Noesis

The Journal of the Mega Society
Number 75
November 1992

EDITORIAL
Rick Rosner
5139 Balboa Blvd #303
Encino CA 91316-3430
(818) 986-9177

After several months of being caught up, I've fallen down again. Though I have many convincing excuses, the main reason is petulance at my laziness and lack of responsibility which drives me into a deeper shiftless funk.

Kevin Langdon phoned me about his test, the LIGHT, which we reprinted in the October issue. He says that the small scale at which we printed it makes it hard to solve some of the problems. Also, he plans on publishing a new edition which may refine or eliminate some of the current questions. Troublesome problems might include 8, 10, 13, 20, 22, 26, 27, 28, 30, 34, 37, 38. He'll let us print his new edition, but only in a larger size.

A bunch of good stuff has accumulated in the last couple of months. Leading off is:

LOTS OF E-MAIL
by Dean Inada, M.C. Price, Chris Cole, et al

Date: Mon, 7 Sep 92 02:15:02 -0700 From: dmi@peregrine.COM (Dean Inada)
To: chris Subject: Re: Newcomb's Daemon & Super-Rationalism Cc: price@peregrine

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: dmi@peregrine.peregrine.com (Dean Inada) Date: Wed, 27 May 92 9:53:59 PDT Cc: price
In-Reply-To: <9205270323.AA24480@peregrine.COM>; from "Dean Inada" at May 26, 92 8:23 pm

> I think you cannot change the past; you can only change the future.
> You can only choose among futures which have non-zero amplitude.
> And you can only choose among pasts which have non-zero amplitude.

You are using "choose" in a funny sense -- which leads me to suspect you want to talk about determinism versus free will. I am happy to talk about that, which I feel is basically a semantic problem, but I think it is off the subject of correlation versus causation. Cause-and-effect makes little sense if you look on the universe as a giant wave function evolving in time; this is because everything causes everything else. This is kind of a mystical view. Fortunately, the universe appears to be governed by local laws, so it is

separable into objects, events, etc. Then it makes sense to say that one event caused another, in the sense that if the universe did not contain the prior event, it would not contain the subsequent event.

This dependence of causality on locality has the consequence that as time goes on, the effects of a given cause are hard to determine. Everything gets tangled. Then we can only speak of correlations.

> But any asymmetries in how often erasure occurs in +t vs. -t seems to be
> largely artifacts of the boundary conditions of your setup)

I agree that the apparent asymmetry between +t and -t is possibly an effect of boundary conditions.

How the underlying time-symmetric laws of physics lead to the asymmetrical cause-and-effect relationship has been discussed often. Hawking talks about it and gives four explanations. I think the "real" answer is unknown at this time.

Remember that I admit that I have no evidence for causality.

> What does a "change" to the future mean anyway, if not an ex-nihilo cause?
> And why must an ex-nihilo event imply the ability to change the past?
> or inability to change the future?

If you don't know what it means to change the future, I don't know how to explain it to you. I certainly don't believe in ex-nihilo anything, so I am not proposing them.

> If you can understand the laws by which a non-local causailty operated,
> why couldn't you take that into account in your decisions?

How would I determine which piece of the universe to look at? Of course, if the non-local causality was approximately local in some way (like limited in distance, or something), that might help.

One could argue that it's just my tough luck if I can't decide what to do given the non-local laws of nature. This sounds right, but I am worried that causality somehow implies locality, and that evidence somehow implies causality. In other words, I am concerned that although we can think about non-local theories, they are impossible to verify. They are akin to metaphysics.

> One can do no better than to choose to do what seems less likely
> to be a mortal sin, (and it would be a less than ideal plan which
> depended criticaly on my exercising abilities which I lack)

This assumes you have a basis for assigning likelihood. Without evidence, this is impossible. Christian existentialists figured out that a being with infinite capacities is hard to gather evidence about.

Date: Wed, 27 May 92 15:20:01 -0700 From: dmi (Dean Inada)

To: chris, dmi@peregrine.peregrine.com Subject: Re: blind watchmaker Cc: price

> > I think you cannot change the past; you can only change the future.
> > You can only choose among futures which have non-zero amplitude.
> > And you can only choose among pasts which have non-zero amplitude.
>
> You are using "choose" in a funny sense -- which leads me to suspect you
Well, I didn't know how you were using "change".
> want to talk about determinism versus free will. I am happy to talk about
> that, which I feel is basically a semantic problem, but I think it is off the
Indeed, I don't know you mean by "free will".
But if you wish to talk about it, I would probably try to see if your
statements about it in +t could also apply to -t.
> subject of correlation versus causation. Cause-and-effect makes little sense
> if you look on the universe as a giant wave function evolving in time; this is
> because everything causes everything else. This is kind of a mystical view.
> Fortunately, the universe appears to be governed by local laws, so it is
> separable into objects, events, etc. Then it makes sense to say that
> one event caused another, in the sense that if the universe did not
> contain the prior event, it would not contain the subsequent event.
Which is not strictly true, since there can be more that one prior event
which could lead to the same subsequent event, but as far as it goes,
can't it also be said that if the universe did not contain the
subsequent event, it would not contain the prior event?

> > But any asymmetries in how often erasure occurs in +t vs. -t seems to be
> > largely artifacts of the boundary conditions of your setup)
> I agree that the apparent asymmetry between +t and -t is possibly an
> effect of boundary conditions.
Perhaps a major (local) asymmetry in boundary conditions is the difference
between conditions at about - 10^10 years and + 10^10 years from now.
I might imagine that if you could set up an experiment arranging the + 10^10
boundary condititions to be like our - 10^10 boundary conditions,
you might see very similar things with just a sign change.
>
> How the underlying time-symmetric laws of physics lead to the
> asymmetrical cause-and-effect relationship has been discussed often.
It seems to be basicly a greater number of possible futures than pasts.
And the past seems to be highly anomolous in being much more highly
contstrained than one might usualy expect on average.
>
> > If you can understand the laws by which a non-local causailty operated,
> > why couldn't you take that into account in your decisions?
>
> How would I determine which piece of the universe to look at? Of
> course, if the non-local causality was approximately local in some way
> (like limited in distance, or something), that might help.
Even with locality, your backward light cone is already too big
to look at everything. And events outside your light-cone can still
influence events in your future light cone, so I don't see how
locality solves this problem eiher. In practice, we deal with
approximations to reality, and seem to get by.

> One could argue that it's just my tough luck if I can't decide what to

> do given the non-local laws of nature. This sounds right, but I am
> worried that causality somehow implies locality, and that evidence
> somehow implies causality. In other words, I am concerned that although
> we can think about non-local theories, they are impossible to verify.
> They are akin to metaphysics.
I haven't heard any convincing non-local theories either, but we
can certainly look for tachyons in particle chambers, or try to send
messages via wave function colapse, or send clocks around spinning
black holes or whatever.
And I think there are a number of (perhaps inelegant) ways in which
to have non-locality while preserving causality.

> This assumes you have a basis for assigning likelihood. Without
> evidence, this is impossible. Christian existentialists figured out
> that a being with infinite capacities is hard to gather evidence about.
A potentialy infinite universe can be hard to gather evidence about too.
(especialy without the possibility of direct interrogation :-)
but we muddle along anyway, and live with the possibility of error.

