THE SCIENCE CREATIVE QUARTERLY ISSUE ONE PART FOUR OF SIX MAY 23RD 2005 LALALALA!

Our masthead, we think, will be forever evolving, although at present we have two Daves, a Bethany, a Caitlin, a Stephen, a Claire, and a Russell.

Tom, Moebius and Richard continue to be happy to help.

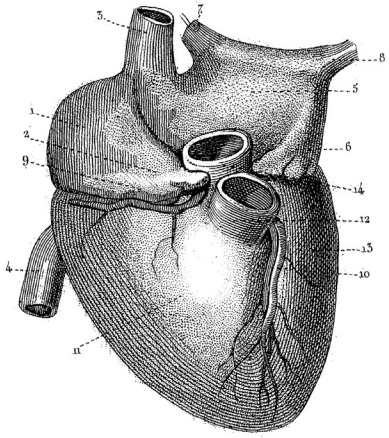
We did follow up on Chris and his friends, and for now, we know that Chris is on board.

Isn't Jen really good at drawing pictures?

Our exotic sounding Azar is sort of still with us, but involved with a different project that will likely have an affiliation with the SCQ later this summer.

Email us at **tscq@interchange.ubc.ca**

SEEKING, SEEKING...



Dear Reader,

At some point in history, someone must have pointed out that the relationship between writers and publishers is a lot like dating. There's the thrill when you score someone out of your league. The misery of losing out to someone new and exciting. Rejection follows hope follows rejection. Even long-term committed relationships can fall apart when one of the partners becomes too big for their britches.

We at The Science Creative Quarterly are metaphorically new to the dating game. In the hope of accelerating our introduction into the swinging scene, we would like to present this personal ad:

Nubile young website seeks contributors for casual fling or enduring love affair. You're a distinguished older writer or a timid young virgin. Your turn-ons include amino acids, plate tectonics, optical isomers, and phylogenetics. You're aroused by hot Canadian research and experiment passionately with new story-telling techniques. We are willing to try anything once.

ABOUT SUBMISSIONS:

Anything will do, but if you like more direction, we are happy to look at:

Things with some link (however weak) to science.

Things in English.
Things in other languages that are more or less readable when translated with Google tools.

Things with many words.
Things with few words.
Things with pictures.

Things that are news worthy.
Things that are not terribly so.

Things that educate.
Things that entertain.
Things that both educate and entertain.

Things that are important to ones well being, or perhaps to the global community at large.
Things that (at the end of the day) are really only there for the sake of being there.

Things from famous people who think that this is a pretty neat thing going on here.
Things from infamous people - they're interesting too.
Things from everyone else.

And things whose copyright ultimately remain with the author, although it would be nice to be acknowledged as being involved in presenting it to others.

Submissions are preferred as attached word documents, or text pasted directly into the body of the email. Please send us your good work to **tscq@interchange.ubc.ca**

AND COMMENTS ALWAYS WELCOMED...

HUNGER IN THE MIDST OF HIV.

By David Secko

New research suggests that British Columbians with HIV are more likely to be unsure of their next meal as compared to the rest of the Canadian population.

This uncertainty is nearly 5 times higher than the general Canadian population, often leading to HIV- positive individuals not having access to adequate amounts of food.

"We were not expecting this many people to be hungry," says Lena Normén, from the Canadian HIV Trials Network at St. Paul's Hospital in Vancouver, BC, and lead author of the new study.

Wasting—loss of strength and weight in a person due to a chronic disease— from malnutrition is already known to be a predictor of mortality in HIV patients. The new findings point to the need to monitor this risk factor in the Canadian Population, and determine if it can be reversed.

"HIV is an extremely complicated disease and medical causes are often looked for in patients with wasting," says Normén, "but it may just be that they haven't enough money to buy food."

HIV infection increases the body's need for energy and protein, which is thought to be due to increases in the production of cytokines—hormone-like proteins that regulate the inflammatory immune response. People with HIV therefore have higher dietary needs in terms of more protein and nutrients.

Normén and colleagues wondered if patients on antiretroviral therapy in British Columbia were having difficulty coping with their higher dietary needs. They asked just under 4000 HIV-infected people about their access to adequate food.

The questions asked of HIV-infected individuals included whether they were going without food, experience hunger pangs, what their household food supply was like, and their feelings about their food situation. Researchers term people having difficulty with any of these questions as 'food insecure'.

Normén points out that food insecurity is a measure of what people eat, what kind of food they can afford to buy, and whether people worry about food due to money or other concerns.

For example, "If you're constantly thinking about how you're going to survive the day and what am I going to feed my kids," says Normén, "we would consider that food insecure."

Of the 1213 people that responded, the bulk of which were men (1116 men and 97 women), Normén and colleagues categorized 48% (584) as being food insecure. In the Canadian population, similar food insecurity is estimated to be approximately 10%, strongly suggesting that British Columbians with HIV are more likely to experience hunger. The results are published in the April, 2005, issue of the Journal of Nutrition.

"From the point of view of a disease [HIV] that has high energy requirements, the fact that you can't control the amount of energy

you get is worrisome," says Normén. Indeed, the researchers also found that food insecurity is associated with decreased weight in the patients surveyed.

In addition, Normén and colleagues found that the strongest predictors of food insecurity included parameters such as incomes below $10,000 (CAD), unemployment, and sharing a household with children.

Although the researchers point out that their sample size was relatively low, their study is first to look at food insecurity in the Canadian HIV population, and they are currently following up on their findings.

"We are doing more work now," says Normén, "and we are looking into the risk of HIV mortality if you are food insecure."

She hopes that as more information is gained, a strategy can be developed to improve support for the HIV patients that need it.

GOLDEN RICE: BACK ON THE BOIL?

By Caitlin Dowling

The genetically modified golden rice that was going to save the world in 2000, has yet to leave Louisiana, where it is being tested.

Despite not having reached the countries it was expected to help, the rice with added vitamin A has been making waves among consumers and scientists alike.

Farmers and research centers in the developing world want to see it, environmental groups are up in arms, and the debate rages as to whether this product will in fact help solve the problem of malnutrition in the developing world.

Five years on, the creator of the controversial rice, Dr Ingo Potrykus has revealed a new generation of the crop in Zurich, with ten times the amount of added vitamin A.

Potrykus, a scientist from the Swiss Federal Institute of Technology first developed golden rice in 2000, together with Peter Beyer, from the University of Freiburg.

Golden rice is a genetically modified hybrid of rice, incorporating a gene from the daffodil flower to allow production of a beta-carotene compound, which the body turns into vitamin A.

It was originally created as a way of targeting vitamin A deficiency, which currently affects over 120 million people in the developing world, mainly children. Long term effects of vitamin A deficiency include measles, diarrhea, pneumonia and eventually, irreversible blindness, which currently affects 250,000 people in poorer countries.

In the Philippines, one of the main targets for the new crop, rice is the staple diet, and the number one nutrient deficiency is vitamin A. Seventeen Filipino children become blind every day due to vitamin A deficiency (VAD).

Duncan Macintosh from the International Rice Research Institute in the Philippines says the company is looking forward to the fortified crop being developed there. Macintosh believes the crop will be greatly appreciated by farmers:

"In addition to it's nutritional benefits for consumers, golden rice must also be attractive for farmers by having such qualities as high yield and pest and disease resistance."

