Animation' in the January issue of *Cryonics* magazine included the results of an experimental model to understand the effects of ischemia on perfusion fixation of the rat brain. Subsequent comments and questions prompted me to omit them from the current (online) version because these results raise complex methodological issues about modelling perfusion fixation of the ischemic human brain in a rat model and I believe that those cannot be done justice without changing the nature of the article. I wish to convey that these results are part of an ongoing research project and using them as an illustration of the potential consequences of conducting perfusion fixation in the ischemic human brain would be premature. Excluding these preliminary results does not affect the general arguments made in this article and restores its intended aim as an opinion piece. Omitting them should not be interpreted as an endorsement of the idea of perfusion fixation of ischemic human brains as a life extension strategy.

Aschwin de Wolf

FROM ENTHUSIAST TO SCIENTIST

By Kelsey Moody

Overview

The mainstreaming of longevity science, coupled with the popularization of DIY biology, has led to the creation of a unique niche of technology enthusiasts who present a potentially valuable resource for advancing rejuvenation biotechnology. This brief guide is my account of major pitfalls facing newcomers to the field, and general advice on how to apply your resources intelligently.

Education vs. Mindset

Your education no longer limits your capacity to contribute to science. Popular resources like Wikipedia provide concise, general overviews of research spaces, while peer-reviewed journal articles fill in the too-often-neglected specifics. Protocols for common methods can be found on Google or YouTube, while used Amazon books provide an inexpensive means to learn highly technical methods. These resources are readily accessible to everyone. For this reason, I believe mindset is far more important, and I cannot stress this enough.

So frequently on forums and in conversation, people hype the latest article from popular science magazines. “Science Daily says making telomeres longer in mice lets them live longer, so why can’t we just do that for humans?” This is the wrong mindset. The “why can’t we” is wrong. The “just” is wrong. The scientist asks, “Why should this work in humans?” The scientist must identify, in excruciating detail, what the “just” actually is, how it will work.

This is where enthusiasts tend to lose interest. Science is hard. Progress demands a degree of specificity that frustrates most hobbyists. Inevitably most ideas are riddled with holes, and many scientists become subjective and defensive when their idealistic proposals come crashing down around them.

The scientist remains objective, asking, “How can I disprove my idea as fast as possible, using the fewest resources?” This is efficiency. This is the mindset that must be acquired to transition from an enthusiast on the sidelines to someone making a meaningful contribution to aging research. There is limited use for the former, but we desperately need the latter.

Constructing a Garage Laboratory

Many technology enthusiasts do not participate in research because they do not think they possess the means to set up and maintain a functional laboratory. This is not so. A basic cell culturing setup can cost less than \$1,000 for equipment, and a cell line can be maintained for less than \$1,000 per year. Biopharma liquidations (go-dove.com), provide an inexpensive source for this and other equipment, especially if purchased locally (beware of shipping). Advanced liquid handling robots have gone for as little as \$50 each, and can be used for various analytical tasks, screening assays and routine cell culture.

To the creative mind, much of this equipment can also be built from scratch or by converting junk in the garage. Two feeder mice from your local pet store can provide all the animals you ever need to learn surgical techniques and work with an animal model for your project. If you are serious about making a difference, be brazen, be bold, and do it! What problem do you want to solve? What is your solution? How can you prove that your solution will fail using the least amount of time, money and effort?

Making a contribution

For the past five years I have seen the same suggestions appear over and over again. Make a knowledge-base for aging research, develop an information sharing platform, rally the researchers

with conferences and advocacy, lobby the government, spur the masses to action, throw money at it!

Useless. I have seen bloggers and forum users post the same opinionated comments and poorly constructed ideas, citing nothing in support of their claims. Even those that do cite almost exclusively list public magazine and Wikipedia articles instead of peer-reviewed sources.

When I first entered this community, I was the same. As I matured into a professional scientist and researcher I learned that cold objectivity and close attention to detail are the tools of scientific progress. It is time that we as a community raise our standards to a level worthy of mainstream scientific respect.

Legitimate science can be done in a garage. I’ve seen it. I’ve done it. Anyone who reads this can make a meaningful contribution to the scientific conquest of biological aging. However, wishing it will not make it so. We need doers and we need doers who do it right. ■



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JOHN ADOLPHUS ETZLER: PIONEER PROPHET OF RADICAL ABUNDANCE

By R. Michael Perry



*“Toil and poverty will be no more among men; Nature affords infinite powers and wealth;
Let us but observe and reason.”¹*

—John Adolphus Etzler, *The Paradise Within the Reach of All Men*

*“The chief fault of this book is that it aims to secure the greatest degree of gross comfort
and pleasure merely.”²*

—Henry David Thoreau, *Paradise (to Be) Regained*

John Adolphus Etzler (1791-1846?) was a visionary scientific utopian whose thinking remarkably anticipates the modern transhumanist movement, with its hope of radically transforming human life through advances in technology. More specifically Etzler can be seen as the pioneer prophet of a coming age of radical abundance, nearly two centuries ahead of some modern thinking along similar lines. His main opus, *The Paradise within the Reach of All Men, without Labour, by Powers of Nature and Machinery: an Address to All Intelligent Men*, offers a vision of a world of unheard-of plenty and enlightening, almost endless leisure. Suffusing this 1833 writing is a boundless optimism that such an upgrade of civilization was feasible and imminent. Unfortunately, reality had other things in store, and Etzler has been described as a “mad inventor” whose continuing mindset may be pernicious.³ I take a more optimistic, if cautionary view and credit the man with a serious attempt at something all would like and benefit from if done rightly but virtually no one of his times imagined was possible in the way he proposed, through human reason and effort. His considerable

failures must be acknowledged, but do not signify the end of all hopes for the sort of radical deliverance he proclaimed.

Born to a shoemaker in Mülhausen, Germany, Etzler studied engineering at the local high school and might have been impressed by the great, contemporary engineering project of Johann Gottfried Tulla, reshaping the Rhine River to control its flood plain and keep its marshlands in permanent cultivation. (This project continued more than 50 years after Tulla’s death in 1827.⁴) He must also have been exposed to the philosopher G. W. F. Hegel with his emphasis on bettering the human condition through reason and science. Utopian socialist Charles Fourier would also influence his thinking by the 1830s. Though Etzler does not seem to have had any formal education beyond high school (a level probably more respected then than it is now), we can assume he was self-taught as far as seemed necessary. As for earnings, Etzler’s many talents would have equipped him for many kinds of work. He would have learned the cobbler’s trade from his father who, however, died when Etzler was a teenager, limiting the pursuit of this

profession which does not seem to have greatly interested him. More to his liking he may have worked as an engineer on a reclamation project related to Tulla’s grand effort. Later in the United States he would find employment as editor, translator, and organizer, scouting out lands and contributing in other ways to German settlements in the developing nation, particularly in Pennsylvania and Ohio. Later still he organized and headed the British-based Tropical Emigration Society.⁵

Etzler first immigrated to the United States in 1822 and stayed seven years, apparently in Pennsylvania. Little is known of this early visit, but when he returned to Mülhausen it was not out of disappointment but to encourage others to go back with him. This, however, was unacceptable to the German aristocracy who, in the meantime, fearing the loss of the very educated class that Etzler exemplified, had made it illegal for them to emigrate. Disdainful of danger Etzler boldly proclaimed his gospel of resettlement in the New World—and landed in jail. Released the following year, he briefly joined forces with John A. Roebling who had organized a Mülhausen

Emigration Society that in 1831 sent a few dozen travelers over to the U.S., Etzler and Roebling among them. Roebling would later design the Brooklyn Bridge and in general be remembered for his successes rather than failures.

