

# Noesis

## The Journal of the Mega Society Number 101 January 1995

### EDITOR

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About every third issue, I urge you to submit stuff. Chris Cole says this is not enough; I should whine every issue. So, **SEND IN YOUR STUFF**. If you're a member (or just look like one, having graduated from The Barbizon School) you get an issue added to your subscription for every two pages you submit.

### IN THIS ISSUE

**LETTERS AND REVIEW OF *THE PHYSICS OF IMMORTALITY* FROM MICHAEL PRICE  
LQ. VS. DISCUSSION TOPIC, PLUS A LETTER AND MATRICES FROM LEROY KOTTKE**

### LETTER FROM RON YANNONE

Just a brief letter to ask if you are aware of a ten-year-old, Michael Kearney, who recently appeared in the news for having broken three Guinness Book of World Records? They report that his IQ exceeds 200. If you know a way to contact him he would be an obvious candidate for Mega and Prometheus and OATH, etc. Having him as a member would most likely bring attention of the media to the high-IQ societies that he belongs to—if they know that he does. The societies could even pay his first year's membership as a drawing card. Maybe this would spark Guinness to put IQ data back into their book. Who knows?

Guinness Book of World Records that Michael broke:

Youngest High School Graduate

Youngest College Student

Youngest College Graduate in America (10 years old)

Both his parents, Kevin and Cassidy Kearney, have 150+ IQ's as well! Two more prospects?

Very cordially yours,  
Ron

From uunet!price.demon.co.uk!price Sun Dec 4 23:11:15 1994  
Received: from uunet by questrel.com via UUCP (920330.SGI/911001.SGI)  
for chris id AA12394; Sun, 4 Dec 94 23:11:15 -0800  
Received: from price.demon.co.uk by relay1.UU.NET with SMTP  
id QQ5sxr01703; Mon, 5 Dec 1994 00:49:57 -0500  
Date: Fri, 02 Dec 1994 19:25:38 GMT  
From: uunet!price.demon.co.uk!price (Michael Clive Price)

Chris, following some comments, here are two letters for Noesis. They are quite intentionally strongly worded.

> Vos Savant no longer subscribes (no doubt due to the poor quality of  
> the material we publish). I may send her issue 100

Make sure it's not #97 or #99! :-). If "Ron Lee" no longer subscribes, might be a good idea to send him some of the better issues as well.

> if we get some good stuff. Please hurry on your Gell-Mann book  
> review.

I \*did\* send you my review of Tipler's "physics of immortality", didn't I? I think I did, but just checking. The Gell-Mann book seems a bit dull, although I will try to get the review done. I'll also write something about the latest Hubble Space Telescope data and the age of the universe "problem".

Here are the letters:

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Dear Rick,

the time has come for some plain speaking.

I thought I'd let you know that I agree completely with Chris Langan's sentiments (in Noesis #94) about the non-desirability of non-mega members having stuff for publication "vetted" or sponsored by bone fide mega members. It would solve a lot of problems and make the journal more readable. In particular it would weed out a lot of "tripe" (to use Chris Langan's apt description of Mr Hannon's unwelcome contributions). Chris's article was spot on about Robert Hannon's failings - failings obvious to all mega members, probably - I agreed with it all, word for word. Well said, Chris. Rick, I urge you to adopt Chris's suggestion, at once, before the rot sets in and we lose more of our mega subscribers. I also suggest that you only accept material for publication from mega members. Putative sponsored material from a non-member could be sent to the sponsor for vetting, before being passed on (or not) to yourself. In other words it would not be sufficient for some mega member to say "I sponsor X, now and forever", if that is what Chris Langan is suggesting, it may not be of course. Of course you could sponsor stuff posted directly to you yourself.

For Noesis to publish stuff from non-members seems to defeat the entire raison d'etre of Noesis which is, I thought, to provide a safe haven where mega members can exchange ideas, chat etc, as an escape from the general stupidity around us. Letting non-members who lack the basics

of elementary algebra (see below) pollute and dilute our profound deliberations is entirely self-defeating. I stopped subscribing to Gift of Fire because it was full of similar tripe. I would be sorry to see Noesis follow a similar descent into mediocrity. Your concern as an editor is to get the issues out, on schedule. My concern, as a reader, is to reduce the amount of junk mail from non-members. I can't believe that other mega members and most non-members get anything from Mr Hannon's imbecilic contributions, which repeatedly confuse the equation of motion for a photon ( $x = Ct$ ) and the equation of a coordinate Lorentz transformation. If I want to read drivel like this I have only to pick up (an old issue of) Gift of Fire or some Mensa journal, where I can read an endless succession of crackpot theories about the universe. I note that the only letter of support for Mr Hannon comes from a non-member.

I for one, am quite happy to accept fewer issues of Noesis, if material from members is lacking. I've paid for issues on a per issue basis, like everybody else. Don't lower our standards in a descent towards the mean. Less tripe, please!