Steve Eury from Syngenta adds that the rice was such a success in field trials in Louisiana that the company is proposing further trials in The Philippines in the future, but he was not able to give a specific date.

Golden rice, yellow in color thanks to the beta-carotine, provides a fraction more vitamin A in the diet. Not enough for a recommended daily amount, but possibly enough to keep blindness at bay.

The new strain of rice uses a gene from the maize plant instead of the daffodil, and could have over ten times the amount of vitamin A as the original. These findings are to be published in the journal Nature later this month.

Golden rice seeds are expected to be given to farmers in the Philippines who make less than US$10,000 a year, to encourage it's use to help people get vitamin A in their diet. And there are plans for further nutrients to be added to crops, including iron.

Despite claims of increased potency in the new rice, Potrykus has admitted research still needs to be done to determine the effects. According to Greenpeace International, it is still unknown how much vitamin A remains in the rice once it is cooked, how much the body will actually absorb, and whether the crop will be detrimental to human health in the long term. The vitamin A content will always be too small to overdose on, but the effect of genetically modified organisms on the body in the long term is still in question.

The development of golden rice was originally funded by several organizations, including the Rockerfeller Foundation, the European Union and the Swiss Federal Institute of Technology.

The multi-national agricultural corporations Monsanto and AstraZeneca have licensed golden rice, and are expected to distribute the seeds free of charge to producers in the developing world. They are also licensing the golden rice genes with no royalties.

Critics warn that this rice is a clever ruse to inject some more publicity, and possibly cash, into the troubled biotech industry. Greenpeace in particular have been very outspoken in their critique of the genetically modified crop, calling it a "trojan horse", a gift at first, then a lifelong dependence on large corporations for their supply of seeds.

"Greenpeace is concerned by the ways in which multinational companies are having a hand in the livelihoods of the people in the developing world. We feel that the corporations should not be imposing their will on farmers with limited options," says Christoph Then, of Greenpeace International in Germany.

"This has the opposite effect of helping countries to help themselves," says Then.

Greenpeace argues that adding vitamin A to rice is merely exacerbating the problem of malnutrition in the developing world.

Then argues that although any extra vitamin A in the diet is an improvement, it's not the most practical or economic solution.

Greenpeace International has advocated other solutions to VAD, such as vitamin A supplements and increased food diversity, which have almost eliminated the problem in Bangladesh.

Dave Ng is the Director of the Advanced Molecular Biology Laboratory at the University of British Columbia, Vancouver. He has lectured frequently on the golden rice phenomenon and whilst generally in favor of the technology, is concerned with the impact on local farmers in the developing world.

"What people don't see are the real pressing economic dangers," Ng says, which he feels deserves more evaluation than even environmental and health repercussions.

"Health risks associated with GM crops are comparatively small," Ng says. "and tend to be over exaggerated in the media."

However, economic repercussions can be significant. Ng knows that the use of GM technology in food production can strengthen a farmer's reliance on large agricultural

corporations. Furthermore, any market advantage the farmer might have because of favourable climate and locale, can be effectively removed through the use of modified crops.

Ng also says that while the environmental and, especially, health risks have often been over hyped, so too have the positive effects of these foods in the press – a good example is that the golden rice isn't the cure-all for VAD, as it was once touted as being.

Three golden rice meals a day for a child, 150g, provide only 10% of the daily requirement of vitamin A. One and a half kilos of the first generation of rice would have to be consumed to get the recommended daily amount.

But judging by Dr Potrykus' response in a previous interview, featured on the website grain.com, he stands by his product:

"If some people decide that they want blind children and white rice, it's their choice. I'm offering the possibility of yellow rice and no blind children. But the decision what people want to eat is theirs."

Shortly after the rice was introduced in 2000, Time Magazine featured Dr Potrykus on the cover, reporting that the new rice could "save a million kids a year." Five years later, the original crop has not met the much-hyped goals, it's not even in the ground where it is needed. Will the new version be the hoped-for answer?

THE SECRETS OF PARENTING THAT NO ONE WILL TELL YOU.

By Russell Bradbury-Carlin

Parenting can be very difficult. And when you become a new parent, people will give you hundreds and hundreds of books about how to be a good parent. But what they don't tell you is that there are secrets to parenting that you will not find in any book, even one from a bookstore. These secrets have been handed down generation to generation, parent to parent for eons. I learned them from my mother and she learned them from her father, who learned them from his Great Aunt Larry. And so on and so on. Well, today, I would like to reveal just some of these secrets about parenting.

The first secret that no one talks about is quite simple: babies are amazing creatures that look a lot you only they are much, much smaller. Now who ever told you that? No one, right? Also, you may know that children of all ages are little balls of energy. But did you know that if one is not careful, they may spontaneously combust. Yep, happens hundreds of times each year. Similarly, if your child screams like he or she is possessed, they probably are.

Now, a common experience that many parents often have is their babies and children interrupting their sex-life. In fact, your baby can be sound asleep and if you and your spouse make any kind of physical contact they will wake up crying. This is because of a small pheromone-sensing organ buried deep in their nostrils. But don't go looking for it. Babies don't like you touching their noses, and besides the organ disappears when you look at it.

Great. Are you still with me? One thing that many people don't know is children are quite thrifty. Just put down an old battered box and a multi-colored all-the-bells-and-whistles Fisher Price toy and see what he or she goes for. They know how you spend your hard-earned money and are trying to teach you that it is better to save - especially for their education, or for the huge credit card bill that they are racking up by ordering all of those pairs of lime-green fleece pants that you are pretty sure you yourself didn't order, though things were a little fuzzy again last month.

Children are mysterious. No, this isn't a secret, but its true. You never quite know what is going through their tiny, teeny, little minds. So, if your baby throws things and watches them roll around the kitchen floor, he is really trying to tell you that he wants to be a major league baseball player, no matter how much you tell him he can have a better career in skeet-shooting or spelunking. A lot of people don't know this, but it is a fact. You should also expect that he won't appreciate the little miner's helmet you gave him either, or the cool cave you made out of the all the pillows in the house and from your neighbor's houses and from the stores.

Another secret is - when your child leans forward as if he or she is preparing to crawl, they are just playing with your head. Children already know how to crawl from birth and will do so when they are damn ready

to - no sooner. Similarly, when your child is babbling and seems to say "da-da" or "ma-ma", he or she is really, truly calling you by this term of endearment. They know it will get you excited and make you clap loudly. Children like to tease their parents and make you do tricks, like slapping yourself in the nose repeatedly for an hour or two or calling your ex-girlfriend and asking her if she's been ordering lime-green pants on your credit card. It's innate.

Finally, it is important to know that Children communicate telepathically. If you ever notice them staring off into the distance, it is because a new signal is coming in. I think this is because they are secretly planning the domination of much of the Earth's resources, especially for some odd reason, coal. Either that or they are sending updates about baseball scores.

Good luck, new parents!

A GAME THEORETIC APPROACH TO THE TOILET SEAT PROBLEM

By Richard Harter

The toilet seat problem has been the subject of much controversey. In this paper we consider a simplified model of the toilet seat problem. We shall show that for this model there is an inherent conflict of interest which can be resolved by a equity solution.