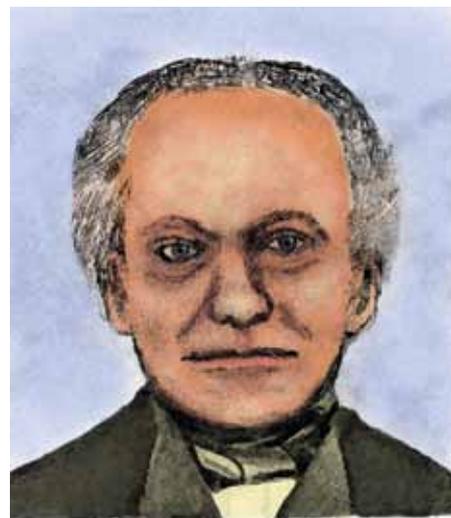
Etzler's dreams in turn were not realizable in the way he foresaw and there is no monument like the Brooklyn Bridge by which to estimate his greatness as a benefactor to civilization. But his grandiose vision can still inspire and motivate us even as it issues a stern warning. We will have to work much harder than Etzler thought to bring about a happy society where unwanted labor is minimal and goods and services are available to all as needed. Etzler's optimism was not on a par with that of some modern technological utopians but it was still considerable, and the reader will ask how such an outlook could seriously be entertained in such relatively primitive times. In the 1830s the Industrial Revolution was still in its earlier stages. Paddle-driven steamboats were beginning to flourish; rail transport was infantile. Horses furnished the main means of overland travel other than walking. Automobiles, airplanes, telephones, cell phones, electronic computers, and industrial robots—to name just a few modern inventions—were unknown and mostly unanticipated.

In other ways, however, great progress had occurred; more would surely follow. Vast resources were waiting to be utilized. Natural energy sources—wind, water currents, and sunlight—far dwarfed the world's supply of human muscle power, as Etzler shows through calculations based on elementary physics.⁶ Ways of tapping into these sources, such as windmills, waterwheels, and burning glasses were well-known and perfected. So with proper additional and seemingly feasible progress it should be possible to replace human labor with something far more powerful. A special moment in history seemed to have arrived, and a startling proposition seemed reasonable: "I promise to show the means for creating a paradise within ten years, where every thing desirable for human life may be had for every man in superabundance, without labour, without

pay; ... he may free himself from almost all the evils that afflict mankind, except death, and even put death far beyond the common period of human life, and, finally, render it less afflicting; mankind may thus live in, and enjoy a new world far superior to our present, and raise themselves to a far higher scale of beings."⁷

An important underpinning of such a paradise would be the food supply. Among Etzler's proposals for supplying the world with eatables at nominal human effort was the "Satellite," a general purpose, wheeled cultivation tool that was to be propelled using a rope-and-pulley system connected to a stationary, rotary engine that was powered in turn, indirectly, by wind. Actually, wind power was to be used to pump water into a reservoir with a spillway to provide a steady supply of power. In its operation the mobile, tethered Satellite, some 40 feet in length, would orbit around the power source (hence the name), plowing a circular furrow, then, with successive adjustments of the pulley system to change the orbiting distance, plow another and another furrow—or it could be used in other ways, processing timber while sitting in one spot, for instance. (Modern, center-pivot irrigation systems that produce large circular watering patterns or "crop circles" are a distant cousin of this proposed system.) Indeed, the Satellite was more than a cultivation tool, however general, and could be used to create parts of itself and thus to build more Satellites, fueling Etzler's argument that vast tracts of land could quickly be brought under cultivation with this labor-saving system.

More generally, the existence of unlimited energy sources should translate to a world with greatly diminished needs for human labor of all kinds, the main problem being how to harness the energy for addressing human needs. Etzler's idea of a flowing-water reservoir replenished through wind power could be adapted to purposes other than agriculture. (Hydroelectric power didn't yet exist but would be a logical possibility for today's world. Etzler ignored electricity which was only beginning to be used, though this technological windfall could have greatly aided his program.) Another of his proposals, the floating



John Augustus Etzler

No photograph or eyewitness-based likeness of Etzler is known to exist. This sketch by me is based on a single surviving, rather detailed description, by editor James Duncan of the *Morning Star*, publication of the *Tropical Immigration Society*, 1 Mar. 1845 (cited in *Brostowin*, 276 and *Stoll*, 27). The signature is from a marriage record of 28 Mar. 1844 (St. Luke Parish, Middlesex, England, to Miss Regina Carolina Soergel).

island, a self-contained habitat somewhat larger than today's largest ships, would facilitate international transportation. (A more recent variation on this theme is the idea, yet to be implemented, of a "sea station" or self-contained habitat on a floating platform in international waters—for those dissatisfied with current governments. Meanwhile air transport has largely obviated the need for passenger shipping.) Still another proposed invention, the Naval Automaton, was a ship to be powered by the ebb and surge of ocean waves. A patent was actually granted, as also for the Satellite, though neither device was successfully implemented. (The Naval Automaton was constructed according to plan but didn't work; water currents flowed around movable, submerged platforms under the boat rather than pushing the boat up and down relative to the platforms to power it as intended. The boat also had sails and, when tested in England in 1842, the drag of the submerged platforms combined with the forward motion from

the wind-blown sails caused the boat to sink. Etzler, who had to swim for his life, had intended to cross the Channel to France and one wit asked “if France lay at the bottom of the sea.”⁸)

Indeed, while certainly there was energy available to power the devices Etzler conjured up, the issue of how to harness the energy was inadequately treated. Etzler ignored such issues as friction—a rope and pulley system such as his Satellite used would need considerable energy input just to get moving in the first place. Stress and strain, expansion, and materials analysis were not adequately treated.⁹ At a higher level, he did not appreciate the difficulty which a century later would spawn a whole new technical field: cybernetics, the science of control, which today is dominated by various specialties based around automated electronic computing, including robotics. In general it would take labor on a substantial scale to properly operate a device even if it could be powered by a free energy source. The labor would have to be human (or that of animals, a limited prospect) unless, of course, the control itself were automated, something largely impossible in Etzler’s time. (Looms and flour mills, powered by flowing water and almost wholly automated in their operation, were interesting if limited exceptions.)