Michael Price

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Dear Chris Langan,

you seem to be asking for more feedback or support against Robert Hannon's demented raving about Special Relativity. I hate to see someone suffer alone, so yes, I agree with you, Mr Hannon's an idiot and I cringe to see his stuff published in Noesis. Having had some experience debating with crackpots (over the internet) I suggest that you simply disengage from dialogue with Robert, if Rick continues to allow him airspace in Noesis (which I hope he won't, as a general policy towards unsponsored non-members). No amount or reasoning can ever persuade a crackpot to change their mind over their pet theories - they simply lack the self-critical faculties to take on board criticism. They're right and the rest of the "establishment" is blind, stupid, etc etc. Hannon, it must be admitted, is worse than some crackpots, in that he's also algebraically incompetent in addition to having an attitude problem. Just look at his  $x=Ct$  rubbish which he repeats ad nauseam, without alteration, despite Chris Cole's early, lengthy, attempts to show him the error of his ways and your own repeated attempts to steer him back to the real world. Where Hannon gets the idea that SR is "predicated" on the equation of motion for a photon, passing through the coordinate origin, is a mystery to everyone except himself. Apparently he's never come across either the concept of an equation of motion or a coordinate transformation, or both. Very sad.

Michael Price

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## Review of The Physics of Immortality by Frank Tipler

Frank Tipler, Professor of Mathematical Physics at Tulane University, has made major contributions to the subject of general relativity and in particular on singularities. SF readers will perhaps be aware of his article on the possibility of time travel in the vicinity of a massive rotating cylinder, directly inspiring a Larry Niven story of the same name: *Rotating Cylinders and the Possibility of Global Causality Violation*. Within quantum cosmology he is well known as a proponent of the many-worlds interpretation of quantum mechanics. To SETI enthusiasts and sceptics he is famous or infamous, depending on your viewpoint, and as having locked horns with Carl Sagan on the existence extraterrestrial intelligent alien life. In 1985 he co-authored, with John Barrow, the monumental *The Anthropic Cosmological Principle*. Now he has written a sequel, *The Physics of Immortality*, where he develops these ideas further.

In *The Physics of Immortality*, Tipler seeks nothing less than a unification of cosmology with theology. Questions like "Does God exist?", does "It love us?", and "Is there an afterlife?" are subjects to be tackled with the same rigour as the behaviour of a star as it collapses into a black hole - in Tipler's opinion. The book is cogently written and includes voluminous technical appendices and notes, backing up his logic. In addition to the physics (most of which is quite wisely confined to appendices) there are extensive discussions of identity, the arrow of time, reductionism, free-will and comparisons of the eschatology of the major world religions and other topics.

Tipler's thesis is that as the universe collapses towards the final Big Crunch the amount of information processing diverges asymptotically to infinity, even as at the same time as the universe is compressed down to zero volume within finite time. The final end point, which will exist only for an infinitesimal moment, he calls the Omega Point and achieves infinite complexity and information processing. In the Omega Point all the beings that have ever lived, you, me, Tipler and everyone else - or ever "could have" lived - are resurrected to live again in an infinitely advanced virtual reality. Subjective time stretches out forever for the denizens and controllers of the last moments.

I found it a technically interesting book, but I was repulsed by the application of religious language to scientific concepts. (I am an atheist, so others may not mind this so much or may mind it more). I think this use of language is very dangerous and is likely to cause much confusion. For all that the discussion and comparisons of the major world religions is quite interesting and original, although the relevance of a lot of it, I have to confess, does escape me. Tipler's re-interpretation of Moses' encounter with the burning bush is worth reading (page 4). Even so, I feel that the theistic terms are misleading. It would have been better to avoid such language.

I have no doubt that many non-technical theists will take solace in this book as "proof" that science endorses notions of a personal God, Heaven, immortality of the "soul" and whatnot. Similarly many scientifically trained people will reject Tipler's arguments out of hand. With this book Tipler will, I'm sure, cement his image in scientific circles as a one great scientist turned crank, joining the likes of Penrose, Eddington, Hoyle and others.

Tipler's arguments deserve careful examination before forming a judgement. To see why Tipler's pseudo-theology is incorrect I shall review his book from three different perspectives. First, I shall examine what Tipler means by the Final Anthropic Principle, which he now calls the Omega Point boundary condition, and why he is, essentially, begging the issue by assuming that God exists rather than deriving this scientifically. Second, I shall examine short fallings in his predictions that result from a certain narrowness of vision or lack of imagination. Third I shall show that Tipler is being inconsistent, selective and simplistic in his application of logic.

### The Anthropic Principle and Boundary Conditions

The Anthropic Principle comes in three varieties, Weak, Strong and Final.

The Weak Anthropic Principle states that we, as conscious observers, necessarily observe, in the surrounding Universe, those conditions necessary for the emergence of life. Had conditions been otherwise there would be no observers to note this. Consequently we must be careful about drawing conclusions about the more distant regions of the Universe where different, more inimical, conditions may apply. For instance, just because the Earth has a relatively large satellite (the Moon) does not mean we can infer that most planets have large moons, since the Moon's presence may be linked with the evolution of intelligent life via, say, tides or the stability of the Earth's orbit. Large moons may be very rare, but only such favoured planets are capable of evolving complex land-living organisms, so we naturally find we have a large moon. At one level the Weak Anthropic Principle is no more than a tautology and most scientists have few problems with it.