I don't know which of uncertainty or non-locality, or acausailty
I should accept, but it seems like Bells inequality implies one of them.
If you want to reject each of them, are you also rejecting Bells inequality?
Or the experiments which appear to confirm it?

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: dmi (Dean Inada) Date: Wed, 27 May 92 23:34:24 PDT Cc: price
In-Reply-To: <9205272220.AA10978@peregrine.COM>; from "Dean Inada" at May 27, 92 3:20
...
> > How the underlying time-symmetric laws of physics lead to the
> > asymmetrical cause-and-effect relationship has been discussed often.
> It seems to be basicly a greater number of possible futures than pasts.
> And the past seems to be highly anomolous in being much more highly
> contstrained than one might usualy expect on average.

Agreed, there is something fundamental we do not understand yet.

> Even with locality, your backward light cone is already too big
> to look at everything. And events outside your light-cone can still
> influence events in your future light cone, so I don't see how
> locality solves this problem eiher. In practice, we deal with
> approximations to reality, and seem to get by.

OK, but its a lot easier to approximate with local causality than without;
it might even be infeasible without local causality to approximate.

> can certainly look for tachyons in particle chambers, or try to send
> messages via wave function colapse, or send clocks around spinning
> black holes or whatever.
> And I think there are a number of (perhaps inelegant) ways in which
> to have non-locality while preserving causality.

I'm not so sure. Since you brought it up, let's talk about another
spooky thing: time travel. I think the arguments are analogous, but I

haven't thought it out in the case of non-local theories.

We know that time travel leads to kill-your-grandfather causality paradoxes. Now, people have proposed models of the universe that solved the equations of general relativity that seemed to include time travel. Godel was the first; Guth recently. As far as I am aware, all such theories have been shot down on closer examination. They either required more time or more mass than the universe has. Kip Thorne has stated that the universe protects itself against time travel. As you might imagine, this teleological bias drives me crazy ... but anyway, the point is that you can't have a solution that has a causality paradox. Why? Because you believe in causality more than you believe in the theory. If the theory allows causality paradoxes, then the theory must be wrong. Is this a violation of scientific objectivity? No, because science itself assumes causality. If there is no causality, there is no evidence; if no evidence, no science. Therefore, I can have unshakeable faith in causality -- I'm sure no one will ever prove me wrong!

Now, take non-local theories (like signalling with wave function collapse, or whatever). Since there is no limit to how far apart the two decay products could be, this implies that we can cause instantaneous state changes over unlimited distances. Therefore, it is impossible for me to predict the value of my local state function one second from now without knowing everything that is going on in the universe. This effectively destroys causality. Thus, I simply reject non-local theories as too awful to contemplate.

You might say -- wait a minute! You can't reject a theory like that. But suppose a theory allows for logical contradictions. Surely we all agree that such a theory is not possible. It's not even really a theory, since it makes no definite predictions. Well, neither does the non-local theory (or the time travel theory). The universe simply can't work that way.

> I don't know which of uncertainty or non-locality, or acausailty
> I should accept, but it seems like Bells inequality implies one of them.
> If you want to reject each of them, are you also rejecting Bells inequality?
> Or the experiments which appear to confirm it?

My position is that we don't understand enough about what time is to answer questions like this yet. Sure, if you put a gun to my head and forced me to choose between locality, causality or determinism, I would reluctantly throw out determinism. I can live with local, causal non-determinism because I can plan my life to avoid the uncertainties. And I agree that Bell's Theorem makes it look pretty bleak for determinism (although of course this is really built in to the assumptions of quantum mechanics -- the whole idea of representing particles with field theory). But then particles were an absurd idea anyway, so maybe determinism is just a chimera. At any rate, I don't have a gun to my head, so I can maintain a comfortable agnosticism.

Hopefully, there'll be time to sort things out.

Date: 28 May 92 02:39:33 EDT From: Michael Clive Price <100034.3077@CompuServe.COM>
To: Dean Inada <dmi@Peregrine.com>, Chris Cole <chris@peregrine.COM> Subject: Re: Various

>> My third effort for the half-planar woods is 6.458912.. miles.
4th effort: 1 + 7pi/6 + sqrt(3) = 6.39724.. (3rd effort = jebat natyr)

> I think you cannot change the past; you can only change the future.
Past(s) and future(s) are both immutable according to Newton, Maxwell, Einstein and Everett, since all have time-symmetric deterministic equations. I would rather say that the distinction between past and future is that we remember the past but 'cause' the future, the arrow of time being a consequence of the increase of entropy / boundary conditions. (see later)

> Actually, Dean and I will be at the Artificial Life conference in
> Santa Fe in two weeks...
Sounds quite interesting, I look forward to the report.

> I assume you are interested in the contract idea. Correct?
Yup.

> You don't like that nature uses amplitudes instead of probabilities?
The probability of an event must be the sum of the probabilities of the alternative sub-events. Since squares of 'alternative' amplitudes don't add they can't be alternatives. eg the electron doesn't choose between which slits to pass through - it passes through both (according to many worlds).

> My position is this: don't form metaphysics based on known incomplete
> physics. We know that the Standard Model (U(1)xS(2)xS(3)) does not
> include enough particles to be correct. We know that GUT (SU(5)) has
> similar problems.
I agree, we know that U(1)xSU(2)xSU(3) must be embedded in some more complex group and that this is not SU(5). But this is no different from the state of physics at previous times, where physicists continually refine their equations/models. BUT for each set of incomplete physics in the past there has been a corresponding set of metaphysics that provides a model - in fact we often identify the two because the models are so compelling
eg
Newton = point particles + action-at-a-distance
Maxwell = fields, ether and point particles
Einstein = curved space-time/geometrodynamics
Each theory of nature supplied its own interpretation. It would be a mistake to suppose that superstrings, Kaluza-Klein or whatever are going to rescue physics from the metaphysical hole it has fallen down. All the mainstream directions at the edges of physics (superstrings, Kaluza-Klein or whatever) are WITHIN the framework of quantum field theory. It is very noticable how out-on-a-limb most attempts to resolve the paradoxes of QM are.

The Everett model is the natural (= coherent) interpretation of quantum theory. Advances in physics are not going to invalidate Everett, but

rather refine and extend his many-worlds picture of the universe. Just as the Newtonian billard-ball model is still useful in many mechanical analyses or Maxwell's equations are still used in waveguide theory.

> It is therefore sensible to talk about quantum gravity involving
> quantizing geometry (i.e., space-time). This is all I mean about
> granularity at the Planck scale..... it is possible that all of
> physics is geometry.
Agreed. Superstrings look like a good candidate for quantum geometrodynamics.

> So, what is my position? ... I don't have to choose between
> Copenhagen, Everett, hidden variable, etc.
Except that with cryonics and many-worlds you are certain of revival;
Objectively:
Those worlds in which have you suffer 'meltdown' (eg thermonuclear holocaust or economic collapse) you simply don't wake up in. Those worlds which develop UIMs and prosperity you are revived in.
Subjectively:
You experience revival.
Moral:
Many-worlds is not entirely some metaphysical irrelevance to life.

