

Noesis

The Journal of the Mega Society Number 85 September 1993

EDITORIAL

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CORRESPONDENCE FROM ROBERT HANNON

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THINKING ON THE EDGE FROM RICHARD MAY

BIOGRAPHICAL MATERIAL FROM CHRIS HARDING

Please note--If everything happens as my wife and I hope, our address and phone number will change by the next issue. So call to get the new address if you want to send stuff that won't get lost in forwarding, or wait a few weeks 'til we let you know where we are, or send material to Chris Cole.

Months ago, Kjeld Hvatum wrote, asking, "Where do you get IQ tests? I have some Eysenck books and an old Mensa book, but most of these tests are not official or accurately normed." Norlin Library at the U of Colorado had an IQ test file, accessible only to those authorized by the psych department. It was easy to get authorization. I'd guess that many college libraries have something similar. The CU file had norming info on Weschler, Stanford-Binet, etc. Elsewhere in the library, I found a book on administering the Stanford-Binet--all the Q's and A's. I think it would be fun to take a three-year-old, teach him/her all the answers by rote, then send the kid to a psychologist to be tested. He/she might be given an IQ as high as 760! (This, of course, would wreck the kid for life.)

Chris Harding writes--

Want to help bring Mega to the public at large?

The Ultimate IQ Book by Philip Carter (UK.) Marcel Feenstra (Holland) & Chris Harding (Australia), published by Cassell, is to be followed by a second book in 1994. A contact address for Mega has been included together with information on the society to draw out any latent interest the public may have in the society.

They are once again asking for contributions from members of Mega. This is an excellent opportunity to see your favorite original puzzle in print. It is also a good opportunity for any contributor to be a part of the general development of Mega.

Puzzles need not be of the brain-busting variety. The public aren't all geniuses! Ability varies widely and so too will the needs of a general readership. the wider the type and range of material the better the

advertising appeal. Amongst the many readers of these books will be lurking potential new Mega members.

If you would like to contribute to this aim you may wish to write to:

Philip Carter
26 Water Royd Crescent
Mirfield
West Yorkshire
WF14 9SY

Marcel Feenstra and his wife have moved to the Boston area while he studies at Tufts (I think) and Harvard. They're going to be roommates with Kevin Schwartz. People wishing to submit puzzles for the next *Ultimate IQ Book* may also send them to:

Kevin Schwartz & Marcel Feenstra
26 Belknap St
Somerville MA 02144

Marcel also gave me this series problem: 13332, 5021, 3122, 2107, 1447, 1097, 909, 777, 668, ?

P.A. Pomfrit sends the following corrections to my typing errors in his series and analogies in *Noesis*, issues 81 through 83:

- 3. omitted SUPPLEMENTARY
- 24. LORDOSIS, not LORDORSIS
- H. should be 70 not 770
- 40. FRUSTUM, not FRUSTRUM
- 43. NUNCIO, not NUMCIO
- 77. should be INVULTUATION
- DD. 1710 shouldn't be repeated

Pomfrit also got the answers to Peter Schmie's two problems and to my series 1, 2, 1, 2, 1.41, 1, ? My impossible sequence, consisting of a string of 1's and 0's, was the result of a bunch of coin tosses. Pete sends a few more analogies and a math question:

- | | | |
|----------------------|----------------------|------------------|
| 86. CLIFF | RICHARD | HARRY |
| 87. (ACU)PRESSURE | (ACU) PUNCTURE | SHIATSU |
| 88. FLIT ON CHEERING | FLORENCE NIGHTINGALE | HONOR EST A NILO |
| ANGEL | | |
| 89. MALE | FEMALE | AESIR |
| 90. FILM PEOPLE | OSCAR | FILM ANIMALS |
| 91. ISLETS | CRYPTS | LANGERHANS |
| 92. PROFESSIONALS | AMATEURS | RYDER (CUP) |

One that Pomfrit says Mike Price would be most likely to know:

93. THE BATSMAN'S HOLDING THE BOWLER'S

Math problem: The volume of a solid sphere of cheese of radius r is 256 cubic units. It is sliced through, with parallel cuts, at distances of $3/4 r$ and $1/2 r$ from the center of the sphere. What is the volume of the piece produced between the two cuts?