The Strong Anthropic Principle moves a step further and proposes that only those universes that contained conscious observers, at some point in their history, exist. This is controversial, to put it mildly - I, for one, see no reason for believing it - although some people see it as meshing well with the wackier side of quantum theory. I find it odd that Tipler should find the Strong Anthropic Principle the least bit attractive since one of the motivations of the many-worlds interpretation (which he believes in, see page 169, as I do) was to remove the observer from any role in physics. The Strong Anthropic Principle intertwines the observer with physics in an unacceptable, non-reductionistic fashion.

The Final Anthropic Principle states that only those universes exist in which conscious life exists for ever. Tipler has recast the Final Anthropic Principle in the form of boundary conditions at the future end of time. To see quite what this means we will digress briefly onto the subject of boundary conditions in science.

Traditionally, in science, boundary conditions on a system are sought at an \*earlier\* time and the laws of physics used make predictions about the system at a \*later\* time. Eg I let go of an apple above the floor in a gravitational field (the boundary condition) and, a few seconds later, the apple hits the floor (the prediction). Logically, though, there is no reason why boundary conditions can not be imposed at later times and used to make retrodictions (deductions about the past). Detectives do this all the time, in reconstructing crimes from clues left at the scene, witnesses etc - although it is unlikely that they would describe it as such! Cosmologists do this when they make conjectures about the early state of the universe from the way the universe is (or appears) now. The present state of the universe, as revealed through a telescope, acts as boundary condition. The early evolution of the universe emerges as a retrodiction.

The reason why scientists and engineers tend to search for or place boundary conditions in the past, rather than the future, is because of the Second Law of Thermodynamics. The Second Law of Thermodynamics, based on countless observations, states that the future is less predictable than the past is retrodictable. Thermodynamics defines the arrow of time. It's why we remember the past and not the future. (Tipler discusses this in more illuminating detail. There is a vast literature on the subject of the "arrow of time" which I can't do justice to here.)

To return to the Final Anthropic Principle, Tipler imposes the boundary condition that conscious life will exist for ever at the end of time, or at least in the distant future. He recasts this in terms of information processing diverging to infinity in the final moments of the Big Crunch. He speculates that infinite subjective time passes for the being(s) who can control the collapse process, extracting unlimited energy from collapse-induced temperature gradients. These being(s) at the End of Time he calls the Omega Point (or God). Unlike the Big Bang and Hubble expansion, which was and is reasonably smooth, as far as we can see, the collapse process is expected to become increasingly disordered or anisotropic. During the collapse process this disorder or shear is expected to grow as time progresses, generating large temperature differences which oscillate back and forth, growing without bound. Tipler's plan is for the Omega Point to extract work from the rising shear and temperature anisotropy. Tipler argues that, even though the operating temperature rises to infinity, the available work grows even faster, enabling intelligent information processing to last "forever" in subjective time.

Unfortunately there seems to be a high level logical flaw in his reasoning. The validity of Tipler's calculations depend on the existence of the Omega Point as **\*\*an\*\*** starting assumption, since Tipler starts by assuming that the Final Anthropic Principle is the correct boundary condition. All Tipler does is derive the existence of the Omega Point by **\*assuming\*** the existence the Omega Point as a final boundary condition. Tipler has derives what he has assumed. A completely circular argument which medieval theologians would have been proud of.

I am also very sceptical of the validity of any calculations projected indefinitely into realms where we know our knowledge of physics is incomplete. On the energy scales and distances approached by the Omega Point we expect quantum gravity to predominate. Science does not have a complete theory of quantum gravity, yet, so this exercise seems rather premature, to put it mildly.

### Omega Point Predictions

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In fairness to Tipler he does offer predictions of his Omega Point theory. He tries to show that the existence of the Omega Point at the Big Crunch - which requires that civilisation expand throughout the entire universe before collapse starts - imposes constraints on the universe today.

Unfortunately all these predictions require that life can't exist indefinitely in **\*any\*** other fashion than he imagines in the Omega Point. This is where his lack of vision lets him down. He dismisses the possibility of infinite life in an open universe (as Freeman Dyson has suggested) because, for instance, protons must all decay, given long enough. This ignores the possibility that an advanced civilisation may find a way of regenerating matter, for instance by controlling cosmological inflation in the laboratory or, more likely, by some means we can't presently imagine or understand. The task of harnessing inflation to generate new matter requires control of physical processes at grand-unified-theory level energies, so this must be inherently **\*more\*** probable (although still, perhaps, unlikely) than the degree of control the Omega Point requires of **\*all\*** energy levels, all the way up to infinity. Whether this is a reasonable assumption I'm not sure. Personally I would have thought that simple thermodynamic considerations suggest that a cold, open universe would be much more conducive to open-ended information processing than an infinity hot dense universe. It certainly seems rather premature, to say the least, to rule out the former in favour of the latter.

Tipler also states that life in an open universe must eventually start repeating itself (which he concludes from an examination of the complexity permitted by the Bekenstein Bound) and, therefore, not grow without bound. This means that no entity can exist for ever, in the sense of always experiencing new and different stimuli, adding new memories. At some point any system in an open universe must start to repeat and overwrite its earlier selves. Unfortunately the Bekenstein Bound has only been proven to apply to flat space-times. There are good reasons for thinking that the Bekenstein Bound will be violated in a non-simply connected space-time manifold that quantum gravity probably implies, permitting indefinite growth in complexity. (Traversable wormholes, for instance, would permit infinite complexity - see Traversable Wormholes... in Noesis 84.)