> How the underlying time-symmetric laws of physics lead to the
> asymmetrical cause-and-effect relationship has been discussed often.
> Hawking talks about it and gives four explanations. I think the
> "real" answer is unknown at this time.
I think people make too much work of the matter. Cause-and-effect equals the flow of time, comes from the slide of universe from a low entropy state to a higher entropy state, comes from inflation just after the Big Bang. Inflation explains the flatness of the universe, its huge size and age etc. Where's the mystery?

> You are using "choose" in a funny sense -- which leads me to suspect
> you want to talk about determinism versus free will. I am happy to
> talk about that, which I feel is basically a semantic problem,
Agreed
> but I think it is off the subject of correlation versus causation.
> Cause-and-effect makes little sense if you look on the universe as
> a giant wave function evolving in time; this is because everything
> causes everything else. This is kind of a mystical view.
???? Surely not. Since the QM is locally deterministic it's mystical (= illogical) to believe in anything else?

> Fortunately, the universe appears to be governed by local laws, so it
> is separable into objects, events, etc.
Agreed. Very handy. And a consequence of the speed of light, which forbids non-locality.

Date: 11 Jun 92 18:05:00 EDT From: Michael Clive Price <100034.3077@CompuServe.COM>
To: Dean Inada <dmi@Peregrine.com>, Chris Cole <chris@peregrine.COM>
Subject: Re: micro-symmetry ==> macro-asymmetry

>> BTW, Dean, you still haven't answered my question about

>> what you believe/don't believe QM means.
> I believe I am happy with the many worlds interpretation.
> Or is this a deeper question about belief?
No, just curious. Many-worldists are a fairly rare breed, although I understand that it's the most popular interpretation amongst quantum gravitists (according to a straw poll at an Oxford QG symposium a few years back).

> I'm not sure what my subjective impression of having
> my corpsicle revived by the flip of Shrodinger's cat would be,
> But then, I also get confused about what it would be like
> to download myself into a bunch of classical robots and then
> to kill half of us.
Yeah, I worry about that as well.

>> The Everett interpretation is able to explain Bell's theorem,
>> but within a local and deterministic model. Bell never
> Is that our old or new sense of the word deterministic?
Both, since Everett has past <==> future, like classical mechanics. Or perhaps I should say, past(s) <==> future(s)

>> >From the definitions and detailed balancing it follows that
>> (proof on request):
>> $S^{n+1} \geq S^n$ (2nd Law of Thermodynamics)
> Yes, I'd like to see the proof,
> There's usualy a boundary condition introduced somewhere
> at this point.
Okay, what follows is Everett's general proof. For some reason it seems easier to prove it for the more general case where detailed balancing doesn't hold and then specialise it to where detailed balancing (read: unitarity) does hold. Everett also covered the continuous case, but, since I can't draw integral signs very easily, I shan't. Can't improve on the elegance of the original, so here it is from Everett's "Theory of the Universal Wave Function" doctoral thesis: a couple of lemmas followed by the 2nd Law.
---------- Lemmas 1 & 2 ----------
Appendix I,
#2. Convex function inequalities

LEMMA 1. $\sum_i P_i = 1, P_i \geq 0, x_i \geq 0 \Rightarrow \sum_i P_i x_i \ln(\sum_i P_i x_i) \leq \sum_i P_i x_i \ln(x_i)$

This property is usually taken as the definition of a convex function, but follows from the fact that the second derivative of x ln x is positive for all positive x, which is the elementary notion of convexity. There is an immediate corollary for the continuous case: [continuous proof deleted]

We can now derive a more general and very useful inequality from Lemma 1:

LEMMA 2. $a_i \geq 0, x_i \geq 0 \Rightarrow \sum_i x_i \ln(\frac{\sum x_i}{\sum_i a_i}) \leq \sum_i x_i \ln(\frac{x_i}{a_i})$

We also mention the analogous result for the continuous case: [continuous proof deleted]

---------- 2nd Law ----------

Appendix I,
#4 Montone decrease of information for stochastic processes

We consider a sequence of transition-probability matrices,

$$0 \leq T^n_{i,j} \leq 1, \sum_{i,j,n} T^n_{i,j} = 1$$

and a sequence of measures a >= 0 having the property that

$$a^{n+1}_j = \sum_i T^n_{i,j}$$

[as far as I can see the "a" measure is just an arbitrarily chosen set of numbers that we can dispense with in the unitarity-true case - but we need them to generate an entropy-like thing in the more speculative case where unitarity is not true]

We further suppose that we have a sequence of probability distributions

$$P^n_i, P^{n+1}_j = \sum_i T^n_{i,j} P^n_i$$

For each of these probability distributions the relative information

I^n (relative to the a^n measure) is defined

$I^n = \sum_i P^n_i \ln(\frac{P^n_i}{a^n_i})$ [generalised entropy, $S^n = -k I^n$]

under these circumstances we have the following theorem:

THEOREM. $I^{n+1} \leq I^n$ [i.e., $S^{n+1} \geq S^n$]

Proof: Simply substitute the two lemmae above into the equation.

---------- end of excerpt ----------

We can recover the Shannon definition of entropy

$$S^n = -k I^n = -k \sum_i P^n_i \ln(P^n_i)$$

in the doubly-stochastic case (= unitarity = CPT invarinace) by chosing the unit relative measure, a = 1, which is a stationary measure, we can remove a from all the above formulae and get:

$I^{n+1} \leq I^n$ [i.e., $S^{n+1} \geq S^n$]===> 2nd Law of Thermodynamics

By basing the proof of the 2nd Law on the informational definition of entropy (from which it is quite easy to recover S = k ln W and dE = Tds + dW) the proof of the 2nd Law becomes insensitive to the fine details of physics, dependent only on unitarity. Thus:

unitarity ==> entropy ==> arrow of time

Hence the arrow of time always points away from entropy minima towards maxima. The fact that we live in a reversible universe and have an arrow of time tells me that the past has lower entropy than the future. Is this the boundary condition you were looking for Dean?

Too tired to think straight. Sorry if the proof is a little opaque and messy (duplicated indices and all that). It blew my mind when I first encountered it. Speak to you both later.

MCP

From: chris (Chris Cole) Subject: Re: The Tangled Web
To: price Date: Sat, 9 May 92 10:38:33 PDT Cc: dmi (Dean Inada)

Date: 21 May 92 17:16:43 EDT From: Michael Clive Price <100034.3077@CompuServe.COM>
To: Chris Cole <chris@peregrine.COM>, Dean Inada <dmi@Peregrine.com>
Subject: Re: blind watchmaker

>> Also, Penrose's nonsense notwithstanding, I understand there does
>> exist a thought experiment in which an Everett turing machine might
>> be able to beat any Classical or Copenhagen turing machine through
>> quantum parallelism.
> I would like a reference to this.

Try

"Quantum theory, the Church-Turing principle and the universal quantum computer", by David Deutsch, Proceedings of the Royal Society London. A 400, 97-117(1985).