In short, Etzler’s proposals proved impractical and did not lead to any great transformation of society or the human condition. A few years after the publication of *Paradise* attempts were made to implement his Satellite that were marginally successful at the proof-of-concept level. A steam-powered, half-size replica of the device was able to break some ground at a test in England and convince some, including Etzler himself, of the viability of the full-sized version, when it could be built. But the opportune moment never arrived, and no such construction was ever attempted.

In addition to bare-bones engineering Etzler was active in founding societies to implement his ideas, which further compounded his difficulties by adding a human dimension. His main effort, the Tropical Emigration Society, was started in England to begin realizing his vision of “paradise” in Central America, mainly

Venezuela, even in advance of such innovations as the Satellite. By then Etzler had become disillusioned with the United States, sensing a greater opportunity in the warm and moist lands near the equator, starting with his sympathizers in Britain. The colonists could plant crops and, Etzler thought, start to reap benefits in a lush setting where labor would be limited and harvesting heavy.¹⁰ Etzler himself journeyed to the region and endeavored to assist the colonists, and also to provide for his own habitation, along with his wife and some of her relatives who accompanied him on the journey. In fact the project was a disastrous failure involving loss of life and bitter recriminations. (Fifteen out of forty-one in the first group of colonists died, while Etzler was still involved; later there were other deaths.¹¹ The emphasis decried by Thoreau on “gross comfort and pleasure merely” appears to have taken a sobering toll on the ill-prepared colonists and their sponsors.) Crushed by the debacle Etzler withdrew from public life and seems to have soon died in obscurity. We last hear of him in June 1846, when, without his relations, he boarded a brig traveling from Demerara (now part of Guyana, close by Venezuela) to New York. The voyage concluded¹² but what happened to him after that, and also to his relations, are unsolved mysteries; were all the travelers somehow lost at sea?¹³

Though of no consolation to Etzler, much of his technical forecast has been boldly exceeded in the historically short interval since his passing. Modern farm machinery, for example, is far more sophisticated and capable than his Satellite would have been had it worked. Vastly more food is being produced per worker than in his time, and farming, once so dominant an occupation, now occupies a much smaller fraction of the labor force. Yet in general the adoption of labor-saving machinery, on the grand scale that has occurred, did not put an end to labor but rather created new jobs connected with managing the new tools. What has occurred—economic growth far beyond any “reasonable” expectations—is still not exactly what Etzler had in mind, which instead was deliverance.

Today, however, we face an ever-increasing encroachment of automation in the job

market. Machinery is assisting with grocery checkout, translating languages, making cars, driving them, doing surgery and medical diagnoses—to name but a few activities where paid, human labor has been supplanted or, it appears, soon will be. The possibility has arisen that automation may eventually replace nearly all paid labor, particularly after an “intelligence explosion” leading to AGIs (artificial general intelligences) which are superior in their powers to the human intellect. Such a prospect is still in the realm of science fiction, but organizations such as the Singularity Institute are concerned about it and how to safely manage its effects ranging from the prospect of a largely automated workforce to scientific research on a superhuman scale. In place of today’s worries over unemployment there could be a future of radical abundance in which goods and services are more or less available free as needed. “Gainful unemployment,” in a world also freed of diseases and aging, could be happily pursued to the benefit of all. Etzler’s vision might thus be spectacularly vindicated, even as life in other ways may be transformed far beyond it. ■

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Etzler, John Adolphus, *The Paradise within the Reach of All Men, without Labour, by Powers of Nature and Machinery: an Address to All Intelligent Men*. Pittsburgh: Etzler and Reinhold, 1833; Charleston, S.C.: Nabu Public Domain Reprints, 2010; other reprints; Online: http://books.google.com/books?id=FHUSAAAAIAAJ&printsec=frontcover&dq=inauthor:%22John+Adolphus+Etzler%22&chl=en&ei=JFNxTvfsD4ntrQfK0MGEBw&sa=X&oi=book_result&ct=result&resnum=2&ved=0CDEQ6AEwAQ#v=onepage&q&f=false

Steven Stoll, *The Great Delusion: A Mad Inventor, Death in the Tropics, and the Utopian Origins of Economic Growth*. New York: Hill and Wang, 2008.

****Notes**—above works referenced by author’s name in italics.

1. *Etzler*, title page, part 1, repeated title page, part 2.
2. Online at <http://sniggle.net/Experiment/index5.php?entry=paradise>, accessed 15 Nov. 2012.
3. *Stoll*. This author is rightly concerned lest “progress equals growth” be taken too axiomatically; *Etzler*, however, does not appear to have been focused on economic growth per se.
4. http://en.wikipedia.org/wiki/Johann_Gottfried_Tulla, accessed 14 Nov. 2012.
5. This biographical paragraph and the next are summarized from *Brostowin* and *Stoll*, the latter offering additional details on *Etzler*’s early life.
6. *Etzler*, 19-51.
7. *Etzler*, 1-2. Remaining material on *Etzler*’s proposed inventions summarized from *Etzler* unless otherwise noted, also summarized in *Brostowin* and *Stoll*.
8. *Stoll*, 100; see also *Brostowin*, 144-9.
9. *Brostowin*, 61.
10. *Brostowin*, 252.
11. *Stoll*, 129-135.
12. New York, Passenger Lists, 1820-1957, Record for John A. *Etzler* (18 Jun. 1846; *Judson*).
13. *Stoll*, 138, speculates that this is what happened but without awareness that *Etzler* had boarded a ship for New York (note 12). The story is complicated by this additional detail, but it still seems likely that *Etzler* must soon have met his demise. His close friend and supporter, Conrad *Stollmeyer*, reported later that his correspondence had completely ceased around this time (*Stoll*, 138).

Acknowledgements: I thank David London who many years ago made me aware of Brostowin’s book on Etzler, and ancestry.com by which I found the 1844 marriage record and the 1846 passenger manifest that other researchers appear to have missed.



Alcor Member Forums

Discussion board of the Alcor Life Extension Foundation

Discuss Alcor and cryonics topics with other members and Alcor officials.

- The Alcor Foundation
- Cell Repair Technologies
- Cryobiology
- Events and Meetings
- Financial
- Rejuvenation
- Stabilization

Other features include pseudonyms (pending verification of membership status) and a private forum.