I am also disturbed by Tipler's claim that the Omega Point would have access to sufficient information to resurrect all historical personages, animals and alien life (if any) from information or signals currently unrecognisable and/or lost into space. The first few times he mentions this claim Tipler adds that signal incoherency (when the signal strength is swamped out by the background noise level) may make this impossible. After awhile, though, he stops adding this all-important caveat. He argues that the indeterminism or randomness in the background static is not relevant to information loss because the many-worlds or Evørett interpretation of quantum mechanics is deterministic (true) and so all the "lost" information is recoverable (false). The many-worlds interpretation of quantum mechanics does not permit such recovery of past information since as entropy increases / information processing grows the worlds become increasingly divorced from each other via a quantum thermodynamic process called decoherence. Loosely speaking, the original information has been dispersed across a multitude of mutually inaccessible

quantum worlds or parallel universes. No super-intelligence, no matter how advanced, without violating the Second Law of Thermodynamics, can access the totality of information necessary for total reconstruction since each intelligence is confined to their own Everett-world, which necessarily has incomplete information.

It must be admitted that it is possible to get around this information loss, with truly infinite computational resources, by simply resurrecting "all possible" entities, regardless of whether they really existed or not. Tipler does mention this possibility, which he dubs Universal Resurrection. This theme has been explored by other authors such as Hans Moravec and Marvin Minsky without all the theological trimmings that Tipler brings to the subject.

### Internal Inconsistencies

The alert reader will notice that I have not disproved Tipler's central thesis - that in the future unbounded information processing will permit the resurrection of everyone to who has, or might have, ever lived. Instead I criticise him for being too narrow in his outlook in dismissing other open-ended futures for immortals. The prospect of universal resurrection is far more likely than he realises. If these were the only faults in his thesis then I would have to accept his notion of universal resurrection.

Unfortunately his vision also has internal inconsistencies. In my opinion the motivation of the Omega Point is never satisfactorily explained. Tipler supposes that as the universe contracts then civilisation will necessarily become more co-operative, altruistic and centralised. (Or else they will fail to control the collapse process, the possibility of which, remember, he excludes by assumption!) Therefore, he argues, the Omega Point "ends" up as a benign unified, singular, god-like super-intelligence, although he concedes that there may be semi-autonomous "subprograms" running. I find this wholly unconvincing. The relevant parameter for describing the "size" of the Omega Point is, as Tipler argues everywhere else, complexity not volume. Tipler needs to think in terms of cyberspace, not physical space. There is sufficient "cyber"-space, within the Omega Point, by Tipler's calculations, for infinite diversity. Within the infinite cyberspace domain there is absolutely no reason to suppose that the Omega Point will converge on a common set of values. Indeed all the trends in society and evolution point to more diversity with time, not less. It is interesting to note that Tipler's earlier on the impossibility of "nearby" extraterrestrial life was based on the principle, by analogy with Darwinian diversity and capitalism, that societies naturally become more diverse as they evolve. Now that it suits his purpose to conclude the opposite he quietly ignores this work.

If we buy Tipler's line about being resurrected into blissful heaven by angels we must also accept that other copies of ourselves will be reincarnated into painful versions of hell, tortured forever by sadistic virtual demons. Indeed, to resurrect "all" possible individuals the Omega Point would necessarily have to create and infinite number of virtual hells, all fully stocked with anguished inmates.

In a paragraph tucked away in an footnote (page 359) the argument is presented that super-beings in the future will fear retribution (or of not being resurrected if "they" die) if they abuse resurrectees. There are many assumptions implicit in this. Surely more powerful beings will have less to fear, being immortal? All societies have contained sadistic individuals and sometimes torture and sadism is condoned at higher group level. I see no reason for supposing that such arational impulses will ever cease. I certainly would not bet eternity on it - lose and end up in hell!

There is also no reason for supposing that future societies would share our concept of morality and feel obliged to bring us back to life. An argument from super-rationality could have been presented here, but Tipler does not do that, unfortunately. Instead Tipler argues that there is common morality which we all agree on which we can expect the Omega Point to share. As an example he cites the human right to life, or the prohibition against murder, as applied to the abortion debate (page 331) and argues that both the pro- and anti-camps are agreed on the right to human life, they just disagree about at which stage a fetus becomes human. This is pure sophistry. There are numerous societies in the past which condoned

murder of humans. The Thugs of India spring to mind, or the Aztecs with their human sacrifices. Or consider the Roman attitude to the gladiatorial slaughter in their arenas for public amusement. No doubt Tipler would argue that they viewed the victims as in some way sub-human. No matter, I could equally imagine future super-beings deciding that we have no rights because we are not super-beings!

I am surprised that a free thinking pro-capitalistic, Hayek-school "Austrian" libertarian, as Tipler seems to be (pages 172 and 267), could entrust his life to super-entities in the infinitely distant future. We have as little right to understand the motivations of our technological descendants as an amoeba has of understanding Einstein's relativity. I prefer to entrust myself with myself, no matter how much I may develop and evolve over the ages. Surely that has to be a better bet than handing over your life the caprices of the Omega Point  
descendants of, say, a race of alien intelligent spiders from a distant galaxy? (There is after all, in Tipler's scheme, no guarantee that we humans will be the race that evolves into the Omega Point.)