Consider a bathroom with one omnipurpose toilet (also known as a WC) which is used for two toilet operations which we shall designate as #1 and #2. The toilet has an attachment which we shall refer to as the seat (but see remark 1 below) which may be in either of two positions which we shall designate as up and down.

Toilet operations are performed by members of the human species (see remark 2 below) who fall into two categories, popularly designated as male and female. For convenience we shall use the name John to refer to the typical male and Marsha to refer to the typical female.

The performance of toilet operations by John and Marsha differ in a number of respects. The costs of these operations are peculiar to the respective sexes and are fixed except with respect to the position of the toilet seat. In particular:

Marsha performs toilet operations #1 and #2 with the seat in the down position. John performs toilet operation #1 with the seat in the up position and toilet operation #2 with the seat in the down position. If the seat is in the wrong position before performing the toilet operation the position must be changed at an average cost C. Optionally the position may be changed after performing the toilet operation, also at an average cost C. (Changing the position of the seat during the performance of a toilet operation is beyond the scope of this note and is definitely not recommended.)

Consider the scenario where John and Marsha each use a separate toilet. It should be obvious to the most casual observer that each minimizes the seat position transfer cost by not altering the seat position after performing a toilet operation.

For Marsha the seat position transfer cost is 0 since all operations are performed with the seat in the down position. For John the cost is greater than 0 since seat position transfers must be performed.

Let p be the probability that John will perform a #1 operation vs a #2 operation. Assume that John optimizes his seat position transfer cost (see remark 3 below.) Then it is easy to determine that John's average cost of seat position transfer per toilet opeation is

$B = 2p(1-p)C$

where B is the bachelor cost of toilet seat position transfers per toilet operation.

Now let us consider the scenario where John and Marsha cohabit and both use the same toilet. In our analysis we shall assume that John and Marsha perform toilet operations with the same frequency (see remark 4 below) and that the order in which they perform them is random. They discover to their mutual displeasure that their cohabitation adversely alters the toilet seat position transfer cost function for each of them. What is more there is an inherent conflict of interest. Attempts to resolve the problem typically revolve around two strategies which we shall designate as J and M

Strategy J
Each person retains the default strategy that they used before cohabiting. This strategy is proposed by John with the argument "Why does it matter if the seat is up or down?". As we see below this strategy benefits John.

Strategy M
Each person leaves the seat down. This strategy is proposed by Marsha with the argument "It ought to be down." As we see below this strategy benefits Marsha.

Consequences of strategy J:
Under strategy J the toilet seat is is in the up position with probability p/2. The respective average cost of toilet seat transfer operations for John and Marsha are:

John: p(3/2-p)C
Marsha: pC/2

The incremental costs (difference between pre and post habitation costs) are:

John: (p - 1/2)pC
Marsha: pC/2
Total: (p^2)C

John's incremental cost would actually be negative if p were less than 1/2. This is not the case; p>1/2. Note that Marsha's incremental cost is greater than than John's for p<1. Marsha objects.

Consequences of strategy M:
In strategy M the seat is always left down. When John performs operation #1 he lifts the seat before the operation and lowers it after the operation. The respective average cost of toilet seat transfer operations is:

John: 2pC
Marsha: 0

The incremental costs are:

John: 2(p^2)C
Marsha: 0
Total: 2(p^2)C

In these strategy Marsha bears no cost; all of the incremental costs are borne by John. John objects. Note also that the combined incremental cost of strategy M is greater than that of strategy J.

It is notable that John and Marsha each advocates a strategy that benefits them. This is predictable under game theory. However the conflict over strategies has a cost M in marital discord that is greater than the cumulative cost of toilet seat transfers. It behooves John and Marsha, therefore, to adopt a strategy that minimizes M.

This is not simple. A common reaction is to advance sundry arguments to justify

adopting strategy M or J. All such arguments are suspect because they are self serving (and often accompanied with the "If you loved me" ploy.) A sound strategy is one that is equitable and is seen to be equitable. In this regard there are three candidate criteria:

(1) Minimize the joint total cost
(2) Equalize the respective total costs
(3) Equalize the respective incremental costs

The argument for (1) is that John and Marsha are now as one and it is the joint costs and benefits of the union that should be considered. This principle is not universally accepted. It is readily seen that (see remark 5) that the joint total cost is optimized by strategy J which has already been seen to be suspect.

Criterion (2) seems plausible. It requires, however, that Marsha put the seat in the up position after performing a toilet operation some percentage of the time. No instance of this behaviour has ever been observed in recorded history; ergo this criterion can be ruled out. (But see remark 6.)

Criterion (3) argues that the mututal increased cost of toilet seat operations should be shared equitably, i.e., neither party should bear a disproportionate share of the costs of cohabitation. A short calculation reveals that criterion (3) can be achieved if John leaves the seat up after performing toilet operation #1 with a frequency

$f = (2p-1)/p$

Since the value of p is seldom precisely measured and is variable in any event it suffices to use an approximate value of f. If we assume that $p=2/3$ then $f=1/2$. This suggests the following convenient rule of thumb:

In the morning John leaves the seat up after performing #1.
In the evening he puts it down.

This rule may not be precise but it is simple and approximately equitable; moreover the use of a definite rule sets expectations. The seat is put down in the evening to avoid the notorious "middle of the night surprise".

I expect that this analysis should settle the toilet seat controversey for once and for all - if John and Marsha are mathematicians.

* * *

Remark 1: The toilet has an additional attachment called the toilet seat lid which can only be down if the toilet seat is down. When the lid is down the toilet is (or should be) non-functional for toilet operations. Some persons maintain the toilet seat lid in the down position when the toilet is not use. For these persons the analysis in this note is moot. Such persons pay a fixed cost in seat movement for all toilet operations.

Remark 2: Toilets are also used by domestic animals as a convenient source of drinking water unless the lid is down. (See remark 1)

Remark 3: Experimental evidence suggests that almost all bachelors optimize the seat transfer cost, the exception being those who put the seat up after performing a #2 operation.

Remark 4: Folklore has it that Marsha performs more toilet operations than John, hypothetically because of a smaller bladder. John, however, drinks more beer. We shall not discuss his prostate problem.

Remark 5: "Readily seen" in this context means "It looks obvious but I don't know

how to prove it; you figure it out."

Remark 6: The toilet lid solution is to put the toilet lid down after all toilet operations. This solution imposes a cost of 2C on each party and is accordingly more expensive. It is, however, more esthetic. It also eliminates the "doggy drinking" problem.

LEGAL RIGHTS AND THE MATERNAL-FETAL CONFLICT.

By Linda Tran
Image by Jen Philpot

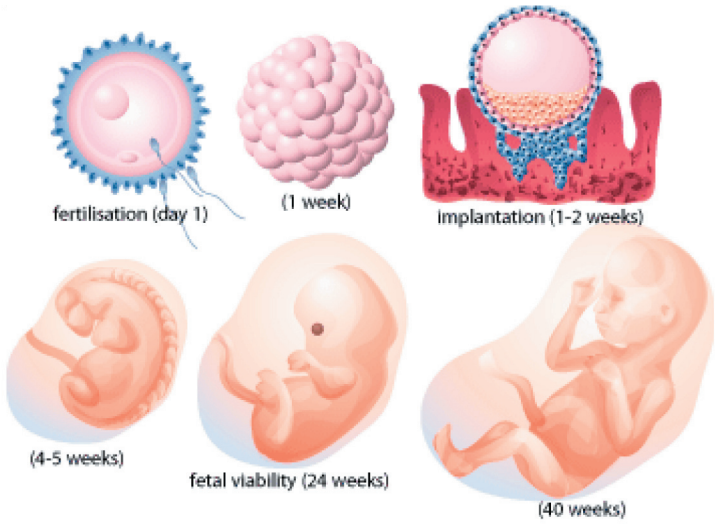


Figure 1. An overview of human fetal development.