<http://www.alcor.org/forums/>

Long-Distance Collaborators Create Inexpensive Prosthetic Finger

When South African craftsman Richard Van As lost most of the fingers from his right hand in an industrial accident, he decided to try to create a prosthetic finger to regain some of his lost mobility. First he recruited the help of Washington State native Ivan Owen, after being impressed with the latter's mechanical hand prop which he had posted on YouTube. The result could be a boon to amputees everywhere. Despite living over 10,000 miles apart, Richard and Ivan set to work exchanging emails, photos and drawings while conversing via Skype. The arduous process of actually manufacturing the prosthetic finger began with Richard creating a plastic replica of his damaged hand for Ivan's reference. The current prototype is held in place by a hand mount, which acts like a glove and is formed to suit the amputee's hand. The prosthetic finger itself consists of a rigid lever arm, pulleys, and finger tip with grip pad. Though much lower-tech than some other prosthetic fingers, like that made by Touch Bionics, it's also far more affordable, and significantly increases Richard's ability to pick up objects.

Adam Williams / Gizmag
30 Oct 2012

<http://www.gizmag.com/homemade-prosthetic-finger/24775/pictures#1>

High Blood Pressure Damages the Brain in Early Middle Age

Uncontrolled high blood pressure damages the brain's structure and function as early as young middle-age, and even the brains of middle-aged people who clinically would not be considered to have hypertension have evidence of silent structural brain damage, a study led by researchers at UC Davis has found. The study's senior author is Charles DeCarli,

professor of neurology and director of the UC Davis Alzheimer's Disease Center. The investigation found accelerated brain aging among hypertensive and prehypertensive individuals in their 40s, including damage to the structural integrity of the brain's white matter and the volume of its gray matter, suggesting that vascular brain injury "develops insidiously over the lifetime with discernible effects." The study is the first to demonstrate that there is structural damage to the brains of adults in young middle age as a result of high blood pressure, the authors said. Published online Nov. 6 in the medical journal *The Lancet Neurology*, the study will appear in print in the December 2012 issue.

UC Davis Health System
31 Oct 2012

<http://www.ucdmc.ucdavis.edu/publish/news/newsroom/7118>

Researchers Create Laser the Size of a Virus Particle

A Northwestern University research team has found a way to manufacture single laser devices that are the size of a virus particle and that operate at room temperature. These plasmonic nanolasers could be readily integrated into silicon-based photonic devices, all-optical circuits and nanoscale biosensors. Reducing the size of photonic and electronic elements is critical for ultra-fast data processing and ultra-dense information storage. The miniaturization of a key, workhorse instrument—the laser—is no exception. The results are published in the journal *Nano Letters*. "Coherent light sources at the nanometer scale are important not only for exploring phenomena in small dimensions but also for realizing optical devices with sizes that can beat the diffraction limit of light," said Teri Odom, a nanotechnology expert who led the research. "The reason we can fabricate nano-lasers with sizes smaller than that allowed by diffraction is

because we made the lasing cavity out of metal nanoparticle dimers—structures with a 3-D 'bowtie' shape," Odom said.

Megan Fellman / Northwestern University
05 Nov 2012

<http://www.northwestern.edu/newscenter/stories/2012/11/researchers-create-laser-the-size-of-a-virus-particle.html>

Extra Chromosome 21 Removed from Down Syndrome Cell Line

University of Washington scientists have succeeded in removing the extra copy of chromosome 21 in cell cultures derived from a person with Down syndrome, a condition in which the body's cells contain three copies of chromosome 21 rather than the usual pair. In their report appearing in the Nov. 2 edition of *Cell Stem Cell*, a team led by Dr. Li B. Li of the UW Department of Medicine described how they corrected trisomy 21 in human cell lines they grew in the lab. The senior scientists on the project were gene therapy researchers Dr. David W. Russell, professor of medicine and biochemistry, and Dr. Thalia Papayannopoulou, professor of medicine. The targeted removal of a human trisomy, they noted, could have both clinical and research applications.

Leila Gray, UW Health Sciences/UW
Medicine
8 Nov. 2012

<http://www.washington.edu/news/2012/11/08/extra-chromosome-21-removed-from-down-syndrome-cell-line/>

Significant Relationship between Mortality and Telomere Length Discovered

A team of researchers at Kaiser Permanente and the University of

California, San Francisco (UCSF) has identified a significant relationship between mortality and the length of telomeres, the stretches of DNA that protect the ends of chromosomes, according to a presentation on Nov. 8 at the American Society of Human Genetics 2012 meeting in San Francisco. While a reduction in telomere length is regarded as a biomarker of aging, scientists have not yet determined whether it plays a direct causal role in aging-related health changes and mortality or is just a sign of aging. In their prospective study of 100,000 multi-ethnic individuals whose average age was 63 years, the researchers determined that an association between telomere length and mortality existed and persisted even after the data were adjusted for such demographic and behavioral factors as education, smoking and alcohol consumption, said Catherine Schaefer, Ph.D., director of the Kaiser Permanente (KP) Research Program on Genes, Environment and Health (RPGEH).

American Society of Human Genetics /
Eurekalert
8 Nov. 2012
[http://www.eurekalert.org/
pub_releases/2012-11/
asoh-srb102012.php](http://www.eurekalert.org/pub_releases/2012-11/asoh-srb102012.php)

Tissue-Engineered Human Colon Made from Postnatal Donor Colon

Children's Hospital Los Angeles scientists, led by principal investigator Tracy Grikscheit, MD, have for the first time grown a tissue-engineered human large intestine. This effort is part of the ongoing projects in Grikscheit's laboratory to help babies who are born with congenital problems of the intestine or who have part of the intestine removed soon after birth due to complications of prematurity. The human tissue-engineered colon includes all of the required specialized cell types that are found in human large intestine. The research team grew the tissue-engineered large intestine from specific groups of cells, called organoid units that were derived

from intestinal tissue normally discarded after surgery. The organoid units grew on a biodegradable scaffold. After 4 weeks, the human tissue-engineered colon contained the differentiated cell types required in the functioning colon, and included other key components including smooth muscle, ganglion cells, and components of the stem cell niche.

Enhanced Online News
8 Nov. 2012
[http://eon.businesswire.com/news/
eon/20121108006700/en/tissue-
engineering/short-gut/complications-of-
prematurity](http://eon.businesswire.com/news/eon/20121108006700/en/tissue-engineering/short-gut/complications-of-prematurity)

Smart Scaffolding Aims to Rebuild Tissue from the Inside

Smart scaffolding that can guide cells, proteins and small-molecule drugs to make new tissue and repair damage inside the body is in the works at Rice University. Scientists at Rice and the Texas A&M Health Science Center Baylor College of Dentistry received a \$1.7 million, five-year grant from the National Institutes of Health (NIH) to develop a hydrogel that can be injected into a patient to form an active biological scaffold. Rice bioengineer Jeffrey Hartgerink and co-investigator Rena D'Souza of Baylor won the grant to continue their groundbreaking work on self-assembling, multidomain peptide hydrogels that not only physically support but also encourage the growth of specific kinds of tissues. Bioengineers use scaffolds to mimic the body's extracellular matrix, which supports the growth and maintenance of living cells. Synthetic scaffolds are used as frameworks to form replacement tissues and, perhaps someday, regenerate entire organs from a patient's own cells. Once their work is done, the scaffolds are designed to degrade and leave only natural, healthy tissue behind.