#### Conclusion

I can't help but feel that Tipler wants to live for ever without doing anything about it - the whole Omega Point theory is a just a rationalisation for this Panglossian stance. To this end he has convinced himself that he will be resurrected by the Omega Point in heaven. I was reminded of my experiences reading Penrose's *The Emperor's New Mind*: bad logic and questionable science is being used to establish a preconceived position, rather than point the way forward in the spirit of inquiry. An interesting book, but the central message of the Omega Point is quite ridiculous. Buy this book only if you're interested in theology - the discussions of religion are interesting (although repetitive) even to an atheist - or cosmology - the physics is fascinating. But if you want to live for ever start your own life extension program or sign up for cryonics!

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[Editor's comments--The book review is perfect, nothing to say about that. About Hannon--I never tried to follow his algebra because I'm too lazy to slog through a set of disproofs of special relativity, a theory I agree with. I published Hannon's articles believing there was no compelling reason not to do so. Many members are letting me know otherwise.

I have two objections to vetting material from non-members. One is that if everything submitted is published, it's not that hard for individual readers to choose what they want to read. I realize this is a weak objection, considering my displeasure at seeing junky material in other journals and considering that junk-filled journals are not a good value. A stronger objection is that many non-members submit good material. Hannon seems to be the only submitter who has built up much specific opposition.

I'm willing to hold back submitted material which I think wouldn't be worthwhile. For each piece held back, I could print an abstract, for example, "Spanky Custis, a non-subscriber who got my address from the *Encyclopedia of Associations*, has submitted a four-page proof that 131 and 133 are the largest twin primes. This will not be published unless a member requests it."]



### Handy I.Q. vs. Topic of Discussion Ranker

Mind Rank	Discussion Topic
1	Ideas Art, Literature, Music, Mathematics
2	Politics Global, National, Local, Workplace
3	People Political Figures, workers, Relatives, Enemies
4	Computers Electronics, VCR's, Cellular phones, Sega-Genesis
5	Cars Sports Cars, 4X4's, Pick-ups, Sedans
6	Sports Chess, Checkers, Baseball, Football
7	Animals Zoo, Pets, Farm, Endangered Species
8	T.V. Investigative Reports, Dramas, Sit-Coms, Talk Shows
9	T.V. News Global, National, Local, Weather
10	T.V. Sports Wrestling, Stars Compete (Simon-Sez), Golf, Home-Shopping
11	Food Cooking, Baking, Recipes, Coupons
12	Drink Wines, Liquors, Beer, Jolt-Cola

So, from the chart we see that category 1.1 is Art, 1.4 Math and so on; 1.0 being reserved for Marilyn who is off the chart.

I.Q.'s correlate roughly as follows; each category has a spread of 10 I.Q. points with 1.1 starting at 180; again 1.0 is off the chart. So we see that 2.1, Global Politics falls in the 140-150 range; 3.1 corresponds to the 100-110 I.Q. range etc. This takes us to 0-10 I.Q. at the Cars (pick-up) level and, after that, I.Q.'s now go negative. Well, why not? Failure to recognize I.Q. as a Bi-Polar quantity is tantamount to rejecting the idea of "Negative Intelligence"--Intelligence that detracts from the discussion group. Negative intelligence is axiomatic and as apparent as the oil slick on a puddle of truth, it distracts and subverts true meaning and the path to truth. It is subtle and shimmering at times but pernicious all the same.

This new Meta-Matrix Formulation of Bi-polar Intelligence, or MMFBI will, in time, supplant the cultural bias built into the Reading, Riting, and Rithmetic of written tests that only purport to correlate with "Intelligence". The MMFBI precludes all that stilted Hog-Wash and espouses the only true indicator of I.Q.; that is: Verbal Discourse or VD. This definition leaves out the verbally incapacitated as it should. They belong in a class by themselves, (like Marilyn). So, you begin to appreciate that by using this descriptor of I.Q., even a below zero I.Q. is necessarily interactive; passivity just doesn't hack it!

This now opens up I.Q. to the real world, i.e., Rap Music, being, after all, Music, ranks high at 1.3 (I.Q. 160-170) level, whereas Wine Tasting, a nasty snobby elitist pseudo-hobby belongs roughly at a 12.1 (I.Q.-260,-250) level. The negative bias reflects the old adage that Genius and Stupidity differ most significantly by virtue of the fact that Genius has limits (+180)

whereas Stupidity does not (-8), please imagine the 8 on its side. Y'all notice that the low end categories are by no means exhausted, and in fact only begin to Kick-in at the Jolt-Cola level of 12.4 and plummet precipitously from there. The imagination is stretched beyond the elastic limit as we consider categories not included here such as Casino Gambling and the Lotto; I hesitate to assign even a tentative value here.