In 1973, the landmark and controversial court case Roe v. Wade came to a close when the U.S. Supreme Court ruled that a woman's Constitutional right to privacy negated abortion legislation [1]. This court ruling enabled women to terminate pregnancies up to the point of fetal viability [2] (the point in fetal development at which a delivered baby can survive without interfering with the body of the mother [3]). In humans, fetal viability is considered to occur at 24 weeks of gestation [4].

In a related case, Doe v. Bolton, the US Supreme Court supported abortion rights after the point of fetal viability in order to preserve women's lives and continuing health [5]. The concept of health, as defined by the Supreme Court in Doe v. Bolton, includes "all medical, psychological, social, familial and economic factors that may potentially encourage a decision to obtain an abortion" [5]. Thus, the mother's life and health takes precedence over the life of the fetus right up until birth. The ruling from this case is controversial due to the partial birth abortion (or late term abortion) debate. In this procedure, a woman's cervix is dilated over several days, the fetus is extracted feet first, the skull is perforated, and the brain is partly evacuated [6]. The fetus is then delivered deceased, but otherwise intact.

Fifteen years later, in 1988, the Canadian Supreme Court abolished its abortion law in R. v. Morgentaler. The Supreme Court determined that restrictive abortion provisions violated women's rights as set out in the 1982 Canadian Charter of Rights and Freedoms [2]. The court ruled that the Criminal Code violated women's rights because "forcing a woman, by threat of criminal sanction, to carry a fetus to term unless she meets certain criteria unrelated to her own priorities and aspirations, is a profound interference with a woman's body and thus a violation of security of the person" [7].

Although abortion has been legal for thirty years in the United States and fifteen years in Canada, much controversy and debate surrounds this issue as well as that of maternal-fetal conflict. Maternal-fetal conflict occurs when a pregnant woman's interests, as she defines them, conflict with the interests of her fetus, as defined by the woman's physician [3]. A conflict of this nature may occur when a pregnant woman decides not to comply with recommendations that her physician considers to be in the best interest of the fetus. What is the best method of resolving this situation? What are the moral obligations of the physician to the pregnant woman and to the fetus?

In order to answer the above questions, it is necessary to examine the issues of when human life begins and the moral status of the fetus. These concerns drive the ongoing debate between abortion advocates and pro-life supporters.

The Beginning of Human Life

When does human life begin? Some ethicists believe human life begins when the female egg is fertilized by the male sperm, forming one cell [3]. This one cell contains the complete genetic blueprint for every detail of human development – from sex, to hair and eye colour. From this moment, some believe that the embryo has the status of a person [3,4].

Others believe that life begins from the 14th day after conception, when nidation of the embryo has occurred and the primitive streak is present [4]. Following menstruation, development of the epithelial membrane, which lines the inner surface of the uterus, allows for embryo attachment to the maternal uterine wall. The primitive streak is an elongated band of cells that forms the axis of an embryo [8]. It is the site of cell activity where the middle layer of the embryo develops and it also determines the basic body plan [9].

There are others that believe life begins at the moment of birth and that the fetus does not have an independent moral status while in utero [3,4]. Another opinion is that life begins 28 days after birth [4].

Moral Status of the Fetus

There are currently three ways of approaching this issue. The fetus can have the same rights as a child, have no rights, or have increasing rights with advancing gestation [9].

Full Fetal Rights

If the fetus is considered to have the full

rights of a person, then it should be treated as a separate entity from the mother [9]. Thus, the pregnant woman and the fetus should be treated as two individual patients. In fact, the medical model for the biological maternal- fetal relationship has shifted emphasis from unity to duality, and the fetal organism is considered a distinct patient [3].

A major problem with this concept is fetal dependence on the mother. This total dependence has the potential to cause serious conflict between maternal and fetal rights [9]. Fetal diagnosis and therapy have undergone developments which have optimized fetal outcome [3], however any fetal diagnosis or therapy performed to improve fetal outcome must include the involvement of the pregnant woman. In most cases, the pregnant woman would agree to undergo the proposed intervention. However, there are cases where the pregnant woman does not. In these circumstances, granting full rights to the fetus infringes upon the mother's autonomy. Autonomy is one of the fundamental principles of biomedical ethics [9].

Biomedical ethics is defined as "the application of general ethical theories, principles and rules to problems of therapeutic practice, health care delivery, and medical and biological research" [10]. In order to address ethical issues and resolve conflicts, biomedical ethics emphasizes the use of moral principles. These are; respect for autonomy, beneficence, and justice [10]. The principles of autonomy and beneficence are viewed as the primary factors involved in the maternal-fetal conflict [11].

The right to be free from unwanted bodily invasions and to control one's own life is fundamental to the pregnant woman's right to security of the person [7]. Maternal right to privacy is also supported by other concepts and rights, specifically that of autonomy. The concept of a person's autonomy is their right to choose how to live their own life [9]. The pregnant woman should be allowed the freedom to decide upon alternative courses of therapeutic action based on her values and beliefs [4].

The principle of beneficence requires an individual to act in such a way as to reliably produce more good than harm in the lives of others [3]. With respect to maternal-fetal relationships, the physician should assess objectively the various therapeutic options that may exist. The physician should implement those that will most likely offer the patient greater benefit over risk [4]. At the same time, the physician should consider the well-being of the fetus and also try to offer the fetus the greater benefit over risk [4]. Therefore, the physician has a beneficence-based obligation to the fetus as well as to the mother, which can put the physician in a difficult position when maternal-fetal conflicts arise.

For a one-patient model, where the pregnant woman and fetus are recognized as one entity, the physician must recommend a therapy where the combined maternal-fetal benefits outweigh the combined maternal-fetal burdens. For a two-patient model, a more difficult decision is required of the physician. A single treatment recommendation for both patients may not be reasonable in terms of the beneficence principle alone. This is because the principle of beneficence does not take into account balancing the burdens of one patient against the benefits of another [3].

Some argue that moral obligations are greater to those who are most in need. Therefore, in cases of maternal-fetal

conflict, the principle of beneficence applies more strongly to the fetus, since the fetus has less to gain and more to lose by reversing the priority. It has also been argued that while a woman has the right to terminate her pregnancy, once she decides not to exercise this right, she is obligated to behave in a manner that contributes to fetal development [3].

Assigning full rights to the fetus has the potential of encouraging legislation against maternal activities that may harm the fetus, such as excessive alcohol consumption or drug abuse. This ultimately infringes upon the mother's autonomy. Some have proposed that privacy is not an absolute right and that the woman's right to privacy concerning her pregnancy may be legally overridden after fetal viability [3]. In situations of conflict, some court rulings have supported the interests of the fetus over those of the mother, both in early and late term pregnancy.