SPECIAL EDITOR'S NOTE: I think analogy 88 is Pomfrit's best and might suggest some other similar problems. Even if you haven't tried any of his other analogies, try this one.

Triple Nine Society Annual Meeting

October 1993

On the Columbus Day Weekend, October 8-11, 1993, there will be a meeting of members of the high-I.Q. societies with cutoffs above the 99.9th percentile, and their guests, at the home of Rena Yates, in Petaluma, California, forty miles north of San Francisco.

Mrs. Yates has a spacious and beautiful house with a large meeting room and lush gardens. She is an accomplished horsewoman and has known the meeting organizer, Kevin Langdon, for over twenty years.

The Airport Express makes the trip from San Francisco International Airport to Petaluma in ninety minutes. The one-way fare is \$15; the round-trip fare is \$22. There are a number of reasonably-priced motels within a few minutes of Mrs. Yates' home. A map of the area and a list of hotels, motels and restaurants in the area will be provided to those who write for information about the meeting. Pickup and delivery of attendees to/from the Airport Express and nearby motels will be available without charge throughout the meeting.

The Triple Nine Society held its first annual meeting in St. Louis in 1985. Meetings in recent years have been open to members of all the "higher-I.Q. societies" and have included participants from the ISPE, Prometheus, Four Sigma, and Mega Societies. (Members of the new One-in-a-Thousand Society and the defunct MM, Minerva, and Cincinnatus societies are also invited, as are those with scores at the 99.9th percentile or above on any of a number of I.Q. and aptitude tests; inquire regarding qualifying scores.)

The cost of the meeting space will be defrayed by participants according to the following schedule: \$5 for Friday evening, \$10 for Saturday, \$10 for Sunday, \$5 for Monday morning; or \$20 for the entire weekend. Those wishing to bring sleeping bags will be able to stay at the meeting place for an additional \$5/night. A smoking area will be available outdoors.

The meeting will be primarily devoted to unstructured socializing, but some time during the weekend will be devoted to informal presentations (30 to 60 minutes) by attendees. Please let us know if you would like to make a presentation and tell us what you'd like to present, so that we can arrange a schedule. Optional excursions may be included in the schedule if participants desire.

One thing that will not be a part of the program is any kind of "official" meeting of the Triple Nine Society or any other group, though we expect that there will be discussion of the affairs of the societies. Also, participants may wish to discuss the venue for next year's meeting. In accordance with the principles and tradition of the Triple Nine Society, we intend to create an open atmosphere and to operate by consensus rather than through authoritarian structures.

To register or for more information, please write to Kevin Langdon, P.O. Box 795, Berkeley, CA 94701, or call (510) 658-1792. After August 20, please call Bill Rowan at (510) 654-6311 to obtain a current number for Kevin Langdon.

SCIENCE FICTION PREDICTION

by Rick Rosner

Haven't written anything except editor's comments for many issues. Here's a sad stab at something.

I used to read lots of science fiction. I've noticed that cultural predictions and extrapolations made in SF stories almost never come true within the predicted time period and usually do come true sometime later. (Some predictions are immediately true, since they're nothing but fictionalization of the present.)

Mainly, I'm thinking about rock bands and butt floss and drugs. In John Brunner's *Stand On Zanzibar* and *The Sheep Look Up* (his best books, and, I found out later, rip-offs of John Dos Passos's *U.S.A.* trilogy), women wear slit skirts which display panties embroidered with pom-poms of synthetic day-glo pubic hair. I consider this cultural prediction fulfilled by butt floss (colorful backless panties worn over bicycle shorts) and by Madonna's Jean-Paul Gaultier torpedo tits. Brunner was writing in the late 60's about the mid 70's (I think), but his predictions weren't fulfilled until the late 80's.

The names and behavior of rock bands follow the same schedule. Today's musicians look and act like writers in the 60's predicted musicians in the 70's would act. It's as if making a cultural prediction temporarily insures that it won't come true, then guarantees its later fulfillment.

Same with drugs. What are ecstasy and crack except tardy versions of drugs predicted 25 years ago by Brunner and Dick and Goulart?