Rice University News & Media
12 Nov. 2012
[http://news.rice.edu/2012/11/12/
smart-scaffolding-aims-to-rebuild-tissue-
from-the-inside/](http://news.rice.edu/2012/11/12/smart-scaffolding-aims-to-rebuild-tissue-from-the-inside/)

Research Breakthrough Could Halt Melanoma Metastasis

In laboratory experiments scientists have eliminated metastasis, the spread of cancer from the original tumor to other parts of the body, in melanoma by inhibiting a protein known as melanoma differentiation associated gene-9 (mda-9)/syntenin. More than 1 million cases of skin cancer are diagnosed each year in the U.S., and melanoma is the deadliest form. With further research, the approach used by the scientists could lead to targeted therapies that stop metastasis in melanoma and potentially a broad range of additional cancers. The study published online in the journal *Cancer Research* was led by Paul B. Fisher, M.Ph., Ph.D. Fisher and his colleagues found that Raf kinase inhibitor protein (RKIP) interacted with and suppressed mda-9/syntenin. Mda-9/syntenin was originally cloned in Fisher's laboratory, and was shown in previous studies to interact with another protein, c-Src, to start a series of chemical reactions that lead to increased metastasis.

Virginia Commonwealth University /
Eurekalert
13 Nov. 2012
[http://www.eurekalert.org/pub_
releases/2012-11/vcu-rbc111412.php](http://www.eurekalert.org/pub_releases/2012-11/vcu-rbc111412.php)

Shedding Light on the Mystery of Aging

Researchers from Kiel (Germany) have examined why the polyp Hydra is immortal — and unexpectedly discovered a link to aging in humans. The tiny freshwater creature does not show any signs of aging and is potentially immortal. There is a rather simple biological explanation for this: these animals exclusively reproduce by budding rather than by mating. A prerequisite for such vegetative-only reproduction is that each polyp contains stem cells capable of continuous proliferation. Studying animal tissue such as that of Hydra — an animal full of active stem cells during all its life — may deliver valuable insight into stem cell

aging as such. Here the search for the cause of Hydra's immortality led the researchers to the so-called FoxO gene, which exists in all animals and has been known about for years. "Our research group demonstrated for the first time that there is a direct link between the FoxO gene and aging," says Thomas Bosch from the Zoological Institute of Kiel University, who led the Hydra study. "FoxO has been found to be particularly active in centenarians"

Christian-Albrechts University of Kiel
13 Nov. 2012
<http://www.uni-kiel.de/aktuell/pm/2012/2012-332-foxogen-e.shtml>

Cells Power Biological Machines

They're soft, biocompatible, about 7 millimeters long — and, incredibly, able to walk by themselves. Miniature "bio-bots" developed at the University of Illinois are making tracks in synthetic biology. Designing non-electronic biological machines has been a riddle that scientists at the interface of biology and engineering have struggled to solve. The walking bio-bots demonstrate the Illinois team's ability to forward-engineer functional machines using only hydrogel, heart cells and a 3-D printer. With an altered design, the bio-bots could be customized for specific applications in medicine, energy or the environment. The research team, led by U. of I. professor Rashid Bashir, published its results in the journal *Scientific Reports*. "The idea is that, by being able to design with biological structures, we can harness the power of cells and nature to address challenges facing society," said Bashir, an Abel Bliss Professor of Engineering. The team uses a 3-D printing method common in rapid prototyping to make the main body of the bot from hydrogel, a soft gelatin-like polymer.

University of Illinois News Bureau
15 Nov. 2012
http://news.illinois.edu/news/12/1115bio-bots_RashidBashir.html

Medical Vital-Sign Monitoring Reduced to the Size of a Postage Stamp

Electrical engineers at Oregon State University have developed new technology to monitor medical vital signs, with sophisticated sensors so small and cheap they could fit onto a bandage, be manufactured in high volumes and cost less than a quarter. A patent is being processed for the monitoring system and it's now ready for clinical trials, researchers say. When commercialized, it could be used as a disposable electronic sensor, with many potential applications due to its powerful performance, small size, and low cost. Heart monitoring is one obvious candidate, since the system could gather data on some components of an EKG, such as pulse rate and atrial fibrillation. Its ability to measure EEG brain signals could find use in nursing care for patients with dementia, and recordings of physical activity could improve weight loss programs. Measurements of perspiration and temperature could provide data on infection or disease onset. "We can now make important biomedical measurements more portable, routine, convenient and affordable than ever before," said Patrick Chang, OSU associate professor.

Oregon State University
15 Nov. 2012
<http://oregonstate.edu/ua/ncs/archives/2012/nov/medical-vital-sign-monitoring-reduced-size-postage-stamp>

New Alzheimer's Risk Gene Identified

Researchers have identified a new genetic variation that confers an increased risk for late-onset Alzheimer's disease. The finding is a result of a collaboration between deCODE genetics in Iceland and Alzheimer's researchers at Emory University School of Medicine and from Germany, Norway and the Netherlands. The results were published online Wednesday, November 14 in the *New*

England Journal of Medicine. The new variant increases risk by about a factor of three, an effect that is similar in size to that of the most common genetic risk factor for Alzheimer's, ApoE E4. However, the new variant is rarer: it is found in one in every 160 people in Iceland, compared to more than 17 percent of the population for Apo E4 and higher in other countries. People who carry the variation and do develop Alzheimer's disease do so roughly three years earlier than non-carriers. Although rare, the new variant is important because it adds to a growing list of genes linked to Alzheimer's disease, and it provides clues to causal mechanisms.

Quinn Eastman, Woodruff Health Sciences Center,
15 Nov 2012
http://news.emory.edu/stories/2012/11/alzheimers_risk_gene_decode_trem2/campus.html

Paralyzed Dogs Walk Again with Injections

Paralyzed dogs in a U.K. study have been restored to mobility thanks to injected cells, letting Cambridge University scientists dare to hope that the technique could eventually aid the treatment of humans. In experiments done by the U.K. Medical Research Council's Regenerative Medicine Centre and Cambridge University's Veterinary School, 23 hobbled dogs who had suffered spinal injuries were injected with cells grown from the nasal passages of healthy dogs. The cells were injected into their spines. A neutral control substance was injected into 11 other injured dogs. No improvement occurred in the control group, but many of the 23 cell transplant dogs were able to walk again on a treadmill with the help of a harness. "Our findings are extremely exciting, because they show for the first time that transplanting these types of cell into a severely damaged spinal cord can bring about significant improvement," the BBC quoted Prof. Robin Franklin, a regeneration biologist at the Wellcome Trust-MRC Stem Cell Institute and report co-author, as saying.