A classic case of maternal-fetal conflict involves a pregnant woman presenting with a well-documented complete placenta previa and refusing to undergo cesarean section, insisting instead on a vaginal delivery [3]. Placenta previa is a condition in which the placenta is in the lower segment of the uterus, partially or completely obstructing the birth canal [12]. Unanimous medical opinion would state that attempting to deliver through the vaginal route would most likely result in death to both the mother and fetus [3]. In this particular case, it is considered ethically acceptable for the caregivers to refuse the mother's wishes of a vaginal birth. This decision is supported by the value of medical beneficence, which is "the prevention of unnecessary death and the prevention, cure or management of morbidity" [3]. Caregivers in this situation may seek added persuasiveness or turn to the legal system to obtain a court order to force the mother to have a cesarean section.

A more recent appellate decision on maternal-fetal conflict is that of the Angela Carder case [13,14]. In 1987, the 27-year-old woman was hospitalized at the 25th week of gestation with metastatic terminal sarcoma, a disease she had battled during her adolescence. Angela Carder agreed to a medical plan which consisted of palliative therapy, attempting to extend her life to the 28th week of gestation. It was thought that if the baby was delivered at 28 weeks of gestation, there would be reasonable expectation for survival. Unfortunately, Angela's condition deteriorated and she required intubation and sedation. She was judged to be terminally ill and near death.

The hospital administration became concerned about the well-being of the fetus and despite the opposition of her attending physicians and family, obtained a court order authorizing a forced cesarean section. The judge ruled in favour of the cesarean section. Angela unexpectedly regained consciousness and was informed about the judge's order. Although she expressed her disapproval with the decision, a cesarean section was performed. Several hours following the operation, the baby died. Two days later, so did the mother.

This case was reviewed by the Appeals Court, District of Columbia, which was critical of the trial judge's decision. This judge had based his decision on balancing the rights of the mother against the interests of the state in the life and well-being of the fetus. He reached his decision by assessing that the State's interest in protecting the fetus outweighed whatever rights or interests the dying woman had. This case

is one specific example of the many court-ordered forced cesarean sections that have occurred in the United States [12]. It clearly demonstrates the violation of a woman's autonomy.

No Fetal Rights

Some argue that the fetus has no moral status independent of the mother, but acquires moral status at birth. It is the emergence into the social world that is thought to transfer moral status [9]. This implies that a pregnant woman has the moral right to abort a viable fetus, but not to kill her newborn infant [3].

Assigning no rights to the fetus strengthens the right of maternal autonomy. In this scenario, court-ordered treatments or interventions are never justified [3]. Data obtained on court-ordered obstetric interventions has suggested that in approximately one-third of the cases where court authority was sought for a medical intervention, the medical treatment was considered wrong or harmful in retrospect [11].

Under the principle of maternal autonomy, once a pregnant woman has made an informed decision to refuse a treatment recommended by the medical team, there must be complete acceptance of her decision with no efforts made to persuade her. The right to bodily integrity and autonomy supports the concept of informed consent, which allows competent patients to accept or refuse medical treatment for their own reasons [3]. The principle of informed consent requires a physician to respect the wishes of a mentally competent adult in situations of medical decision making [3].

Despite these principles, the Committee on Bioethics for the American Academy of Pediatrics state that "three conditions must be fulfilled for a physician to consider opposing the woman's refusal of a recommended intervention: (i) there is reasonable certainty that the fetus will suffer irrevocable and substantial harm without the intervention, (ii) the intervention has been shown to be effective, and (iii) the risk to the health and well-being of the pregnant woman is negligible"[15].

Fetal Rights Acquired with Advancing Gestation

Others argue that the fetus acquires increasing moral status as it advances in gestation. Are there ethical differences between aborting during early pregnancy versus during late pregnancy? Society perceives moral differences between an early abortion and termination of a viable full term fetus. This suggests that the moral status of the fetus does increase with gestation [9].

Legal issues exist with regards to maternal-fetal conflict. The law "does not oblige physicians to resort to court orders demanding pregnant women to undergo treatment or alter their behaviour for their fetus" [3]. There are "no statutes, regulations, or court decisions in any jurisdiction that require physicians to seek legal review of a competent pregnant woman's decision to decline medically indicated treatment or to avoid behaviour that poses a risk of harming her fetus" [3]. There is no legal penalty to the physician who fails to seek a court order forcing obstetric treatment. Therefore, the physician must accept the ethical responsibility for his or her decision in seeking judicial authority to treat a pregnant woman against her will,

but by taking the matter into a public judicial forum, the patient-physician confidentiality clause is breached [3].

Summary

It is clear from the relevant case-law that this issue is still very much under debate (at least in the U.S.). If the fetus is assigned full rights, then society is required to protect those rights as it would for a live baby. This is the case even if the fetus's rights conflict with maternal autonomy. If the fetus has no rights, then a viable fetus is not protected if the mother jeopardizes its existence. If the moral status of the fetus increases with advancing gestation, then a viable fetus has greater moral status than a newly fertilized egg and it is reasonable to intervene if the mother's behaviour jeopardizes the fetus near term [9].

There exists a theory that the fetus is not a separate biological entity at all. Rather, it is dependent on the mother's body until near term. The mother and fetus are involved in a symbiotic relationship in which the mother is the moral guardian. If significant differences arise in the interests of the mother and fetus, the mother has the responsibility to consider the interests of both in making an informed decision regarding medical treatment. If a conflict arises, the competent mother's rights to personal autonomy should prevail over the lesser rights of the fetus early in gestation. As the fetus matures and acquires greater moral status, the situation may become less clear [9].

References

1. Roe v. Wade, 410 US 113, US Supreme Court, 1973.

2. Cook, R.J. & Dickens, B.M. Human rights and abortion laws. Int. J. Gynecol. Obstet. 65, 81-87 (1999).

3. Fasouliotis, S.J. & Schenker, J.G. Maternal-fetal conflict. Eur. J. Obstet. Gynecol. Reprod. Biol. 89, 101-107 (2000).

4. Oduncu, F.S., Kimmig, R., Hepp, H. & Emmerich, B. Cancer in pregnancy: maternal-fetal conflict. J. Cancer Res. Clin. Oncol. 129, 133-146 (2003).

5. Doe v. Bolton, 410 US 179, 1973.

6. Charatan, F. US courts in conflict over later term abortion. BMJ 319, 1220 (1999).

7. R. v. Morgentaler. 44 D.L.R. (4th) SCC, 1988.

8. Stables, D. Physiology in childbearing with anatomy and related biosciences. (Harcourt Brace & Co. Ltd., Toronto, 1999).

9. Isaacs, D. Moral status of the fetus: fetal rights or maternal autonomy? J. Paediatr. Child Health 39, 58-59 (2003).

10. Beauchamp, T.L. & Childress, J.F. Principles of biomedical ethics. (Oxford University Press, New York, 2001).

11. Harris, L.H. Rethinking maternal-fetal conflict: gender and equality in perinatal ethics. Obstet. Gynecol. 96, 786-791 (2000).

12. Annas, G.J. The impact of medical technology on the pregnant woman's right to privacy. Am. J. Law Med. 13, 213-232 (1987).

13. Tuohey, J.F. Terminal care and the pregnant woman: ethical reflections on In

Re: A.C. Pediatrics 88, 1268-1273 (1991).