I'm offering this as a starting template, a benchmark by which to gauge the rate of cultural degradation. Some of the conclusions can be quite startling, such as an individual with a prodigious I.Q. could be easily swamped by 2 or three others in the discussion group with only moderately negative I.Q.'s. Consider a Salvatore Dali in the same room as Evel Knievel (I.Q.-550) approx.) this yields an algebraic sum of  $(180-550)=-370$  which brings the whole room up to the level of roughly a demolition derby discussion. Our only hope for a Zero I.Q. net in this case by adding one more person (small room) would be to introduce A Marilyn; just kidding, there's only ONE Marilyn. But this is hardly fair, since Off The Chart (OTC+) can counter-balance any given finite negative and threatens the truth of the common sense assertion that Stupidity can always overwhelm Genius.

The MMFBI is only incomplete and tentative as evidenced by the 8.4 category which is the Talk-Show, this is clearly a Meta-Category since we have a discussion of discussions, the topics can vary widely and like Russell's library paradox, point to the limits of closed systems and raises the possibility of open-endedness. After all, one can see Frank Tipler discussing his "Physics and Immortality" along side (other channel talk show) with a guy claiming that he is a woman with a penis, so we nearly run the gamut in an inductionary sense, with that one.

Well, the possibilities seem truly endless with the MMFBI, but right now I'll settle for a ZERO I.Q. (neutral influence) for this paper. I think under the MMFBI ground rules, that Noesis #98 deserves a -350 due to C. Manclesco broaching R.Hannon (as a topic of discussion), (OTC-). That's all for now.

Insincerely,

LeRoy Kottke




Rick Rosner  
5139 Balboa Blvd. #303  
Editor NOESIS  
Encino, CA 91316

Dear Rick;

Here's an answer to J. Albert Geerken's number series in NOESIS # 98.  $2 \frac{3}{16}$

My rationale is as follows:

1. all digits in the series are the numbers 1,2,3,4,5, or 6.
2. If I ignore the slashes in the fractions the number series can be written: 1514 612 31516 21516.
3. If I sum the digits in each group, successively if necessary, to arrive at a single digit then then sums are: 11,9,7, and 5. The next number in this series would logically be a 3; and 3 can be expressed as either 516 ( $5+1+6=12$  and  $1+2=3$ ) or 2316 ( $2+3+1+6=12$  and  $1+2=3$ ).
4. Since the differences are decreasing,  $2 \frac{3}{16}$  seems to fit better.
5. The problem with this is the 11 in the first group is a two digit sum, but if I sum it again, it becomes 2, the common difference.--Oh well.

  
Lesley Kottke  
4787 Dawson Dr.  
Ann Arbor, MI 48103

World Population Model  
1650-1990 — LeRoy Kottke



$$x := \begin{bmatrix} 0 \\ 100 \\ 200 \\ 250 \\ 300 \\ 330 \\ 330 \\ 340 \end{bmatrix} \quad M := \begin{bmatrix} 1 & x_0 & (x_0)^2 & (x_0)^3 \\ 1 & x_1 & (x_1)^2 & (x_1)^3 \\ 1 & x_2 & (x_2)^2 & (x_2)^3 \\ 1 & x_3 & (x_3)^2 & (x_3)^3 \\ 1 & x_4 & (x_4)^2 & (x_4)^3 \\ 1 & x_5 & (x_5)^2 & (x_5)^3 \\ 1 & x_6 & (x_6)^2 & (x_6)^3 \end{bmatrix} \quad p := \begin{bmatrix} \ln(550) \\ \ln(725) \\ \ln(1175) \\ \ln(1600) \\ \ln(2565) \\ \ln(4477) \\ \ln(5333) \end{bmatrix}$$

$x$ ,  $M$ , and  $p$  are, respectively, the year, basis matrix, and the population at these years. I took the log of  $p$  to find the coefficients, so that's why the final equation is  $\exp(f(x))$ .

$$c := (M^T \cdot M)^{-1} \cdot M^T \cdot p \quad \text{A way of finding the coefficients in a least squares sense.}$$

$$c = \begin{bmatrix} 6.302 \\ 0.004 \\ -2.021 \cdot 10^{-5} \\ 7.844 \cdot 10^{-8} \end{bmatrix} \quad \text{These are the coefficients}$$

$x = 0, 10, \dots, 380$  This is the year variable starting at zero (1650) and going to 380 (2030).

$$f(x) := c_0 + c_1 \cdot x + c_2 \cdot x^2 + c_3 \cdot x^3 \quad y(x) := x + 1650$$

$$p(x) := \exp(f(x)) \quad \text{This is the population} \quad y(350) = 2 \cdot 10^3 \quad \text{The year 2000}$$

$$g(x) := \frac{d}{dx} f(x) \cdot \exp(f(x)) \quad \text{This is the growth rate}$$

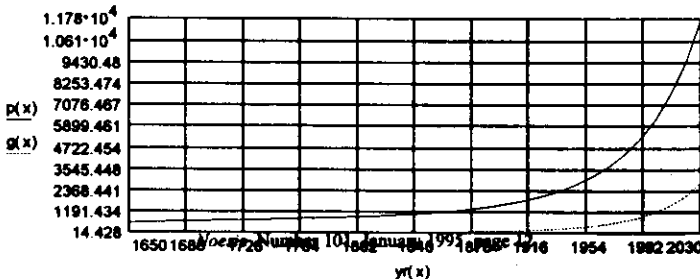
$$p(350) = 6.266 \cdot 10^3 \quad 6.266 \text{ Billion in the year 2000}$$

$$g(350) = 1.167 \cdot 10^3 \quad 1.167 \text{ Billion per year added}$$

Seconds per year

$$\frac{g(350) \cdot 10^6}{3.158 \cdot 10^7} = 36.985 \quad \text{Almost 37 people per second} \quad 24 \cdot 3600 \cdot 365.25 = 3.158 \cdot 10^7$$

World Population in Millions



Multiple Linear Regression using vectors.