CBC News
20 Nov. 2012

[http://www.cbc.ca/news/technology/
story/2012/11/20/sci-paralyzed-dogs.
html?cmp=rss](http://www.cbc.ca/news/technology/story/2012/11/20/sci-paralyzed-dogs.html?cmp=rss)

Noninvasive Sequencing of a Human Fetus

The story first broke in the summer of 2012 — two separate research groups, one from the University of Washington and the other from Stanford, announced within weeks of each other that they had successfully sequenced a human fetus and done so noninvasively. Scientist Jacob O Kitzman, who led the University of Washington study, sequenced the fetal genome by analyzing a blood sample from the mother and a saliva sample from the father, while H. Christina Fan, leader of the Stanford study, just analyzed a blood sample from the mother. By sequencing DNA from one or both parents and applying some computational tricks, these researchers were able to decode the genome sequence of the fetus. Their approach was possible because a small but very measurable percentage of DNA found in a pregnant mother's bloodstream comes from the fetus. Noninvasive sequencing of human fetuses holds clinical utility. It does not pose a risk to the developing fetus and it provides a whole genome's worth of information.

23andMe
26 Nov. 2012

[http://blog.23andme.com/health-traits/
noninvasive-sequencing-of-a-human-
fetus/](http://blog.23andme.com/health-traits/noninvasive-sequencing-of-a-human-fetus/)

Breakthrough Offers New Route to Large-Scale Quantum Computing

In a key step toward building a machine that promises to revolutionize computing, Princeton researchers have developed a method that could quickly and reliably transmit information through a computer

using the power of subatomic particles. The finding, by a team led by Princeton's Associate Professor of Physics Jason Petta, could eventually allow engineers to build a working quantum computer. By using principles radically different from classical physics, quantum computers would allow mathematicians to solve problems impossible to approach with standard computers: factoring immense numbers, cracking codes or simulating molecular behavior. Quantum computers take advantage of the strange behaviors of subatomic particles like electrons. By harnessing electrons as they spin, scientists could use the particles to form the basis for a new type of computing. Petta's team has demonstrated a new approach that could eventually allow engineers to build quantum computers consisting of millions of quantum bits, or qubits.

John Sullivan, Office of Engineering
Communications, Princeton University
27 Nov 2012

[http://www.princeton.edu/main/
news/archive/S35/39/69G74/index.
xml?section=topstories](http://www.princeton.edu/main/news/archive/S35/39/69G74/index.xml?section=topstories)

Researchers Create World's Largest Functioning Brain Model

Thursday, November 29, 2012

A team of researchers from the University of Waterloo, Ontario, Canada, has built the world's largest simulation of a functioning brain. It can help scientists understand how the complex activity of the brain gives rise to the complex behavior exhibited by animals, including humans. The model is called Spaun, which stands for Semantic Pointer Architecture Unified Network. It consists of 2.5 million simulated neurons. The model captures biological details of each neuron, including which neurotransmitters are used, how voltages are generated in the cell, and how they communicate. Spaun uses this network of neurons to process visual images to control an arm that draws Spaun's answers to perceptual, cognitive and motor tasks.

The research team's findings appear in this week's *Science*. "This is the first model that begins to get at how our brains can perform a wide variety of tasks in a flexible manner—how the brain coordinates the flow of information between different areas to exhibit complex behaviour," said Professor Chris Eliasmith, Director of the Centre for Theoretical Neuroscience at Waterloo.

University of Waterloo
29 Nov. 2012

[https://uwaterloo.ca/news/news/
waterloo-researchers-create-worlds-largest-
functioning-model-brain](https://uwaterloo.ca/news/news/waterloo-researchers-create-worlds-largest-functioning-model-brain)

DNA Imaged with Electron Microscope for the First Time

It's the most famous corkscrew in history. Now an electron microscope has captured the famous Watson-Crick double helix in all its glory, by imaging threads of DNA resting on a silicon bed of nails. The technique will let researchers see how proteins, RNA and other biomolecules interact with DNA. The structure of DNA was originally discovered using X-ray crystallography. This involves X-rays scattering off atoms in crystallized arrays of DNA to form a complex pattern of dots on photographic film. Interpreting the images requires complex mathematics to figure out what crystal structure could give rise to the observed patterns. The new images are much more obvious, as they are a direct picture of the DNA strands, albeit seen with electrons rather than X-ray photons. The trick used by Enzo di Fabrizio at the Italian Institute of Technology in Genoa, Italy, and his team was to snag DNA threads out of a dilute solution and lay them on a bed of nanoscopic silicon pillars.

Roland Pease / NewScientist
3 Dec. 2012

[http://www.newscientist.com/article/
dn22545-dna-imaged-with-electron-
microscope-for-the-first-time.html](http://www.newscientist.com/article/dn22545-dna-imaged-with-electron-microscope-for-the-first-time.html)

Reality Check for DNA Nanotechnology

Two major barriers to the advancement of DNA nanotechnology beyond the research lab have been knocked down. This emerging technology employs DNA as a programmable building material for self-assembled, nanometer-scale structures. Many practical applications have been envisioned, and researchers recently demonstrated a synthetic membrane channel made from DNA. Until now, however, design processes were hobbled by a lack of structural feedback. Assembly was slow and often of poor quality. Now researchers led by Prof. Hendrik Dietz of the Technische Universitaet Muenchen (TUM) have removed these obstacles. One barrier holding the field back was to demonstrate precise positional control: now done for the first time. In a separate set of experiments, the researchers discovered that the time it takes to make a batch of complex DNA-based objects can be cut from a week to a matter of minutes, and that the yield can be nearly 100%.



This 3-D print shows a DNA-based structure designed to test a critical assumption — that such objects could be realized, as designed, with subnanometer precision. This object is a relatively large, three-dimensional DNA-based structure, asymmetrical to help determine the orientation, and incorporating distinctive design motifs. Subnanometer-resolution imaging with low-temperature electron microscopy enabled researchers to map the object — which comprises more than 460,000 atoms — with subnanometer-scale detail.