14. Dickens, D.M. The continuing conflict between sanctity of life and quality of life from abortion to medically assisted death. Ann. N. Y. Acad. Sci. 913, 88-104 (2000).

15. American Academy of Pediatrics Committee on Bioethics. Fetal therapy-ethical considerations. Pediatrics 103, 1061-1063 (1999).

WHEN CELEBRITIES, WHO HAVE BEEN CLONED IN THE MOVIES, GET TOGETHER FOR A COFFEE.

By David Ng

SETTING: A Starbucks in L.A. - three celebrities are sitting at a table with their coffees and sharing a newspaper, a fourth is walking towards the table with his coffee.

FADE IN

MICHAEL KEATON
(Approaching the table)
Man, I really need this now.

(Sits down, whilst the others nod or wave).
Is there a free section of paper?

ARNOLD SCHWARZENEGGER
You vant the sports section?

MICHAEL KEATON
Sure.
(Takes the paper and starts looking at the front page)

(A few minutes of silence as everyone reads their newspaper)

HITLER
(Slams his paper down and stands up).
Dis ist terrible! As Fuehrer of the German people and Chancellor of the Reich, I cannot agree with dis. Vee must fight. Neither force of arms nor lapse of time vill conquer Germany. It ist infantile to hope for the disintegration of our people. Mr. Bush may be convinced that America vill win. I do not doubt for a single moment that Germany vill be victorious. Destiny vill decide who is right. One thing only ist certain. In the course of world history, there have never been two victors, but very often only losers.

MICHAEL KEATON
Whoa easy there Adolf. Is that de-caf you're drinking there buddy?

PIKACHU:
Pikachu! Pikachu!

MICHAEL KEATON:
Hey, look at this, Governor Arnold. Looks like you're in the paper today.

ARNOLD SCHWARZENEGGER
I know, isn't it swell? My biceps looked especially good on that day.

MICHAEL KEATON
(sipping his coffee)
Yeah, pretty cool, pretty cool. I've got to ask though, what's it like being a Governor of California anyway?

ARNOLD SCHWARZENEGGER
Oh, you know, nothing special really. Besides, what makes you so sure that it is me and not my clone.
(Everyone chuckles).

HITLER
Hey, I saw Spider Man 2 yesterday – it vas really good. Hey Michael, do dat funny thing I like.

MICHAEL KEATON
You mean this.
(Grabs Arnold by the shirt lapels and pulls him close to his face)

I'm Batman!

ARNOLD SCHWARZENEGGER
(Laughing)
Ya, that kills me too.

PIKACHU
Weeeeeeeeeeeeeeeeee!

(Darth Vader, the Lord of Sith then approaches the table)

DARTH VADER
Hello Arnold, may I join you?

HITLER
(Standing up and cutting in)
I'm sorry Mr Vader, but dis table ist reserved only for celebrities who have been cloned in zee movies.

DARTH VADER

(Facing Arnold)
Your destiny lies with me Schwarzenegger. Obi-Wan knew this to be true.

(Turning to Hitler, with two raised fingers and speaking very deliberately)
I am welcome to join you for coffee.

HITLER
(In a sort of trance)
You are velcome to join us for coffee.

DARTH VADER
Here, please have my seat.

HITLER
Here, please have my seat.

ARNOLD SCHWARZENEGGER
Darth! Stop that now!
(Hitler shakes his head)

The 'cyborg' coffee group doesn't meet until tomorrow morning.

DARTH VADER
(Turning to Arnold)
Impressive. Most impressive. Obi-Wan has taught you well. You have controlled your fear. Now, release your anger. Only your hatred can destroy me.

MICHAEL KEATON
(Tapping his finger on Darth Vader's arm)
Umm, buddy, I think Arnold told you to get lost.

DARTH VADER
(Looking at everyone)
Hmmmpph, very well.

(Turns away and leaves)

MICHAEL KEATON
(Quietly)
Loser.

PIKACHU
Pfffffsssstttt!

FADE OUT

* Michael Keaton was in "Multiplicity," Arnold Schwarzenegger was in "The Sixth Day," Hitler was in "The Boys of Brazil," and Pikachu was in "Pokemon, the First Movie: Mew vs MewTwo"

INTRODUCTION TO PHYLOGENETICS.

By Faride Unda
Images by Jen Philpot.

From the time of Charles Darwin, it has been the dream of many biologists to reconstruct the evolutionary history of all organisms on Earth and express it in the form of a phylogenetic tree. Phylogeny uses evolutionary distance, or evolutionary relationship, as a way of classifying organisms (taxonomy).

Phylogenetic relationship between organisms is given by the degree and kind of evolutionary distance. To understand this concept better, let us define taxonomy. Taxonomy is the science of naming, classifying and describing organisms. Taxonomists arrange the different organisms in taxa (groups). These are then further grouped together depending on biological similarities. This grouping of taxa reflects the degree of biological similarity.

Systematics takes taxonomy one step further by elucidating new methods and theories that can be used to classify species. This classification is based on similarity traits and possible mechanisms of evolution. In the 1950s, William Hennig, a German biologist, proposed that systematics should reflect the known evolutionary history of lineages, an approach he called phylogenetic systematics. Therefore, phylogenetic systematics is the field that deals with identifying and understanding the evolutionary relationships among many different kinds of organisms

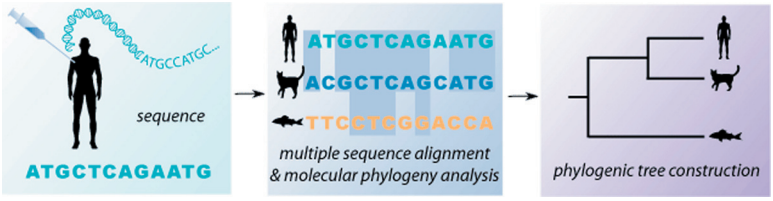
Phylogenic relationships have been traditionally studied based on morphological data. Scientists used to examine different traits or characteristics and tried to establish the degree of relatedness between organisms. Then scientists realized that not all shared characteristics are useful in studying relationships between organisms. This discovery led to a study of systematics called cladistics. Cladistics is the study of phylogenetic relationships based on shared, derived characteristics. There are two types of characteristics, primitive traits and derived traits, which are described below.

Primitive traits are characteristics of organisms that were present in the ancestor of the group that is under study. They do not indicate anything about the relationships of species within a group because they are inherited from the ancestor to all of the members of the group. Derived traits are characteristics of organisms that have evolved within the group under study. These characteristics were not present in the ancestor. They are useful because they can help explain why some species have common traits. The most likely explanation for the presence of a trait that was not present in the ancestor of the whole group is that it evolved from a more recent ancestor.

Two extensive groups of analyses exist to examine phylogenetic relationships: Phenetic methods

and cladistic methods. Phenetic methods, or numerical taxonomy, use various measures of overall similarity for the ranking of species. They can use any number or type of characters, but the data has to be converted into a numerical value. The organisms are compared to each other for all of the characters and then the similarities are calculated. After this, the organisms are clustered based on the similarities. These clusters are called phenograms. They do not necessarily reflect evolutionary relatedness. The cladistic method is based on the idea that members of a group share a common evolutionary history and are more closely related to members of the same group than to any other organisms. The shared derived characteristics are called synapomorphies.