And all this stuff has finally arrived, but we don't walk around in a perpetual state of SF wonder, even though current technology is even more surprising compared to 1968 than is current culture. Everything seems more or less normal and a pain in the ass. So, what's the deal? Why isn't modern life as exciting as a science fiction novel (besides the obvious thing that life can't be edited like a book)?

As I see it, the deal is this--stories are disguised vectors. An author imagines a point in plot-character-cultural-technologic space, builds a structure to support the point, make it seem believable. But it's still just a point. You can draw a line from where we are to where it is. The author's structure lies mainly along that line, justifying the imaginary world, camouflaging its artificiality.

And authors usually go too far. Imagined weirdness usually lies beyond the sphere of impending weirdness. Or, rather, the sphere of potential near-future weirdness is so large that there's lots of room for predicted weirdness not to match the strangeness of what's really going to happen.

So you have this sphere in n-space, representing in some way the current situation. It bubbles outward in spikes (looking like the spiny chestnuts Dave Shuchter whipped into the audience during summer movies at Chataqua). Big spikes that get some attention (the Branch Davidians) but become way boring because of incessant coverage and everyday details and the regularness of the participants. (David Koresh failed to be witty or sexy or even very scary.) Little support spikes. The cultural-technological sphere expands jaggedly and eventually envelops most predictions, making them true, draining them of interest.

So, all this weird stuff is going to happen, but it won't seem weird. We live in a science fiction world, without the thrill of amazement. Real-life thrills are what they've always been--sex, money, food, sometimes velocity. Transformation, revelation, almost never. Sometimes I pretend I'm someone from the past, waking up to this world. It's good for minor excitement.

July 24, 1993
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LETTERS FROM ROBERT DICK

Dear Rick:

I enjoyed seeing my name mentioned in genuine print in *Noesis* #81.

In reply to Kevin Schwartz: Yes, absolutely, God is not omniscient nor omnipotent--in Kevin's sense. The existence of such a God is incompatible with there being any non-God, anything or anyone but God and His robots. Furthermore, such a God as Kevin seems to think exists is not Biblical. There would be no tares in anyone's wheat, no sickness, no pain, at least not in a universe run by an omnibeneficent, omniscient, and omnipotent Being. Therefore God is not all of these.

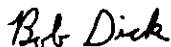
Furthermore, a God that time-travels and goes back and fixes bad events before they happen is incompatible with Judaism. It is a Jewish teaching, I'm sorry, I forget who said it, that one must not pray for the changing of an event that has already happened. For example, on my way home from vacation I must not pray that my house has not already burned down.

Maybe God limits Himself, maybe He just can't do everything. I favor the former possibility. Genesis tells us that God did not create the universe ex nihilo, He created it by forming order out of chaos. His very first creative act was the invention of "light." What happened before the advent of "light" is shrouded in darkness. This "light" is some places and not others. I maintain that even God cannot see in the darkness which is even yet not penetrated by His "light."

I believe that the universe is sufficient and only just sufficient for God's purposes. The purpose of creation and human life is to share joy with God. We enjoy Him, He enjoys us. Potence and science (as in "omnipotence" and "omniscience") do not have much to do with joy. Otherwise Mega Society members and/or presidents of the United States would be the happiest people on Earth.

Well, enough theologizing for now. I look forward to whatever replies anyone cares to send me or to publish in *Noesis*.

Very truly,



Robert Dick

PS I oppose publishing the names of the tests members have taken to qualify for Mega. I thought the idea of second-class membership for non-Mega-test-qualifiers was finished. Now I see it rearing its ugly head again.

July 26, 1993
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Dear Rick:

Robert Hannon's article "Does the Future Exist?" in Noesis #83 prompts me to write a rebuttal. I hate to be a spoil-sport, but it is simply not true that a wave's behavior in the present depends on its behavior in the future.

1) Bob writes: "...any wave-shape that has a repeating pattern is the sum of a set of perfect sine-waves..." Not true. Bob's definition of a "perfect" sinewave is one with zero width in frequency. Such a wave must be everlasting both in the past and the future. It must therefore have predated the Big Bang by an immense margin. Further, the wave with the repeating pattern must perfectly replicate its pattern in the everlasting past and future also for this to be true.