But...
Unfortunately the "Everett turing machine" can't beat the the others in any real-world situation. Deutsch shows that a quantum computer fails sufficiently often so that the average time taken to perform any calculation using quantum parallelism must exceed the conventional "Copenhagen" or serial computation. His proof neglects to cover the case of the reversible quantum computer which dosen't suffer from this defect. But in any case the types of problems amenable to cracking (by any form of quantum computer) are too restricted to be useful in most "real-world" situations.

I had an e-mail dialogue with Deustch about this, which I can forward onto you if you're interested.

> The idea that quantum effects are truly random (versus
> computationally random) has not been proven, yes?

Insofar as any physical theory can be proved quantum theory has passed the tests with flying colours. Everett, by completing the philosophical basis of QM (i.e. removing the vitalistic element of observer-triggered wavefunction collapse), showed that whilst QM was an objectively deterministic theory it was subjectively random. So I would say that quantum effects are truly subjectively random, even if objectively deterministic.

BTW I know that Feynman regarded his sum over histories approach as side stepping the wavefunction collapse problem, which he described as a fiction. This approach requires non-additive probabilities, which I regard as mathematically impossible. Given a choice of the physically implausible (many-worlds) or the mathematically impossible I have to choose the former. Do you know what Feynman thought of many-worlds?

-MCP

PS the easy answer I saw to the half-planar woods was the 1+2pi solution. I shall carry on looking for a harder solution.

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: elroy!ames!mimsy!uunet!compuserve!100034.3077 (Michael Clive Price)
Date: Fri, 22 May 92 15:51:29 PDT Cc: dmi (Dean Inada)

Thanks, I'll get this paper. By the way, Dean, you never did respond to my question about the origin of your claim that local causality is known to be wrong.

> I had an e-mail dialogue with Deustch about this, which I can forward
> onto you if you're interested.

If it's not too much trouble, I would be very interested in this.

> Insofar as any physical theory can be proved quantum theory has passed the
> tests with flying colours. Everett, by completing the philosophical basis
> of QM (i.e. removing the vitalistic element of observer-triggered
> wavefunction collapse), showed that whilst QM was an objectively
> deterministic theory it was subjectively random. So I would say that
> quantum effects are truly subjectively random, even if objectively
> deterministic.

Two objections:
1. Everett might be wrong. I am still perturbed by Bohr's comment that QM in 4 dimensions is like C(lassical)M in five. What is spin, anyway?
2. Quantum random STILL could be the same as computational random, via something like CTMU, Fredkin, etc.

> BTW I know that Feynman regarded his sum over histories approach as side
> stepping the wavefunction collapse problem, which he described as a
> fiction. This approach requires non-additive probabilities, which I

> regard as mathematically impossible. Given a choice of the physically
> implausible (many-worlds) or the mathematically impossible I have to
> choose the former. Do you know what Feynman thought of many-worlds?

You are going way too fast for me here. Why is many-worlds any different
from many-histories (a term Gell-Mann prefers -- and I agree)?

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: dmi@peregrine.peregrine.com (Dean Inada) Date: Fri, 22 May 92 15:55:25 PDT Cc: price

> PS the easy answer I saw to the half-planar woods was the 1+2pi solution.
> I shall carry on looking for a harder solution.
> Hmm, it seems that the 1+2pi answer is just so attractive that
> one tends not to think of looking for improvements.

Yes, that of course is what makes it a good problem.

> (Might 1+2pi be the solution to the question of minimizing the
> expected value of the path to the road? That may be another
> possible variant of the puzzle)

Are you saying it might be, or that you think it is, and if so, why?

Re: half-planar woods
Aha! Down to 2+pi3/2 now.
And $f(x) = (1/(1+i) + ix)^{2\ 1/2}$

Right, now for the hypercubes...

PS I'll send the stuff about Deutsch a bit later.

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: dmi (Dean Inada) Date: Sat, 23 May 92 0:58:52 PDT Cc: price

> Is that what you asked, I must have misunderstood.
> Anyway, doesn't the Bell inequality show that the predictions of any
> local hidden-variables theory were inconsistent with those of QM.
> (although there may still be some loopholes in the experiments to confirm it,
> for example, the particles could still have "conspired" before
> hand with the measuring aparatus, and, knowing on which axis their
> spin was going to be measured, adjusted their correlations accordingly)

Don't you think it's a bit much to claim that just because wave
functions collapse, local causality is out the window? Isn't it more
likely that wave function collapse does not correspond to a physical
process. This, I gather, is what Everett is getting at. I am not sure
though. At any rate, like Hume, I am much more attracted to the idea
that wave function collapse is non-physical than that local causality is
violated.

> 1. Everett might be wrong. I am still perturbed by Bohr's comment that
> Which is what makes the possibility of an experimental test to interesting.
> QM in 4 dimensions is like C(lassical)M in five. What is spin, anyway?
> What is this? Anything like the Kaluza-Klein unified field theorys?

This is an obscure statement by Bohr that I am still trying to understand and track down. It may be related to Kaluza-Klein, but I am not sure.

> 2. Quantum random STILL could be the same as computational random, via
> something like CTMU, Fredkin, etc.
> Wouldn't this be a Hidden Variable theory?

I don't think so. If the universe is a computer -- a cellular automaton with finitely many cells -- then computational randomness IS physical randomness, and the mathematical ideal of computational randomness can never be purely attained, but only more or less approximated. This is what most physicists envision the ultimate merger of quantum mechanics and gravitation (i.e., geometry) will yield. They might be wrong, of course.

> You are going way too fast for me here. Why is many-worlds any different
> from many-histories (a term Gell-Mann prefers -- and I agree)?
> Is it different? I thought they were two names for same treatment,
> and that both were synonymous with Everett's interpretation.

I think that too. But Mike threw me for a loop here. What is this about non-additive probabilities?

Date: 24 May 92 18:58:25 EDT From: Michael Clive Price <100034.3077@CompuServe.COM>
To: Chris Cole <chris@peregrine.COM>, Dean Inada <dmi@Peregrine.com> Subject: Various

Re: Noetic problems
My third effort for the half-planar woods is 6.458912.. miles. Definitely a VERY good problem!

Re: quantum gravity and granularity of space
>> What is it that physicists think quantum gravity will yield?
> My sense is that "they" (and I include myself in this group) expect
> to find that there are finitely many cells of the Planck length...
I have never seen any evidence for space being granular (if that's what you referring to). Even if space-time becomes frothy on the Planck scale (which I think it will) that's not the same as granular. But perhaps you use the word in a different sense....

Re: many-histories versus many-worlds
>> You are going way too fast for me here. Why is many-worlds any
>> different from many-histories (a term Gell-Mann prefers -- and
>> I agree)?
> Is it different? I thought they were two names for same treatment,
> and that both were synonymous with Everett's interpretation.

I guess we'll have to ask Gell-mann that. I know that Gell-Mann doesn't believe in many-futures, which is a consequence on many-worlds. But he hasn't published his own many-histories variant (as far as I know), so we don't know what he means by this.

To me it looks like:

Everett => many-worlds => many-histories and many-futures.

Gell-Mann seems to be trying to separate the unseparable.

> What is this about non-additive probabilities?