The introduction of two important tools has dramatically improved the study of phylogenetics. The first tool is the development of computer algorithms capable of constructing phylogenetic trees. The second tool is the use of molecular sequence data for phylogenetic studies.



Phylogenetics can use both molecular and morphological data in order to classify organisms. Molecular methods are based on studies of gene sequences. The assumption of this methodology is that the similarities between genomes of organisms will help to develop an understanding of the taxonomic relationship among these species. Morphological methods use the phenotype as the base of phylogeny. These two methods are related since the genome strongly contributes to the phenotype of the organisms. In general, organisms with more similar genes are more closely related. The advantage of molecular methods is that it makes possible the study of genes without a morphological expression.

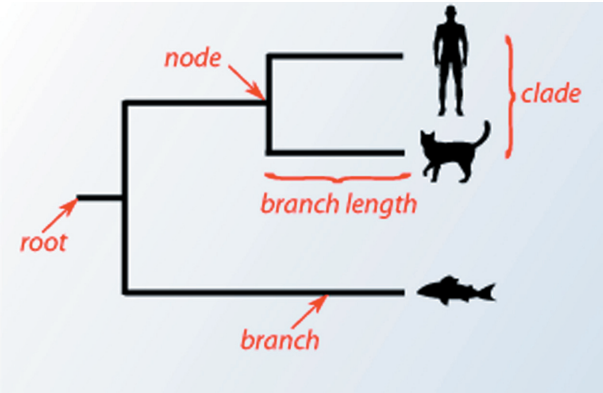
As previously mentioned, closely related species share a more recent common ancestor than distantly related species. The relationships between species can be represented by a phylogenetic tree. This is a graphical representation that has nodes and branches. The nodes represent taxonomic units. Branches reflect the relationships of these nodes in terms of descendants. The branch length usually indicates some form of evolutionary distance. The actual existing species called the operational taxonomic units (OTUs) are at the tip of the branches on the external nodes.

Tree construction methods

Some methods have been proposed for the construction of phylogenetic trees. They can be classified into two groups, the cladistic methods (maximum parsimony and maximum likelihood) and the phenetic method (distance matrix method).

Maximum parsimony trees imply that simple hypotheses are more preferable than complicated ones. This means that the construction of the tree using this method requires the smallest number of evolutionary changes in order to explain the phylogeny of the species under study. In the procedure, this method compares different parsimonious trees and chooses the tree that has the least number of evolutionary steps (substitutions of nucleotides in the context of DNA sequence).

Maximum likelihood This method evaluates the topologies of different trees and chooses the best based on a specified model. This model is based on the evolutionary process that can account for the conversion of one sequence into another. The parameter considered in the topology is the branch length.



Distance matrix is a phenetic approach preferred by many molecular biologists for DNA and protein work. This method estimates the mean number of changes (per site in sequence) in two taxa that have descended from a common ancestor. There is much information in the gene sequences that must be simplified in order to compare only two species at a time. The relevant measure is the number of differences in these two sequences, a measure that can be interpreted as the distance between the species in terms of relatedness.

Molecular phylogeny was first suggested in 1962 by Pauling and Zuckerkandl. They noted that the rates of amino acid substitution in animal hemoglobin were roughly constant over time. They described the molecules as documents of evolutionary history. The molecular method has many advantages. Genotypes can be read directly, organisms can be compared even if they are morphologically very different and this method does not depend on phenotype.

Phylogeny is currently used in many fields such as molecular biology, genetics, evolution, development, behaviour, epidemiology, ecology, systematics, conservation biology, and forensics. Biologists can infer hypotheses from the structure of phylogenetic trees and establish models of different events in evolutionary history. Phylogeny is an exceptional way to organize evolutionary information. Through these methods, scientists can analyse and elucidate different processes of life on Earth.

Today, biologists calculate that there are about 5 to 10 million species of organisms. Different lines of evidence, including gene sequencing, suggest that all organisms are genetically related and may descend from a common ancestor. This relationship can be represented by an evolutionary tree, like the Tree of Life. The Tree of Life is a project that is focused on understanding the origin of diversity among species using phylogeny.

References:

1) Whelan S., Lio P., Goldman N., (2001)Molecular phylogenetics: state-of-the-art methods for looking into the past Trends in Genetics, Volume 17, Issue 5, 1, Pages 262-272

2) Berger J. Introduction to Molecular Phylogeny Construction. BIOL 334.

3) Wen-Hsiung Li. Molecular Evolution. Sinauer Associates, 1997.

4) Pagel, M. (1999) Inferring historical patterns of biological evolution. Nature 401, 877–884

5) Zuckerlandl, E. and Pauling, L. (1962) Molecular disease, evolution, and genetic heterogeneity. In Horizons in Biochemistry (Kasha,M. and Pullman, B., eds), pp. 189–225, Academic Press 1921–1930

6) Felsenstein, J. (1981), Evolutionary trees from DNA sequences: a maximum likelihood approach, Journal of Molecular Evolution 17:368-376

7) Endo T., Ogishima S., Tanaka H. (2003) Standardized phylogenetic tree: a reference to discover functional evolution J Mol Evol; 57 Suppl 1:S174-81. Plant Species Biology

8) Murren C. (2002) Phenotypic integration in plants. Plant Species Biology. Volume 17 Issue 2-3 Page 89

9) Tree of life web project. What is phylogeny? http://tolweb.org/tree/phylogeny.html

10) National Center of Biotechnology Information. Systematics and Molecular Phylogenetics. http://www.ncbi.nlm.nih.gov/About/primer/phylo.html

11) Embley M. Molecular Systematics and evolution of microorganisms. http://www.dbbm.fiocruz.br/james/lecture1/index.htm

THE CRAIGSLIST EUTHANIST THEORY.

By Brian Sack

THEORY

A public job listing for an animal euthanist will go over poorly.

SCIENTIFIC STUDY

1:17 PM - The following is posted in the Jobs section of Craigslist:

Seeking Experienced Euthanist for Animal Facility

New Jersey animal science facility seeks an experienced Euthanist. You should be skilled in euthanizing not only standard test dogs and cats, but also horses, pigs, rabbits, monkeys and various rodentia, some birds. If you do not have this experience we will be willing to provide training to an individual with the right qualifications.

This is a full-time job with health benefits. You should be prepared to euthanize 50-250 animals per week, depending on current testing conditions. Please be prepared for this - our last three euthanists have been unable to perform to our standards.

Please send resume and salary requirements. Thank you.

1:45 PM - Email Received:

Greetings....
Could you please consider me for 'ANY' job on full time/part time/project basis.

I have been working as a data entry/bookeeping clerk and a website developer for over five years.

If I am not fit for the job posted by you then kindly consider me for any other opening.

My rates are:

$5.00/hour for contract job
$120/week for part time service and
$259/week for full time service (8 hrs)

I can only telecommute, as I am physically disabled and is located "FAR AWAY" from your place.

I am equipped with a Pentium IV PC and 24 hours net connection.

If you have a computer microphone then you can give me dictation to type.

2:02 PM - Someone posts the listing in the "Pets" forum.

"Did you SEE THIS???"

3:03 PM - Email Received

YOUR FAMILIES SHOULD BE EUTHANIZED!

You disgusting excuse for a human being.

3:10 PM - Someone posts the listing in the "Pets" forum.

"Attention all animal lovers..."