Example - LeRoy Kottke

*JKP*

$$\begin{matrix}
 \vec{n} = \vec{u} - \vec{u} \\
 \vec{u} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} &
 \vec{x}_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \\ 3 \\ 1 \end{bmatrix} &
 \vec{x}_2 = \begin{bmatrix} 1 \\ 1 \\ 6 \\ 5 \\ 4 \end{bmatrix} &
 \vec{x}_3 = \begin{bmatrix} 3 \\ 2 \\ 1 \\ 8 \\ 4 \end{bmatrix} &
 \vec{y} = \begin{bmatrix} 0 \\ 9.293 \\ 11.986 \\ 9.293 \\ 2.4 \end{bmatrix}
 \end{matrix}$$

$$\begin{matrix}
 \vec{S}X = \begin{bmatrix} \vec{u} \cdot \vec{u} & \vec{u} \cdot \vec{x}_1 & \vec{u} \cdot \vec{x}_2 & \vec{u} \cdot \vec{x}_3 \\ \vec{x}_1 \cdot \vec{u} & \vec{x}_1 \cdot \vec{x}_1 & \vec{x}_1 \cdot \vec{x}_2 & \vec{x}_1 \cdot \vec{x}_3 \\ \vec{x}_2 \cdot \vec{u} & \vec{x}_2 \cdot \vec{x}_1 & \vec{x}_2 \cdot \vec{x}_2 & \vec{x}_2 \cdot \vec{x}_3 \\ \vec{x}_3 \cdot \vec{u} & \vec{x}_3 \cdot \vec{x}_1 & \vec{x}_3 \cdot \vec{x}_2 & \vec{x}_3 \cdot \vec{x}_3 \end{bmatrix} &
 \vec{S}Y = \begin{bmatrix} \vec{u} \cdot \vec{y} \\ \vec{x}_1 \cdot \vec{y} \\ \vec{x}_2 \cdot \vec{y} \\ \vec{x}_3 \cdot \vec{y} \end{bmatrix} &
 \vec{S}X = \begin{bmatrix} 5 & 8 & 16.1 & 18 \\ 8 & 16 & 27.1 & 36 \\ 16.1 & 27.1 & 78.01 & 64.3 \\ 18 & 36 & 64.3 & 94 \end{bmatrix}
 \end{matrix}$$

$$\vec{B} = (\vec{S}X^T \vec{S}X)^{-1} \cdot \vec{S}X^T \cdot \vec{S}Y$$

$$\vec{S}Y = \begin{bmatrix} 32.972 \\ 60.851 \\ 137.274 \\ 114.516 \end{bmatrix}$$

$$\vec{B} = \begin{bmatrix} -0.898 \\ 6.618 \\ 1.351 \\ -2.068 \end{bmatrix}$$

$$\vec{y}_T = B_0 + B_1 \cdot x_1 + B_2 \cdot x_2 + B_3 \cdot x_3$$

$$\vec{y}_T = \begin{bmatrix} -0.35 \\ 9.552 \\ 11.757 \\ 9.163 \\ 2.85 \end{bmatrix}$$

$$(\vec{y} - \vec{y}_T) \cdot (\vec{y} - \vec{y}_T) = 0.461$$

$$i = 0..n-1$$

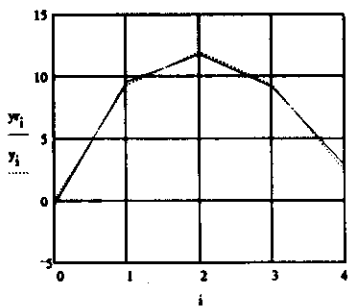
$$\sum_i (y_i - y_{T_i})^2 = 0.461$$

$$r = 1 - \frac{(\vec{y} - \vec{y}_T) \cdot (\vec{y} - \vec{y}_T)}{(\vec{y} - \frac{\vec{u} \cdot \vec{y}}{n}) \cdot (\vec{y} - \frac{\vec{u} \cdot \vec{y}}{n})}$$

$$r = 0.996$$

$$\left( \vec{y} - \frac{\vec{u} \cdot \vec{y}}{n} \right) \cdot \left( \vec{y} - \frac{\vec{u} \cdot \vec{y}}{n} \right) = 104.713$$

$$\left[ \sum_i \left[ y_i - \frac{\sum_i y_i}{n} \right]^2 \right] = 104.713$$



Interpolation Functions used to write a traffic flow vs density function.