In Feynman's sum-over-histories approach objects are treated as classical point entities that take all possible paths. Final states are regarded as being the sum of all intermediate states. But the probability of a final state is not the sum of the probabilities of the intermediate states. (I know this is elementary to us, but I want to explain my terminology). If probability is defined via relative frequencies of events then this is simply not logically possible.

In the Everett many-worlds approach the fundamental objects of existence are not point particles but the wave function itself. The wave function, instead of just mathematically modelling reality, is treated as *being* physically real, and therefore does not collapse. In the double slit experiment the electron is not viewed as going through one slit or the other, in particle fashion. Instead the wave function passes through *both* slits and the paradox of non-additive probabilities is removed.

> 1. Everett might be wrong.

The Everett approach has the merit of being determinstic, locally causal and treats observers in a reductionist fashion. Subjective probability emerges from the formalism of the theory, rather than being built into the axioms.

No one has constructed a relativistic hidden-variables theory. Non-relativistic hidden variable theories are all either non-causal or non-local. They are wishful pie-in-the-sky attempts to deny the admittedly unsettling consquences of quantum theory. Copenhagenism is not a scientific theory since it treats observers in a non-reductionistic fashion, having to invoke them to collapse wavefunctions. Is a frog an observer? Or an ant?

I believe that it's a straight choice between Everett and Hidden Variables. It's always possible that a more refined theory (hidden variables) will replace quantum theory. But many-worlds is such a fundamental aspect of quantum theory that I'm sure it will be present in whatever theory supersedes it. Just as planets still follow Keplerian ellipses although classical physics is only an approximation.

MCP

From: chris (Chris Cole) Subject: Re: Various

To: elroy!ames!mimsy!uunet!compuserve!100034.3077 (Michael Clive Price)
Date: Tue, 26 May 92 17:49:42 PDT Cc: dmi (Dean Inada)

> as being the sum of all intermediate states. But the probability of a
> final state is not the sum of the probabilities of the intermediate
> states. (I know this is elementary to us, but I want to explain my
> terminology). If probability is defined via relative frequencies of
> events then this is simply not logically possible.

Well, the sum of the AMPLITUDE of the final state is the sum of the AMPLITUDES of the intermediate states. Is this what you are objecting to? You don't like that nature uses amplitudes instead of probabilities? (But see below).

...

> I believe that it's a straight choice between Everett and Hidden
> Variables. It's always possible that a more refined theory (hidden
> variables) will replace quantum theory. But many-worlds is such a
> fundamental aspect of quantum theory that I'm sure it will be present in
> whatever theory supersedes it. Just as planets still follow Keplerian
> ellipses although classical physics is only an approximation.

My position is this: don't form metaphysics based on known incomplete physics. We know that the Standard Model (U(1)xS(2)xS(3)) does not include enough particles to be correct. We know that GUT (SU(5)) has similar problems. They are discussed because they are probably good approximations for certain temperature ranges after spontaneous symmetry breaking.

We know that the only theories that have worked out are renormalizable theories. This seems to indicate that such theories are embeddable in some way in a theory of energy (=mass). Such a theory would be, of course, be quantum gravity.

General relativity shows that the effects of mass are exactly equivalent to the effects of geometry. It is therefore sensible to talk about quantum gravity involving quantizing geometry (i.e., space-time). This is all I mean about granularity at the Planck scale.

Kaluza-Klein shows that all conventional forces arise from gravity (=geometry) in higher dimensions projected via collapse of some dimensions onto fewer dimensions. Therefore, it is possible that all of physics is geometry.

Superstrings are the only known candidate for a geometrical model that has enough particles to be real and that is renormalizable. We don't know much about the solutions to the equations of superstrings.

So, what is my position? All I know is that I know nothing. I don't have to choose between Copenhagen, Everett, hidden variable, etc. I don't think any of them are correct. My position is the same as, perhaps, Maxwell's was when he calculated the spectrum of radiation from a black body. "Hmm. Infinity can't be right. There must be something wrong with my basic assumptions." The part I hope to avoid is the rest of Maxwell's hypothetical conclusion: "I'll probably die before I figure

it out."

From: chris (Chris Cole) Subject: Re: blind watchmaker
To: dmi@peregrine.peregrine.com (Dean Inada) Date: Tue, 26 May 92 18:03:52 PDT Cc: price

> Playing devil's advocate, why are you so attatched to causality?
> All we have are correlations beteen events, (and P(A|B) does not have
> to equal P(B|A) (in fact they differ by P(A)/P(B)))
> and a theory that predicts when and how strongly events will be correlated.
> Why do you need anything more than the statement that, under a given theory,
> for the given conditions, A is a good/poor predictor of B or vice versa?

I think you cannot change the past; you can only change the future.
This is another way of saying that nothing happens without a cause.
Notice that I also am attached to local causality. This prevents
"spooky action at a distance." Without this, it is impossible to decide
what to do next. Sort of like Christian existentialism -- since you
can't know God's plan, anything you do could be a mortal sin.

What evidence do I have for causality? Hume answered that: none. So
why do I assume it? Why ask why?

A REVIEW BY M. C. PRICE

The full reference is 'Cauchy problem in spacetimes with closed timelike curves', Physical Review D Vol 42, #6, September 1990, by J Friedman, MS Morris, ID Novikov, F Echeverria, G Klinkhammer, KP Thorne and U Yurtsever.

The article builds on some earlier work done on the possibility of constructing a "time-machine" via wormholes connecting different regions of space-time. You construct a wormhole (this is the hard part of the recipe!), placing the usual obligatory, imaginary clocks at both ends. Accelerate one end away to relativistic speeds so that it time dilates. Then bring it back. If a traveller enters the wormhole at the gone-away-and-come-back end he reappears out of the stayed-at-home end in the past. The amount that the traveller goes back in time is the difference in the clock readings.

Now imagine that the wormhole is connecting two of the pockets of a pool table. So knocking a ball down one the pockets causes it to reappear out of the other, at an earlier time. A paradox occurs when the path of the ball is planned so that it collides with an earlier copy of itself, deflecting the earlier ball from the path necessary for the later ball to collide with it to exist. This is an impossible state of affairs since the ball must travel on a well defined path (even if it does loop back and forth through spacetime). What the article claims is that for every paradoxical path there is another non-paradoxical path, with the same *starting* path for the ball. Sometimes there are multiple non-paradoxical paths (we'll come back to this later). If you plotted a causality-violating path and sent your ball off towards the pocket then

as the ball approached the "entry" pocket a copy of itself would emerge from the "exit" pocket BUT on a slightly different path than you had calculated. Just sufficiently different so that, instead of knocking the earlier version completely off course and missing the "entry" hole, it has a glancing collision with its earlier self. The deflected earlier ball now enters the "entry" pocket on a slightly altered path, which accounts for the slightly different path that the later ball had taken on exit from the other pocket. Thus the paradox has been resolved and causality saved.