3:11 PM - Email Received

how horrific. please stop this animal testing. be kind.

3:19 PM - Email Received

what are the qualifications, ice water for blood?

3:26 PM – Email Received

This ad is very upsetting for any animal lovers. I would remove it if I were you. It makes me sick just thinking about it.

3:44 PM – Email Received

I am very interested in this job. I have many years of experience as a med tech taking blood from humans in a human hospital and am sure that I can perform the necessary work needed to facilitate your research regarding the proper humane discard of animals.

5:00 PM – Email Received

Good Afternoon

I just came across your ad on Criagslist seeking an experienced euthanist for animals for your company. I am experienced in working in an animal hospital where I assisted in euthanasia procedures on a constant level. I was employed there for over 2 years. I enjoyed my work immensely and wish to return to this line of work. Many may call me morbid for enjoying euthanasia procedures, but I explain it like this. An animal in pain or suffering should be given the mercy of peace by euthanasia. I would truly like to be considered for this position and would like very much to be trained to properly perform up to your company's standards.

5:29 PM – Email Received

You're disgusting and you should be ashamed of yourselves

5:38 PM – Post "flagged and removed" by users of Craigslist.

RESULTS OF STUDY

Lifespan of job posting: 4 hours 21 minutes

Summary: There is sufficient reason to believe that job listings for Animal Euthanists are not popular, and most likely will not be productive.

However, even a nauseating job listing will attract some interest from Indian guys offering to work for $5 an hour or job-seeking Sodium Penobarbitol enthusiasts.

Furthermore, it is apparent that the Craigslist community is somewhat censorious, and will vote to remove a job listing for a job they do not agree with, even though it may be a legitimate listing.

ELSEWHERE AND OVERHEARD.

By Caitlin Dowling

Overheard

"At the beginning we thought it was a big fish, but then we spotted hair on the head of the monster and his fins looked pretty strange, the front part of his body was equipped with arms."
Gafar Gasanof, the captain of the Baku, an Azeri trawler who claims to have seen an amphibious humanoid Merman in the Caspian Sea. (ananova.com)

"It was for sale on a table next to some vegetables, and I knew immediately it was something I had never seen before."
Conservation biologist Robert Timmins on the Rock rat, a species of rodent totally new to science, being sold as an Asian snack (New Scientist)

"We know there are people who are walking time bombs."
Dr. Michael Lauer, on findings in the New England Journal of Medicine that suggest that people with slow heartbeats during exercise and fast heartbeats at rest are more likely to drop dead of a heart attack. (Globe and Mail)

"As far as we know, this is the oldest shoe ever found in the United Kingdom."
Stephen Reed, who led the team from Exeter Archaeology and found a 2,000-year-old shoe in a hollow tree. (Globe and Mail)

Elsewhere

To some kinds of fish, size really does matter (The Globe and Mail)
http://www.theglobeandmail.com/servlet/story/RTGAM.20050510.wsize0510/BNStory/specialScienceandHealth/

The waggle dance of the bee (BBC News)
http://news.bbc.co.uk/1/hi/sci/tech/4536127.stm

Scientists find the world's fastest growing plant (Guardian.co.uk)
http://www.guardian.co.uk/life/science/story/0,12996,1481965,00.html

Creepy... Self-replicating robots (science a-go-go)
http://www.scienceagogo.com/news/20050413011737data_trunc_sys.shtml

PICK A NUMBER BETWEEN ZERO AND INFINITY...

By David J. Chalmers

From: dave@cogsci.indiana.edu (David Chalmers)
Newsgroups: sci.math,sci.math.num-analysis
Subject: Re: call for votes: most & least boring numbers
Date: 17 Jan 90 20:40:02 GMT

In article <18311.25b44848@merrimack.edu> ain14924@merrimack.edu writes:

"Reminds me of a friend of mine who claims that the number 17 is "the most random" number. His proof ran as follows: pick a number. It's not really as good a random number as 17, is it? (Invariable Answer: "Umm, well, no...")"

This reminds me of a little experiment I did a couple of years ago. I stood on a busy street-corner in Oxford, and asked passers-by to "name a random number between zero and infinity." I was wondering what this "random" distribution would look like.

The results: (most common numbers first, out of about 150 responses in all):

* 3 (11 people)
* 7 (9 people)
* 5 (8 people)
* 12 (6 people)
* 1, 4, 10, 77 (5 people each)
* 2, 47, infinity-1 (4 people each)
* 15, 17, 20, 27 (3 people each)
* 18, 23, 26, 30, 42, 99 (2 people each)
* 6, 13, 14, 19, 21, 22, 25, thirteen more 2-digit numbers, twenty 3-digit numbers, twelve 4-digit numbers, one 5-digit number, one 6-digit number, four 7-digit numbers, one 8-digit number, one non-integer (328.39), one huge number (9.265.10^10^10). (1 person each)

Of course a uniform distribution is a priori impossible so I couldn't have expected that :-). Even a logarithmic distribution is impossible (it has infinite integral). Interestingly enough, this distribution, taken coarsely, was quite close to logarithmic up to 1000 or so. There were roughly the same number of 2-digit responses as 1-digit responses, and a few less 3-digit reponses. Then things fell off sharply, however.

Other interesting features:

* 17 wasn't quite as "random" as might have been predicted.
* Extreme frequency of the digit "7" all round.
* Especially notable are the good performances of 77 and 47.
* Poor performance of digit "8", also "6" and "9".
* Both "very prime" (e.g. 17) and "very composite" (e.g. 12) numbers did well.

Then I could tell you about the "random word" experiment I did on Sydney harbour...perhaps another time.

NEW (THIS TIME AROUND) CONTRIBUTORS

David Chalmers is Director of the Centre for Consciousness at the Australian National University, is author of "The Conscious Mind: In Search of a Fundamental Theory", and is occasionally conscious. His piece was first published on the newsgroup sci.math in 1990, and can be found on his website (http://consc.net/)

Richard Harter is an eclectic auto-didact, a man of letters and software. By turns a mathematician, a software maven, and an entrepeneur, he has retired to the wilds where he tends his garden and his web site. He has a keen interest in science, the philosophy of science, and science fiction, and professes to have the wit not to confuse the three.

Brian Sack had a subscription to Astronomy Magazine once so he knows the magnitude of several stars. He has written humor for Radar, London daily The Independent, Glamour and McSweeney's. He attended Marine Corps Military Academy one summer and had cow poo flung at him as he crawled under barbed wire. Everyone that knows him is glad he stopped flying planes. He drinks like a racehorse and pees like a fish. He is a voiceover and actor, and performs on stages in New York on streets other than Broadway. He recently appeared as "Paul Reddy" on the John Mayer Heavier Things DualDisc. In his spare time he is raised by his hot wife and cool son. He edits the humor site www.banterist.com

Linda Tran graduated from McMaster University with a BSc. Then, grew a brain and decided to move to Vancouver to pursue graduate studies in Pharmaceutical Sciences. She would appreciate it if someone would create a cure for being a "lactard" - her own word for being lactose intolerant.

Faride Unda is a graduate student at the Plant Science Department at UBC; where she is figuring out a way to enhance disease resistance of an ornamental plant. Coming from the middle of the world, Ecuador, she still misses warm weather and latin dancing parties. Now she enjoys Vancouver's outdoor lifestyle with her little daughter.