2) Bob mentions a "wave analyzer." I presume he means a spectrum analyzer. I assure him and you that such devices cannot predict the future. The frequency resolution of a spectrum analyzer depends strictly on how long it is run. Its assessment NOW of the "perfection" of a sinewave depends ONLY on what has been put into it IN THE PAST.

3) A signal generator cannot produce a perfect sinewave no matter how long it is going to run in the future. It must also have run everlastingly in the past. Further, we must wait everlastingly in order to determine that its sinewave is in fact perfect.

Of course, many people and many machines make predictions about the future which often come true. However, that marvel of modern electronics, the spectrum analyzer, is not one of them.

Very truly,

Bob Dick

Robert Dick

Dear Rick, LETTER FROM G. ARTHUR MORRISON

Please continue your gentle fun-making and keep up the good work; the journal is splendidly entertaining and even enlightening at times. Have you seen the first chapter of Martin Gardner's Fads and Fallacies? He suggests some handy non-senseless techniques for evaluation of theories by context. From what I've seen, they should be just about right for application in editing Noesis.

I ran across the following aesthetically neat result in matrix theory while calculating some circuit impedances, and vainly attempted to track it down at the Northwestern library. Does anyone know the name or source of this theorem?

Begin with the function $f(x,y)$ given by the truncated Taylor series:

$$f(x,y) = \sum_{\substack{r,s= \\ 0,1,\dots,n-1}} c(r,s) x^r y^s$$

where x and y are real or complex variables.

Now let the $n \times n$ matrix M have elements $m(i,j)$ for every (x,y) , given by

$$m(i,j) = f(x+i, y+j) \quad ; \quad i,j = 0,1,\dots,n-1$$

Also, let the matrix D of partial derivatives of f at (x, y) have elements:

$$d(i,j) = i!j! c(i,j) = \frac{\partial^{i+j} f(x,y)}{\partial x^i \partial y^j}$$

Then the determinants of D and M are equal. $\det D$ and $\det M$ remain constant for all x, y .

Example: Let $f(x,y) = 1 + y^2 + xy^2 - xy^3 - y^3 + x^3y^3 + x^3$

Then, with $n = 4$, evaluating $m(i,j)$ and $d(i,j)$ at $(x,y) = 0,0$:

$$\det M = \begin{vmatrix} 1 & 2 & 9 & 28 \\ 1 & 3 & 15 & 49 \\ -3 & 4 & 57 & 210 \\ -17 & 5 & 177 & 667 \end{vmatrix} = \det D = \begin{vmatrix} 1 & 0 & 0 & 6 \\ 0 & 1 & 0 & 0 \\ 2 & 0 & -4 & 0 \\ -6 & 0 & 0 & 36 \end{vmatrix} = -288$$

~~PROOF AND DEMONSTRATION FROM GEORGE W. DICKS~~
A DEMONSTRATION THAT THE SET OF POWERS OF 2 WHICH ARE NATURAL NUMBERS HAS A LOWER CARDINALITY THAN THAT OF THE NATURAL NUMBERS

By George W. Dicks, Jr.
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Let $N = \{ n : n \text{ is a natural number} \}$
Let $P = \{ p : p \text{ is a member of } N \text{ and } p \text{ is a power of } 2 \}$
Let $S = \{ s : s \text{ is a subset of } P \}$
Let $B = \{ b : b \text{ is a member of } S \text{ and the sum of } b \text{'s members is a member of } N \}$

By the Diagonal Theorem, S has a higher cardinality than P .
Every member of N is the sum of the members of a unique member of S .
Therefore, B and N have the same cardinality.
Now, there are two possibilities:

Possibility 1: there exists a member s of S which is not a member of B .
Let $x =$ the sum of the members of s .
Because s is clearly a member of S , it must fail the other qualifier of set B , namely that x is a member of N .
Therefore, there exists a potential member of N , namely x , which is not a member of N .
Therefore, the largest possible member of N is $x - 1$.
Now, any set which contains a largest member is finite.
Therefore, the set of natural numbers is finite.