Whilst the authors claim to have proved this only for the elastic collisions of a time-travelling ball with itself, they are hopeful that it can be extended to more complex situations to remove more complex paradoxes. It's fun to speculate on how time-travel paradoxes can be averted by this mechanism [this is my own example]:

Suppose someone starts construction of a time machine, intent on murdering their grandfather. Instead of appearing back in his grandfather's time an older version of the traveller appears to the younger, homicidal traveller and persuades him to abort the original mission and instead go and use the time machine to stop the murder (by talking his younger self out of it....). Presumably the older traveller would have no problem persuading the younger version to change his mission objectives, since he has memories of the encounter and understands his earlier self very well.

The trouble with dreaming up these escape-from-paradox scenarios is that, generally speaking, there are too many solutions (i.e. more than one) to each potential paradox. The question arises, how does the universe 'choose' between the different resolutions? This is a problem in classical, Newtonian physics, where balls (and atoms) are expected to follow a single path. However in quantum theory you are allowed to consider all the possible paths, via the Feynman sum-over-histories or path-integral approach, which removes all ambiguities. This is the solution proposed by the article. All possible configurations contribute to the Feynman integral. The authors invite the reader to consider the implications of this with regards to many-worlds!

----------End of review----------

Well, that's my version of the article. The conclusions I draw from it are:

- o There's no logical reason why we can't travel through time, although the physical possibilities have yet to be demonstrated. eg can we construct wormholes, rotating massive cylinders etc?
- o We won't be able to change history.
- o The mechanism that prevents the altering of history is the presence of time travellers, either ourselves or others. They can always pop up where least expected, with their behaviour generating the conditions necessary for their own existence. Nobody expects the .... the time traveller?

As for why we see no time travellers (to answer an unasked question). I think that this is probably because the time machine can't move through

time. Of the three proposed mechanisms for time travel (spinning blackholes, rotating cylinders and wormholes) each one only permits travel over the life-time of the machine, which itself doesn't travel through time. So we never get to photograph dinosaurs (sob!) unless we find a time-machine that's been operating for 65million+ years. And similarly our descendants (and ouselves!) can not come and visit us until we get some time machines built ourselves.

M. C. Price

WHY WE NEED A SHORT FORM TEST

>From Arthur Watson via Kveld Hvatum:

...you may use the quote as well as my name and path, provided you do at least the following editing to encapsulate the context, raise the grammaticality, and lower the fatuousness to render it more suitable for publication:

> "Since I'm trying to finish my dissertation while holding a fulltime job, I won't have a lot of free time in the next few months, but I'd like to join societies that are convenient (no 150-hour test) and have interesting journals. My profession is computer science, but I have varied interests. I got 760V 800Q 800A on the GRE general in 1985, and had a 780V 780M on the SAT in 1982 -- is this sufficient to get into anything beyond Mensa?"

GREAT REWARDS FOR PROBLEM SOLVERS FROM THE INTERNET

Great rewards are available to problem solvers worldwide! Here is a list of math problems with $6800 in prizes!

If you are the first person to answer one of these questions, you get the prize! Warning: The poser of each question is the sole and final arbiter of what constitutes a completely correct solution, who is the first to solve it, how much money a putative solution deserves, and all other terms of the offer. The wording of the problems given here is due to me, and the wording preferred by the problem posers may differ.

If you have ideas for one or more of these problems, you can send me mail at greg@math.berkeley.edu. If the ideas are interesting and especially if you crack one of the problems, I will try to get you in touch with the relevant problem poser or posers.

You may conclude that problems with a large prize are impossible. Some of them might be, but others have been solved. For example, Walter Rudin offered $1000 for a solution to the question: Is there a complex analytic function f from the open unit disk in the complex plane to itself such that the image under f of every radius of the disk has infinite length? The answer was recently provided by

Jean Bourgain of IHES. Unfortunately, I do not know it myself.

If you have your own math problem (or problems) with a prize attached, please contact me. New contributions are always welcome. I can't promise that I will include your problem in my list, but I will give it serious attention.

The problems are listed by the size of the award, with the person offering the prize and the amount wagered for a completely correct solution. In the future there may be problems with a non-monetary prize like a bottle of wine, a live goose, or tickets to the opera, as well as problems for which the prize depends on the answer to the question, for example $5000 for a yes and three lemons for a no. All problems so far offer the same prize independent of the answer to the question.

And now, the problems!

John Conway: $1000. The thrackle problem
A thrackle is a graph drawn in the plane with straight or curvy edges in such a way that any two edges either cross each other exactly once or share one endpoint, but not both. No other kinds of incidence between edges or vertices or self-intersections of an edge are allowed. Is there a thrackle with more edges than vertices?

Ron Graham: $1000. Monochromatic arithmetic progressions
Does every 2-coloring of the integers from 1 to 2^2^...^2 (k times) have a monochromatic arithmetic progression of length k?

David Gale: $500. Decimal expansions of powers of 2
Are there infinitely many positive integers n such that 2^n does not contain a 7 in its decimal expansion?

Ron Graham: $500. Triangular houses for worms
What is the shortest curve (not necessarily closed) that does not fit in an equilateral triangle with unit sides?

Ron Graham: $500. 2n choose n relatively prime to 105
Are there infinitely many positive integers n such that 2n choose n is divisible by neither 3,5, nor 7?

David Gale: $200. 3D Chomp
In the game of Chomp, two players alternate stating triples of non-negative integers, and once a triple (a,b,c) is named, then for ever after neither player can name a triple (d,e,f) with d>=a, e>=b, and f>=c. A player who names (0,0,0) loses. Does the first player have a winning strategy?

Greg Kuperberg: $100. Algebraic knotted tori
What is the minimum possible degree of a real polynomial equation in three real variables whose solution set is a knotted torus?

Paul Erdos, the Hungarian problem solver extraordinaire, has offered money for so many problems that I have decided to separate them from the rest of my list. This posting is a partial list of Erdos prize problems. At least $9050, and perhaps as much as $34100, in prizes, are here for the taking!

Many of these problems were formulated jointly by Erdos and other mathematicians. However, Erdos is the purser of all of the problems. As I have mentioned before, the purser is the final judge and arbiter of prize-winning solutions to each of the problems. The award for a problem only goes to the person who solves it first, and the purser is the arbiter of that too. I have given my own description of each problem, but I am not responsible for the consequences of mistakes or misleading wording in my formulation.

If you are getting somewhere one of the problems, or if you plan to try, you can contact me at greg@math.berkeley.edu. Please contact me if you know of other Erdos prize porblems.

The problems listed here are from two sources:

T = A Tribute to Paul Erdos, Cambridge University Press, 1990, pp. 467-477.
P = Paths, Flows, and VLSI Layout, Springer-Verlag, 1980, pp. 35-45

The problems are labeled by their source and number in the reference. In addition, problems in the first reference are labeled by topic:

N = Number theory
C = Combinatorics and graph theory
G = Geometry

$3000. (T3N) Divergence implies arithmetic progressions
If the sum of the reciprocals of a set of positive integers is infinite, must the set contain arbitrarily long finite arithmetic progressions?

$1000. (T2N) Unavoidable sets of congruences
A set of congruences n = a_1 mod b_1, n = a_2 mod b_2,... is unavoidable if each n satisfies at least one of them. Is there an N such that every unavoidable set of congruences either has two equal moduli b_i and b_j or some modulus b_i less than N?