Credit ©: Dietz Lab, TU Muenchen
Technische Universitaet Muenchen
(Technical University of Munich) /
Eurekalert
13 Dec 2012

http://www.eurekalert.org/pub_releases/2012-12/tum-rcf121112.php

To Make Old Skin Cells Act Young Again, Boost Their Surroundings

As we get older, the trillions of cells in our body do too. Our skin especially tells the tale of what's happening throughout our bodies. But recently, scientists have learned that aging cells bear only part of the blame for this downward spiral. And a new study shows that it might be possible to slow the decline of aging tissue — and even make it act younger — by focusing on the stuff that surrounds those cells. In the study, scientists from the University of Michigan Department of Dermatology injected the skin of 21 volunteers in their 80s with a filler often used cosmetically to reduce facial wrinkles. The filler bolsters the extracellular matrix, or ECM, a scaffold that skin cells roost in, by filling in the spaces left by aging. In the study the entire layer of skin grew thicker, and more blood vessels, which nourished the cells were seen. "...by altering the matrix using an external filler and increasing the internal pressure, we've shown that we can essentially trigger a signal for cells to wake up," says Gary Fisher, Ph.D., senior author of the new study, published in the Journal of Investigative Dermatology.

UofMHealth.org
10 Dec. 2012

<http://www.uofmhealth.org/news/archive/201212/make-old-skin-cells-act-young-again-boost-their-surroundings>

DARPA Foam Fights Internal Bleeding

The Defense Advanced Research Projects Agency (DARPA) is developing a foam

that can be injected into the body cavities of battlefield wounded to protect them from internal abdominal bleeding. The agency hopes that when perfected, the foam will help the wounded to survive the critical minutes needed to transport them to proper surgical facilities for treatment. Developed by Arsenal Medical, Inc. as part of DARPA's Wound Stasis program, the product is a polyurethane polymer foam designed to control internal hemorrhaging for at least an hour and is designed to be easy for doctors and surgeons to remove. The "Golden Hour" is the 60 minutes when initial treatment of battlefield casualties means the probable difference between life and death. Abdominal injuries are particularly dangerous during this time because they can't be treated with compression pads or tourniquets. This means that internal bleeding is a real threat to survival before proper facilities can be reached. No human tests have been conducted, but work has been done with test swine injuries.

David Szondy / Gizmag
11 Dec. 2012

<http://www.gizmag.com/darpa-foam-wound-treatment/25384/>

PURE, HEART HEALTHY

Super Omega-3

EPA/DHA



Item # 01482

There's no debating the power of **omega-3** fatty acids. From support for **heart health** and **brain function** to help with **inflammation**, their broad-spectrum benefits have been firmly established in a wealth of studies.^{1,9}

To ensure the purest, most stable, and easy-to-tolerate fish oil supplement, **SUPER OMEGA-3 EPA/DHA** is *molecularly distilled*. This proprietary technology ensures any environmental pollutants are reduced to extremely low levels. The result? Our fish oil enjoys a **5-star rating for purity, quality, and concentration** from the **International Fish Oil Standards** program (IFOS)—the highest possible ranking from the world's *premier* testing laboratory.

Sesame Lignans and Standardized Olive Fruit Extract for Enhanced Benefits

Fish oils (and other fatty acids) have a tendency to **oxidize**, rendering them nutritionally inferior. Scientific studies show that when added to fish oil, **sesame lignans** safeguard against oxidation **and** direct fatty acids toward pathways that help with inflammatory reactions.¹⁰

To further emulate the benefits of a **Mediterranean diet**, **Super Omega-3** delivers standardized, high-potency **olive fruit extract**. Research shows that **fish oil** combined with **olive oil** helps with inflammation **better** than fish oil alone.¹¹

Olive also contains the compounds **hydroxytyrosol**, **tyrosol**, and **oleuropein**. Together these nutrients counter the action of free radicals, delay aging in specialized skin cells, prevent undesirable LDL oxidation, and help maintain normal platelet activation.¹²⁻¹⁵

Super Omega-3 (4 regular size softgels) supplies the equivalent content of **6 tablespoons of extra virgin olive oil**. Take **two** softgels twice daily with meals.

A bottle containing 120 softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for \$32. If a member buys four bottles, the price is reduced to **\$21** per bottle. If **10 bottles** are purchased, the cost is **\$18.68** per bottle. (Item # 01482)

Just one serving of **SUPER OMEGA-3 EPA/DHA** with Sesame Lignans & Olive Fruit Extract provide:

EPA Pure+™ Extract (eicosapentaenoic acid)	1400 mg
DHA Pure+™ Extract (docosahexaenoic acid)	1000 mg
Olive Fruit Extract [std. to 6.5% polyphenols (39 mg), 1.73% hydroxytyrosol/tyrosol (10.4 mg), 0.5% verbascoside/oleuropein (3 mg)]	600 mg
Sesame Seed Lignan Extract	20 mg

A SMALLER SOFTGEL for easier swallowing!

Some members have requested we make **Super Omega-3** available in a smaller capsule for easier swallowing. We have accomplished this by making **half-size softgels** available.

A bottle containing 240 half-size softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for \$32. If a member buys four bottles, the price is reduced to **\$21** per bottle. If **10 bottles** are purchased, the cost is **\$18.68** per bottle. (Item # 01619)

For those with sensitive stomachs, **Super Omega-3** is also available with **enteric coating** and retails for **\$34**. If a member buys four bottles, the price is reduced to **\$23.25** per bottle. If **10 bottles** are purchased, the cost is **\$21** per bottle. (Item # 01484)

To order the most advanced fish oil supplement, **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** (with or without enteric coating), call **1-800-544-4440** or visit **www.LifeExtension.com**



Ratings based on results of the 2012 ConsumerLab.com Survey of Supplement Users. More information at www.consumerlab.com.

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product. Contains fish (anchovy, mackerel), sesame, and corn.

Supportive but not conclusive evidence shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc. These products have been tested to the quality and purity standards of the IFOS™ program conducted at Nutrasource Diagnostics, Inc.

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

MEETINGS

About the Alcor Foundation

The Alcor Life Extension Foundation is a nonprofit tax-exempt scientific and educational organization dedicated to advancing the science of cryopreservation and promoting cryonics as a rational option. Being an Alcor member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day, 365 days a year.

Alcor's Emergency Response capability includes specially trained technicians and customized equipment in Arizona, northern California, southern California, and south Florida, as well as many additional certified technicians on-call around the United States. Alcor's Arizona facility includes a full-time staff, and the Patient Care Bay is personally monitored 24 hours a day.

ARIZONA

Flagstaff:

Arizona without the inferno. Cryonics group in beautiful, high-altitude Flagstaff. Two-hour drive to Alcor. Contact eric@flagstaffcryo.com for more information.

Scottsdale:

This group meets the third Friday of each month and gatherings are hosted at a home near Alcor. To RSVP, visit <http://cryonics.meetup.com/45/>.