Possibility 2: there exists no member s of S which is not a member of B .
Therefore, B equals S .
Therefore, B has the same cardinality as S .
Therefore, N has the same cardinality as S .
Therefore, P has a lower cardinality than N .

Therefore, either the set of natural numbers is finite or the set of powers of 2 which are natural numbers has a lower cardinality than that of the natural numbers. Q.E.D.

A DEMONSTRATION THAT THE SET OF NATURAL NUMBERS EVENLY DIVISIBLE BY 2 IS HALF AS LARGE AS THE SET OF ALL NATURAL NUMBERS

By George W. Dicks, Jr.
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Let n be a natural number.
The probability that n is evenly divisible by 2 is $1/2$.
Now, the probability of an event equals the size of the set of favorable outcomes divided by the size of the set of all possible outcomes.
Therefore, the set of natural numbers evenly divisible by 2 is half as large as the set of all natural numbers. Q.E.D.

A DEMONSTRATION THAT EUCLID NEVER PROVED THERE IS NO LARGEST NATURAL NUMBER

By George W. Dicks, Jr.
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Euclid's Proof:

Assume n is the largest natural number
However, m is a natural number which is the successor of n
Any member of a set which has a successor which is also a member of the
set is not the largest member of the set
Therefore, n is not the largest natural number
Contradiction
Therefore, n is not the largest natural number

Euclid's proof may be stated more succinctly as follows:

Assume n is the largest natural number
However, n is not the largest natural number
Contradiction
Therefore, n is not the largest natural number

Now, Let's construct a very similar reductio ad absurdum:

Assume n is not the largest natural number
However, n is the largest natural number
Contradiction
Therefore, n is the largest natural number

From this, a proof similar to Euclid's may be constructed:

Assume n is not the largest natural number
However, n has no successors which are natural numbers
A member of a set which has no successor which is also a member of the
set is the largest member of the set
Therefore, n is the largest natural number
Contradiction
Therefore, n is the largest natural number

Euclid demonstrated n is not the largest natural number if n has a successor.
However, Euclid never proved there is no largest natural number. Q.E.D.

AN ALTERNATIVE RESOLUTION TO THE COUNTING PARADOX

By George W. Dicks, Jr.
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Counting Paradox:

Let $N = \{n : n \text{ is a natural number}\}$
Let $E = \{e : e \text{ is a natural number evenly divisible by 2}\}$
We can compare the sizes of these sets by constructing a set of ordered pairs where each pair consists of one member of N and one member of E . There are as many different sets constructible in this manner as the product of the number of distinct orderings of each of the sets. Let's examine two of these sets of ordered pairs:
Case 1:
Let $M = \{(n,e) : n \text{ is a member of } N, e \text{ is a member of } E \text{ and } e = n\}$
 M contains 1 member for each and every member of E
 E contains 1 member for each and every member of M
Therefore, M and E contain the same number of members
 N contains 1 member for each and every member of M
 N contains members not corresponding to members of M
Therefore, N contains more members than E
Therefore, N contains more members than E
Case 2:
Let $M = \{(n,e) : n \text{ is a member of } N, e \text{ is a member of } E \text{ and } e = 2n\}$
 M contains 1 member for each and every member of N
 N contains 1 member for each and every member of M
Therefore, M and N contain the same number of members
 E contains 1 member for each and every member of M
 M contains 1 member for each and every member of E
Therefore, M and E contain the same number of members
Therefore, N and E contain the same number of members
Therefore, a paradox: has been demonstrated in that sets N and E appear to simultaneously be of both the same and different sizes based upon the order in which they are compared

Cantor's Resolution:

Assume E is a proper subset of N in both cases
As demonstrated by Case 2, E and N have the same number of members
Therefore, conclude that an infinite set such as N may have the same number of members as an infinite proper subset of itself such as E .
Therefore, conclude that two sets are the same size if at least one set of ordered pairs such as M in Case 2 can be constructed such that M contains 1 member for each member in each of the sets
Explain Case 1 as being an illusion

Proposed Resolution:

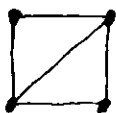
Let $E_1 = \text{set } E \text{ from Case 1}$
Let $E_2 = \text{set } E \text{ from Case 2}$
Now extrapolating somewhat from Case 1, it can be concluded that set N has twice as many members as set E_1
Case 2 has demonstrated that set N has as many members as set E_2
Therefore, set E_2 has twice as many members as set E_1
Therefore, set E_2 and set E_1 are not the same set
Now, set E_2 is the proper set of a set of natural numbers, N_2
Applying Case 1 to sets E_2 and N_2 , it can be concluded that set N_2 has twice as many members as set E_2
Therefore, set N_2 has twice as many members as set N
Every member of N is a member of N_2
Because N_2 has more members than N , there must be members of N_2 which are not members of N
Therefore, N is a proper subset of N_2
Therefore,
1. Case 2 above represents the case of two different proper subsets of a set which have the same number of members
2. It may not be concluded from these cases that any set may have the same number of members as a proper subset of itself
3. Because N is a proper subset of N_2 , there must be a member of N_2 which is not a member of N
Therefore, N is finite
Since N is finite, N_2 is finite
Since a larger set N_2 may be constructed for any set N , the natural numbers are potentially, but not actually, infinite.

A SOLUTION TO CONWAY'S THRACKLE PROBLEM

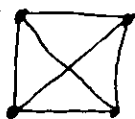
By George W. Dicks, Jr.
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Problem: A thrackle is a graph drawn in the plane with straight or curvy edges in such a way that any two edges either cross each other exactly once or share one endpoint, but not both. No other kinds of incidence between edges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

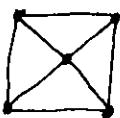
There are a potentially infinite number of solutions of which here are a few:



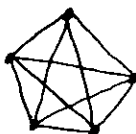
$$V=4$$
$$E=5$$



$$V=4$$
$$E=6$$



$$V=5$$
$$E=8$$



$$V=5$$
$$E=10$$



$$V=10$$
$$E=20$$

IT IS NOT POSSIBLE TO COMPARE THE SIZE OF THE SET OF NATURAL NUMBERS WITH THE SIZE OF THE SET OF REAL NUMBERS BETWEEN 0 AND 1 WITHOUT FIRST DEFINING THE SETS MORE PRECISELY

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Definition: Reflective Numbers - Two Numbers x and y are reflective within a counting system if x is a natural number, y is a real number between 0 and 1, and the digit expansion of x is the reverse of the digit expansion of y within the counting system.
For example, 1 and .1 are reflective as are 10 and .01

Let $N = \{ n : n \text{ is a natural number} \}$

Let $D = \{ d : d \text{ is a real number between } 0 \text{ and } 1 \}$

Let $M = \{ (n,d) : n \text{ is a member of } N, d \text{ is a member of } D, n \text{ and } d \text{ are a pair of reflective numbers} \}$

Here is the set of ordered pairs (using binary notation):

$M = \{ (1,.1), (10,.01), (11,.11), (100,.001), (101,.101), (110,.011), \dots \}$

Now, for any member d of D , it is possible to construct $(R(d),d)$ where $R(d)$

is the other member of the reflective pair of which d is a member

If, for every d which is a member of D , $R(d)$ is a member of N then

D can not have more members than N

Now, for any member n of N , it is possible to construct $(n,R(n))$ where $R(n)$

is the other member of the reflective pair of which n is a member

If, for every n which is a member of N , $R(n)$ is a member of D then

N can not have more members than D

If, for every n which is a member of N , $R(n)$ is a member of D , and for every

d which is a member of D , $R(d)$ is a member of N , then sets N and D have

the same number of members.

N can not have more members than D

Therefore, the respective sizes of the sets cannot be determined without first

defining which potential members of the sets are actually members

Therefore, it is not possible to compare the size of the set of natural with

the size of the set of real numbers between 0 and 1 without first defining

the sets more precisely Q.E.D.