LeRoy Kottke

*LK*

a = 227 Traffic Density (Cars per mile)

$$M = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 1 & \frac{a}{4} & \left(\frac{a}{4}\right)^2 & \left(\frac{a}{4}\right)^3 & \left(\frac{a}{4}\right)^4 \\ 1 & \frac{a}{2} & \left(\frac{a}{2}\right)^2 & \left(\frac{a}{2}\right)^3 & \left(\frac{a}{2}\right)^4 \\ 1 & \frac{3}{4} & \left(\frac{a \cdot 3}{4}\right)^2 & \left(\frac{a \cdot 3}{4}\right)^3 & \left(\frac{a \cdot 3}{4}\right)^4 \\ 1 & a & a^2 & a^3 & a^4 \end{bmatrix} \quad y1 = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \quad y2 = \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix} \quad y3 = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{bmatrix} \quad y4 = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{bmatrix} \quad y5 = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$

$$a1 := M^{-1} \cdot y1 \quad a3 := M^{-1} \cdot y3 \quad a5 := M^{-1} \cdot y5$$

$$a2 := M^{-1} \cdot y2 \quad a4 := M^{-1} \cdot y4$$

$$j1(x) = a1_0 + a1_1 \cdot x + a1_2 \cdot x^2 + a1_3 \cdot x^3 + a1_4 \cdot x^4$$

$$j2(x) = a2_0 + a2_1 \cdot x + a2_2 \cdot x^2 + a2_3 \cdot x^3 + a2_4 \cdot x^4$$

$$j3(x) = a3_0 + a3_1 \cdot x + a3_2 \cdot x^2 + a3_3 \cdot x^3 + a3_4 \cdot x^4$$

$$j4(x) = a4_0 + a4_1 \cdot x + a4_2 \cdot x^2 + a4_3 \cdot x^3 + a4_4 \cdot x^4$$

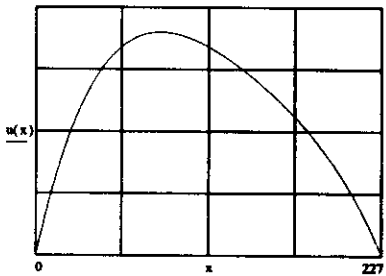
$$j5(x) = a5_0 + a5_1 \cdot x + a5_2 \cdot x^2 + a5_3 \cdot x^3 + a5_4 \cdot x^4$$

$$u(x) = e_0 \cdot j1(x) + e_1 \cdot j2(x) + e_2 \cdot j3(x) + e_3 \cdot j4(x) + e_4 \cdot j5(x)$$

$$e = \begin{bmatrix} 0 \\ 1350 \\ 1344 \\ 890 \\ 0 \end{bmatrix} \quad \text{Data from Holland Tunnel Flow in cars per hour.}$$

x = 0..227 Density Variable

Traffic Flow vs. Density



$$u(0) = 0$$

$$u(56.75) = 1.35 \cdot 10^3$$

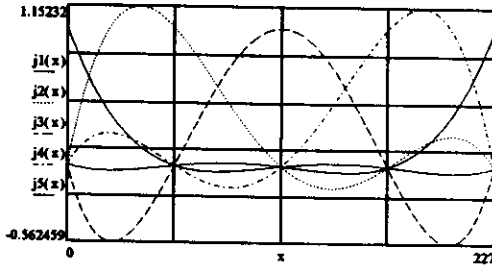
$$u(113.5) = 1.344 \cdot 10^3$$

$$u(170.25) = 890$$

$$u(227) = -3.226 \cdot 10^{-12}$$

$u(82) = 1.44 \cdot 10^3$  Peak Flow Rate

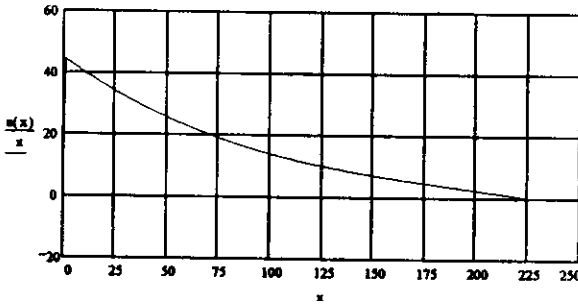
$$a1 = \begin{bmatrix} 1 \\ -0.037 \\ 4.528 \cdot 10^{-4} \\ -2.28 \cdot 10^{-6} \\ 4.017 \cdot 10^{-9} \end{bmatrix} \quad a2 = \begin{bmatrix} 0 \\ 0.07 \\ -0.001 \\ 8.207 \cdot 10^{-6} \\ -1.607 \cdot 10^{-8} \end{bmatrix} \quad a3 = \begin{bmatrix} 0 \\ -0.053 \\ 0.001 \\ -1.094 \cdot 10^{-3} \\ 1.607 \cdot 10^{-8} \end{bmatrix} \quad a4 = \begin{bmatrix} 0 \\ 0.023 \\ -7.245 \cdot 10^{-4} \\ 6.383 \cdot 10^{-6} \\ 1.607 \cdot 10^{-8} \end{bmatrix} \quad a5 = \begin{bmatrix} 0 \\ -0.004 \\ 1.423 \cdot 10^{-4} \\ -1.368 \cdot 10^{-6} \\ 4.017 \cdot 10^{-9} \end{bmatrix}$$



Basis or interpolation functions.

$$u(x) := e_0 j_1(x) + e_1 j_2(x) + e_2 j_3(x) + e_3 j_4(x) + e_4 j_5(x)$$

### Traffic Speed vs Density



$$\frac{u(82)}{82} = 17.562$$

Speed at Max. Density  
(Miles Per Hour)