$1000. (T1C) Three-petal sunflowers
Is there an integer C such that among C^n sets with n elements, there are always three whose mutual intersection is the same as each pairwise intersection? (Problem P2 is the same, except that Erdos asks about k-petal sunflowers for every k but then says he would be satisfied with k=3.)

$500. (T7N) Asymptotic bases of order 2 (I)

Consider an infinite set of positive integers such that every sufficiently large integer is the sum of two members of the set. Can there be an N such that no positive integer is the sum of two members of the set in more than N ways?

$500. (T8N) Asymptotic bases of order 2 (II)
In the context of the previous problem, let f(n) be the number of ways that n is the sum of two members of the set. Can f(n)/log(n) converge to a finite number as n goes to infinity?

$500. (T9N) Evenly distributed two-colorings
Given a black-white coloring of the positive integers, let A(n,k) be the number of blacks minus the number of whites among the first n multiples of k. Can the range of A be bounded on both sides?

$500. (T4C) Friendly collections of half-sized subsets
Given 1+((4n choose 2n) - (2n choose n)^2)/2 distinct, half-sized subsets of a set with 4n elements, must there be two subsets which intersect only in one element? (As problem P1, 250 pounds is offered.)

$500. (T1G) Uniformity of distance in the plane (I)
Is there a real number c such that n points in the plane always determine at least cn/sqrt(log(n)) distinct distances?

$500. (T1G) Uniformity of distance in the plane (II)
Is there a real number c such that given n points in the plane, no more than n^(1+c/log(log(n))) pairs can be unit distance apart?

$500. (P2) Sets with distinct subset sums
Is there a real number c such that, given a set of n positive integers whose subsets all have distinct sums, the largest element is at least c2^k? (As problem T1N, no prize is mentioned.)

$250. (P4) Collections of sets not represented by smaller sets
Is there a real number c such that for infinitely many positive integers n, there exists cn or fewer sets with n elements, no two of which are disjoint, and every n-1-element set is disjoint from at least one of them?

$250/$100. (P15) Slowly increasing Turan numbers
If H is a (simple) graph, the Turan number T(n,H) is the largest number of edges a graph with n vertices can have without containing a copy of H. Conjecture: the function f(n) = T(n,H)/n^(3/2) is bounded above if and only if every connected subgraph of H has a vertex of valence 1 or 2. The larger award would be granted for a proof.

$100/$25000. (T6N) Consecutive early primes
An early prime is one which is less than the arithmetic mean of the prime before and the prime after. Conjecture: There are infinitely many consecutive pairs of early primes. The larger award would be granted for a disproof.

$100. (T8G) Quadrisecants in the plane
Given an infinite sequence of points in the plane, no five of which are

collinear, let r(n) be the number of lines that pass through four points among the first n. Can it happen that r(n)/n^2 does not converge to zero?

NOT A LETTER FROM KEN WOOD

. . . Though I can't imagine why you would, I ask anyway that you please not reprint this.

Cordially,

Ken Wood

[Editor's comment: I was very entertained by your letter, but you've asked me not to share it. So please send some stuff which I can print. This goes for everybody else as well.]

LETTER FROM DONALD SCOTT

Dear Rick,

Thanks for your response to those questions I asked you.

New questions

1. Would you recommend the study of logic, statistics, probability, and critical thinking since I'm so interested in learning to use my mind. Also, if you recommend any of the above could you provide me with names and authors so that I could purchase some books about each of the above subjects?

2. I would like to know if it is possible to obtain some issues of the Mega Society's old journal before they merged. Whom should I contact, and how much are back issues?

[Editor's reply: I definitely recommend statistics and probability. I'm too lazy for logic, and I don't know much about critical thinking as a field of study. My favorite statistics book is a thin yellow paperback called **Error Analysis**, by Taylor (I think). There's a picture of a wrecked train on the cover. It was my textbook for two different physics courses, one of which I even passed.

Jeff Ward was the pre-merger editor of the Mega Society journal. His address is 13155 Wimberley Square #284, San Diego CA 92128. However, unlike me, he has a life.]

VARIOUS YOUTHFULLY ENERGETIC CORRESPONDENCE FROM KEVIN SCHWARTZ

Dear Mr. Rosner:

Your name rings a bell from my grade school days; didn't you tie with Gov. Sununu in an **Omni** contest? I wish to subscribe to **The Megarian**; since I lack qualifying scores, for now I wish to subscribe as a non-member. Please send information. thank you for your time.

Sincerely yours,

Kevin Schwartz
Chairman, Greater Boston Chapter
The Thousand

P.S. Enclose: three juvenilia "sonnets". Perhaps you have the time and interest in corresponding?

What do I care your woman's heart should rove,
Or blow about with every wind so slight?
I can live just as well without your love --
Your kisses cannot warm a winter's night.
No frog stays faithful to his lily pad,
No bumblebee but flies from flower to flower;
The Laws of Nature prove that I'd be mad
To want your company hour after hour.
Though anyone would find your features pleasing,
Mere ringlets can't entangle who's free.
I may have pledged my love to you when teasing
But hope you will not claim... you do love me?
  Yes, I can live without your tongue's sweet praise
  At least an afternoon -- perhaps for days.

Why should you care if she admires another?
No legal contract binds her to your will
Nor makes her yours to own because you love her --
You might as well demand the earth stand still.
Go tell a nightingale when she may sing,
Go tell the Western Wind which way to blow,
Go tell those falling leaves to wait till spring.
You ask for love? Just ask for summer snow!
Yet fools in love turn deaf ears to the wise,
Sweeping out wisdom with the raked-up leaves.
Hope has no hope when beauty blinds your eyes:
Each heart hosts scoundrels, murderers, and thieves!
  Before you dare to love a woman's face,
  First learn to walk on snow and leave no trace.

Upon the Heights

You fools claim my poor Cathy lies beneath
Here in this damned moss-covered churchyard mound,
But when I venture on the snowy heath
I know she lingers yet above the ground!
No one who understood the girl at all
Could think, while I'm still on this earth, she's gone:
If you could see her shadow on the wall
Each night! Or hear her laughter in the dawn
And wake to feel her fingers on your brow!
Have you your wits, to tell me I've lost mine?
If Cathy's dead, no reason's reason now!
To prove this grave contains no Catherine
  I'll rip her coffin open; then you'll see:
  That rotting thing inside could not be she!

1032 Centre St
Newton Centre, MA 02159
(617) 964 - 5679

October 12, 1992

Mr. Rick Rosner
Editor, Noesis
5139 Balboa Blvd # 303
Encino, CA 91316-3430

Dear Rick,

My sincere apologies for subjecting you to such a lengthyrambly letter. Maybe you can read it while bouncing bar or while half-dozing during some dull lecture on Feynman diagrams. (Letters make for good scratch paper.)

Thanks both for your kind letter and for the copy of Noesis. (What does "noesis" mean? Etymologically related to "noetic" and to "nous"?) **Loved** the journal, especially your witty, self-depricating editorials. Do you also publish political and psychometrics articles; stories, poems, art...; or usually just puzzles? I'm curious about procuring past issues -- please inform. Could the journal expand with more submissions, or does a harsh budget keep the belt so tight?