AN ALTERNATIVE RESOLUTION TO THE BI-SECTION PARADOX

By George W. Dicks, Jr.
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Let $R_1 = \{ r_1 : r_1 \neq 0 \text{ and } r_1 \leq 1 \}$
Let $R_2 = \{ r_2 : r_2 \neq 0 \text{ and } r_2 \leq 2 \}$

Let $M_1 = \{ (r_1, r_2) : r_1 \text{ is a member of } R_1, r_2 \text{ is a member of } R_2, r_1 = r_2 \}$
Let $M_2 = \{ (r_1, r_2) : r_1 \text{ is a member of } R_1, r_2 \text{ is a member of } R_2, r_2 = 2 * r_1 \}$

Case 1:

For every member of R_1 there is a member of M_1
For every member of M_1 there is a member of R_1
Therefore, M_1 and R_1 have the same number of members
For every member of M_1 there is a member of R_2
There exist members of R_2 for which there is no member of M_1
Therefore, R_2 contains more members than M_1
Therefore, R_2 contains more members than R_1

Case 2:

For every member of R_1 there is a member of M_2
For every member of M_2 there is a member of R_1
Therefore, R_1 and M_2 have the same number of members
For every member of R_2 there is a member of M_2
For every member of M_2 there is a member of R_2
Therefore, R_2 and M_2 have the same number of members
Therefore, R_2 and R_1 have the same number of members

Cantorian Resolution:

A subset can have the same number of members as a proper subset of itself
This is demonstrated by:
If two sets may be shown to be of the same size by comparing them in any order then the sets are in fact of equal size
Case 2 demonstrates such a mapping
Therefore, sets R_1 and R_2 are indeed of equal size
Case 1 is an illusion

Proposed Resolution:

Two sets are of equal size only if they may be shown to be of equal size by comparing them in any possible ordering
Case 1 represents a counter-example to the conjecture that the sets are of equal size

Therefore, set R_2 does, in fact, contain more members than set R_1

Now, let's examine Case 2 more closely:

Focus on the third premise:

For every member of R_2 there is a member of M_2

Why must this be true?

Consider:

Each member of R_1 is representable by a binary representation

Each member of R_2 is representable by a binary representation

Multiplying by two is equivalent to shifting left one position

Such a shift vacates the right-most position in the binary expansion of the members of set R_1

Therefore, we can construct a set S_1 :

$S_1 = \{ s_1 * 2 : s_1 \text{ is a member of } R_1 \}$

For every member of R_1 there is a member of S_1

For every member of S_1 there is a member of R_1

Therefore, S_1 and R_1 have the same number of members

Now apply Case 1 to sets S_1 and R_2

Let $M_3 = \{ (s_1, r_2) : r_1 \text{ is a member of } S_1, r_2 \text{ is a member of } R_2, s_1 = r_2 \}$

For every member of S_1 there is a member of M_3

For every member of M_3 there is a member of S_1

Therefore, M_3 and S_1 have the same number of members

For every member of M_3 there is a member of R_2

There exist members of R_2 for which there is no member of M_3
(These are members of R_2 which have a 1 in the right-most place)

Therefore, R_2 contains more members than M_3

Therefore, R_2 contains more members than S_1

Therefore, R_2 contains more members than R_1

Therefore, it has been demonstrated that the third premise is not true

Therefore, the paradox has been resolved without requiring that a proper subset of a set contain as many members as its parent set

PARTITIONS OF THE SET OF REAL NUMBERS

By George W. Dicks, Jr.
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Let $N = \{ n : n \text{ is a natural number} \}$
Let $E = \{ e : e \text{ is a natural number evenly divisible by } 2 \}$
Let $R_1 = \{ r_1 : r_1 \geq 0 \text{ and } r_1 \leq 1 \}$
Let $R_2 = \{ r_2 : r_2 \geq 0 \text{ and } r_2 \leq 2 \}$

Define $|n| =$ the number of members of set n

As demonstrated in reference 1, $|N| = 2 * |E|$
As demonstrated in reference 2, $|R_2| = 2 * |R_1|$

Now, consider the entire number line:

Let $R = \{ r : r \text{ is a real number} \}$

Set R can be described as a consisting of a copy of set R_1 between each pair of consecutive members of set N

Therefore, $|R| = |N| * |R_1|$

Set R can be described as a consisting of a copy of set R_2 between each pair of consecutive members of set E