At Alcor:

Alcor Board of Directors Meetings and Facility Tours — Alcor business meetings are generally held on the first Saturday of every month starting at 11:00 AM MST. Guests are welcome. Facility tours are held every Tuesday and Friday at 2:00 PM. For more information or to schedule a tour, call D'Bora Tarrant at (877) 462-5267 x101 or email dbora@alcor.org.

The Alcor Volunteer Network, Scottsdale Chapter has a variety of meetings on topics including: member education, training, community outreach, and fundraising. To RSVP, visit: <http://www.meetup.com/AVNScottsdale/members/>

CALIFORNIA

Los Angeles:

Alcor Southern California Meetings—For information, call Peter Voss at (310) 822-4533 or e-mail him at peter@optimal.org.

Although monthly meetings are not held regularly, you can meet Los Angeles Alcor members by contacting Peter.

San Francisco Bay:

Alcor Northern California Meetings are held quarterly in January, April, July, and October. A CryoFeast is held once a year. For information on Northern California meetings, call Mark Galeck at (408) 245-4928 or email Mark_galeck@pacbell.net.

FLORIDA

Central Florida Life Extension group meets once a month in the Tampa Bay area (Tampa and St. Petersburg) for discussion and socializing. The group has been active since 2007. Email arcturus12453@yahoo.com for more information.

NEW ENGLAND

Cambridge:

The New England regional group strives to meet monthly in Cambridge, MA — for information or to be added to the Alcor NE mailing list, please contact Bret Kulakovich at 617-824-8982, alcor@bonfireproductions.com, or on FACEBOOK via the Cryonics Special Interest Group.

PACIFIC NORTHWEST

Cryonics Northwest holds regular meetings for members of all cryonics organizations living in the Pacific Northwest.

For information about upcoming meetings and events go to: <http://www.facebook.com/cryonics.northwest>

A Yahoo mailing list is also maintained for cryonists in the Pacific Northwest at <http://tech.groups.yahoo.com/group/CryonicsNW/>.

British Columbia (Canada):

The contact person for meetings in the Vancouver area is Keegan Macintosh: keegan.macintosh@me.com

Oregon:

The contact person for meetings in the Portland area is Chana de Wolf: chana.de.wolf@gmail.com

ALCOR PORTUGAL

Alcor Portugal is working to have good stabilization and transport capabilities. The group meets every Saturday for two hours. For information about meetings, contact Nuno Martins at n-martins@n-martins.com. The Alcor Portugal website is: www.alcorportugal.com.

TEXAS

Dallas:

North Texas Cryonauts, please sign up for our announcements list for meetings (<http://groups.yahoo.com/group/cryonauts-announce>) or contact David Wallace Croft at (214) 636-3790 for details of upcoming meetings.

Austin/Central Texas:

We meet at least quarterly for training, transport kit updates, and discussion. For information: Steve Jackson, 512-447-7866, sj@sjgames.com.

UNITED KINGDOM

There is an Alcor chapter in England. For information about meetings, contact Alan Sinclair at cryoservices@yahoo.co.uk. See the web site at www.alcor-uk.org.

If you are interested in hosting regular meetings in your area, contact Alcor at 877-462-5267, ext. 113. Meetings are a great way to learn about cryonics, meet others with similar interests, and introduce your friends and family to Alcor members!

WHAT IS CRYONICS?

Cryonics is an attempt to preserve and protect human life, not reverse death. It is the practice of using extreme cold to attempt to preserve the life of a person who can no longer be supported by today's medicine. Will future medicine, including mature nanotechnology, have the ability to heal at the cellular and molecular levels? Can cryonics successfully carry the cryopreserved person forward through time, for however many decades or centuries might be necessary, until the cryopreservation process can be reversed and the person restored to full health? While cryonics may sound like science fiction, there is a basis for it in real science. The complete scientific story of cryonics is seldom told in media reports, leaving cryonics widely misunderstood. We invite you to reach your own conclusions.

HOW DO I FIND OUT MORE?

The Alcor Life Extension Foundation is the world leader in cryonics research and technology. Alcor is a non-profit organization located in Scottsdale, Arizona, founded in 1972. Our website is one of the best sources of detailed introductory information about Alcor and cryopreservation (www.alcor.org). We also invite you to request our FREE information package on the "Free Information" section of our website. It includes:

A fully illustrated color brochure

- A sample of our magazine
- An application for membership and brochure explaining how to join
- And more!

Your free package should arrive in 1-2 weeks.

(The complete package will be sent free in the U.S., Canada, and the United Kingdom.)

HOW DO I ENROLL?

Signing up for a cryopreservation is easy!

Step 1: Fill out an application and submit it with your \$150 application fee.

Step 2: You will then be sent a set of contracts to review and sign.

Step 3: Fund your cryopreservation. While most people use life insurance to fund their cryopreservation, other forms of prepayment are also accepted. Alcor's Membership Coordinator can provide you with a list of insurance agents familiar with satisfying Alcor's current funding requirements.

Finally: After enrolling, you will wear emergency alert tags or carry a special card in your wallet. This is your confirmation that Alcor will respond immediately to an emergency call on your behalf.

Call toll-free today to start your application:

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info@alcor.org

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Will You Be Alive and Healthy 10...20...30 Years from now?

Your best chance at achieving future immortality is to protect your precious health now so you can benefit from future medical breakthroughs. Staying informed about the latest health discoveries can mean the difference between life and premature death.

And the **Life Extension Foundation** can be your passport to the future. As the largest anti-aging organization in the world, we are dedicated to finding scientific ways to prevent disease, slow aging, and eventually stop death.

For more than three decades, Life Extension has been at the forefront of the movement to support revolutionary anti-aging research that is taking us closer to our goal of extending the healthy human life span indefinitely. We inform our members about path-breaking therapies to help keep them healthy and alive.

**Join today and you'll receive
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- **A subscription to *Life Extension* magazine** (\$59.88 yearly newsstand value)...Over 100 full-color pages every month are filled with medical research findings, scientific reports, and practical guidance about using diet, nutrients, hormones, and drugs to prevent disease and slow aging.
- Access to a toll-free phone line to speak with **knowledgeable health advisors**, including naturopathic doctors, nutritionists, and a cancer expert, about your individual health concerns. You can also receive help in developing your own personal life extension program.
- **Discounts on prescription drugs, blood tests, and pharmaceutical quality supplements** that will greatly exceed your membership dues. You'll receive a directory listing

the latest vitamins and supplements, backed by scientific research and available through a unique buyers club.

FREE BONUS!

- ***Disease Prevention and Treatment* book** (\$49.95 cover price)...this hardbound fourth edition provides novel information on complementary therapies for 133 diseases and illnesses—from Alzheimer's disease to cancer, from arthritis to heart disease—that is based on thousands of scientific studies.

Life Extension Foundation funds advanced vitrification and gene-chip research. Your \$75 membership fee helps support scientific projects that could literally save your life.

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