Very flattered by your offer to run my sonnets in Noesis; also curious: how can you, since I'm not (yet? fingers crossed...) a true Megarian. Would it matter if my material were also published in, say, Telicom (journal of ISPE) or The Boston Globe? I have seen the same article printed both in Telicom and in Triple Nine's Vidya.

Also appreciate your offer re phoning. Have tried to contact you; left incoherent messages either on your answering machine, or on someone else's. Littorally constant calls would drain my allowance; perhaps you have the time and interest in postal correspondence?

Please let me know roughly how much free time you have, so I know how much material with which to inundate you without becoming a nuisance. I'm a **prolific** epistler at times: since graduation, my loneliness quotient, always high, has gone through the roof. (Must complete this letter in a hurry, before another bout of depression incapacitates me.)

Is there any way I can "pen pal" with other Megarians **before** I officially join up? (Also: do you have any teen-ish members? Or members near Boston?) My primary interests

include: classical music (violinist in numerous orchestras); literature; art; history; etymology; math; physics; Left Wing politics et pacifism -- but will enjoy nearly any topics (except UFOs, lotto, parapsychology).

Aside from Marilyn vos Savant, Chris Harding, Anton Anderssen, and Eric Hart, who are the world's "centa-megarians"? Do they ever submit anything to Noesis? (Why does the English-speaking world have such a preponderance compared with random chance? With so many scores above 190 IQ, the U.S. population should be a few dozen billion.) How, if at all, do C-Megarians differ from "ordinary" Megarians?

Having attended only one ISPE and one Mensa meeting, I can certainly attest to a profound difference between the memberships of those two organizations! At the Mensa meeting (at which I was easily the youngest): while making a point about Bush, I paused to note that whenever the national economy sinks the average SATs will tend to rise; to my shock I discovered the Ms did not understand "correlation". Yet even within the pages of Telicom one can always find hilariously sophistic "physics" or "economics" treatises by engineers who never really got math under their belts.

Had to laugh at your description of the conversations you endure as a bouncer. When I worked (usher, associate BSO auditions coordinator, operator) at Symphony Hall last year I had nothing about which to speak with my co-workers -- except sometimes with the music students. I wound up trying to teach them, which merely caused resentment. How do **you** cope? My bosses and some co-workers called me "The Genius" or "Little Man Tate"; others employed more scatological and often anti-Semitic terminology.

Do the following individuals belong to the Mega Society: J. Veldhuis, former ISPE Vice President; R. May, ISPE Diplomate, Prometheus President; J. Sununu; J. Clifton; E. Hart; S. Golomb; H. Taylor; K. Langdon; R. Hoeflin; D. Inman; A. Anderssen; M. vos Savant? I trust the Chris-es (Harding and Cole) are still members?

Would you say Mega -- or any IQ Society for that matter -- has any geniuses in the **pre**-Terman sense? Examples: Noam Chomsky, Stephen Hawking, John Bardeen, Gerd Falting, Marvin Minsky, Bobby Fischer ((180+ IQ)), Milton Babbit...

I think you'd enjoy correspondence with former Telicom editor, poet, punmaster Bob Birch. Come to think of it, you might enjoy several Thousanders -- some are quite sharp. Chris Harding (world's highest IQ) is our Founder; Anton Anderssen is our Director of Public Relations; Marilyn vos Savant helps with publicity. Can't easily call THEM stupid!

For free info on ISPE:

Harry L. Callahan
Dept KLS
PO box 34034
Omaha, NE 68134

How can one get access to the Ultra and Hyper Tests? Or to Harding's tests? Sometime in the upcoming months, when I have a little free time, I plan to sit myself down and take the dread Mega test. Have already raced through and "answered" the questions -- must now go to the library to double-check everything: the hard part. (Do I utterly misunderstand the three cube problem, or is it merely the trivial algebra problem it seems: 3 (bounded) intersections, where N = 3?) Still have AT LEAST three anal-ogies that need serious work. (If you don't mind my prying, how did your famed score of 44 of 48 break down, verbal vs math?)

Does the FBI really keep files on those who ace the SAT? What for? If they do, my friends are in big trouble! (When I took the SAT I was barely yet a teenager; does that exempt me? Then again: the FBI and CIA probably have my phones tapped because of all my "socialist" publications.)

A. Palmer's name and address smeared on my Noesis. What are they?

Enclosed: a juvenalia short-short story; plus $ 10 (so I can start to receive Noesis as soon as convenient).

Thanks again. Hope to hear from you soon. Hope to be a Megarian soon!

Sincerely yours,

Kevin L. Schwartz

[Editor's comments:
A. I'm a terrible letter writer. Correspondence fills me with dread. I file letters to which I must respond, find then weeks later, get scared, and hide them again. I like the telephone. Nevertheless, please send letters. The last few months have been filled with stuff that's lowered my already low efficiency--suicide, cancer, school, real estate agents. I've put all of this behind me and am ready to find new excuses.
B. Can never remember the definition of Noesis. Looking it up, I find that it means cognition.
C. We publish whatever, with a preference for brevity. For $20, Chris Cole can send you a complete set of back issues. As publisher, Chris likes to limit each issue to 20 pages. I'm willing to run your sonnets 'cause they're short, camera ready, and not too sappy. I skipped your short story.
D. Other Mega members/subscribers would probably be very pleased to correspond. There might be a few your age. There are two or three members/subscribers in Massachusetts.
E. Those wacky centa-Megarians: Hart used to submit stuff; he moved to some alternate virtual reality a couple years ago. Harding submits stuff. I especially liked his Multimax Test. The English-speaking world has a preponderance of super-high-IQ people because IQ testing is a ridiculous damn thing, just like western civilization. Sometimes **Hard Copy** runs out of "Cheerleaders Who Kill." They then do a segment on "Deranged Geniuses." The English-speaking world also has a preponderance of men and women with abnormally-large pectoral areas. Like high-IQ, this is also a media-induced phenom. As you might guess, the major diff between generic and centa-Megarians is that centa-Megarians show up more often in the tabloids. My theory is that a generic Megarian could ascend to centa status by getting a boob job or kidnapping Chelsea Clinton's cat.
F. I cope with philistine co-workers using a spectrum of techniques based on being meaner and crazier than they are. Stuff that works well for me--eating beer bottles, disrobing at parties & hitting other guests in face w/ my underpants, abusing customers. However, I'm getting too old for such misbehavior, so lately I just pay co-workers to be my friends.
G. Ten out of the fourteen people you ask about are past or present Mega members.
H. Any Mega members showing any sign of pre-Terman type genius will be asked to leave. (Seriously, there are some very competent Mega members. Some even make the big bucks. Cole is optimistic that we could get together and change the universe, but so far we haven't. I think many members have points of view about the world that are way ahead of our time, but no one has convinced society yet.)
I. Hoeflin hasn't yet published the Ultra and Hyper Tests, but I'd guess that the Ultra will be published in '93.
J. No one I know of has found the three cube problem trivial or algebraic. It's considered the hardest problem on the Mega Test. I missed one verbal & two math & skipped one math.
K. I dunno what the FBI does.
L. A. Palmer, 609 W Washington St Apt 11-69, Sequim WA 98382