Therefore, $|R| = |E| * |R_2|$

Therefore, $|N| * |R_1| = |E| * |R_2|$

Therefore, $2 * |E| * |R_1| = |E| * 2 * |R_1|$

Therefore, $|E| * |R_1| = |E| * |R_1|$

Therefore, the theorems of references 1 and 2 are satisfiable

Generalizing this result yields the following:

Let $|I| =$ the number of identical partitions of the real numbers

Let $|D| =$ the number of real numbers in each identical partition

$|R| = |I| * |D|$

Reference 1:

AN ALTERNATIVE RESOLUTION TO THE COUNTING PARADOX (8-10-93)

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Reference 2:

AN ALTERNATIVE RESOLUTION TO THE BI-SECTION PARADOX (8-16-93)

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ROBERT J. HANNON ~~LETTERS FROM ROBERT HANNON~~ Sarasota FL 34238-5626
26 July 93

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Dear Rick,

I was appalled at the egregiously presumptuous, arrogant, and pompous reply to my letter of 5 May that Chris Cole sent to you for publication. My experience says that this sort of thing results when I hit a nerve, or have offended the godhead.

In my letter of 5 May (I sent the same letter to several people) presented some simple, established algebraic relationships, the straightforward conclusions I drew from them, and the question:

"Where is the error, if any, in the foregoing?"

A simple question calling for only a simple, objective reply.

Having no simple, objective reply, Cole fired a barrage of poppycock. He didn't send it to me. He sent it to you for publication, obviously intending, through calumny, to do the greatest possible damage to an idea he finds unacceptable.

All others (including four professors of physics, expert on relativity) who answered that letter offered me a variety of objective responses. Only Cole (who knows zero about me) arrogated himself qualified to judge my perception of reality, objectivity, character, integrity, scientific acumen, and personal motives. He alone failed to offer a single objective algebraic argument. Instead, he pontificated that we cannot share a mutual understanding of the simple prosaic algebra on which the Lorentz Transformation is predicated. He rejected the applicability of mathematics to ordinary algebraic equations that are entirely mathematical in their origin. Having no knowledge whatsoever of my education, experience, personality, or character, he pompously presumes that I would automatically reject sound mathematical or logical argument which disproves my position. Perhaps these utterly unfounded judgments are but reflections of himself.

He tells me not to "waste his time", yet he ends his tirade with a question, "what is it about relativity that bugs you?"

My answer is that there appears to be sound algebraic evidence that the LT, which is entire mathematical foundation of SPECIAL relativity, is algebraically incomplete/unfinished. When the algebra is completed, the foundation of SPECIAL relativity vanishes. The implication is that SPECIAL relativity is not a true description of nature. That's what bugs me.

IF my straightforward algebraic arguments are true, then SPECIAL relativity is a fallacy. Number 85 September 1993 page 15

Cole apparently is so obtuse in his bigotry as to believe that I

am a cretin who would put forth these arguments without having become intimate with the physical, mathematical, and logical premises from which the LT is derived, sans extensive objective study of its various derivations. The fact is that I have been intensively studying the fundamentals of the LT for over three years.

The LT is a simple algebraic construct, predicated on a simple, specific physical model, and on the postulate that the speed of propagation of electromagnetic radiation in a vacuum (C) is the same in all inertial frames of reference.

The simplest algebraic form of this postulate is:

$$(1-1) \quad x/t = C = x'/t'$$

I have analyzed about ten different derivations of the LT. I have seen several others. All rigorous derivations are predicated on (1-1). It is not logically possible to derive the LT without (1-1) or its equivalent.

All derivations produce the same "results": the simultaneous equations we call the Lorentz Transformation. Anyone familiar with Special Relativity is familiar with these equations and the definitions of the symbols they contain:

$$(1-2) \quad x' = (x-Vt)/\sqrt{1-V^2/C^2}$$

and

$$(1-3) \quad t' = (t-Vx/C^2)/\sqrt{1-V^2/C^2}$$

and

$$(1-4) \quad y' = y$$

and

$$(1-5) \quad z' = z$$

x = a distance, measured from its origin, along the x-axis of the IFR being observed.

t = a time interval as measured by a perfect clock in the IFR being observed.

x' = x as measured by the observer using perfect instruments in his own IFR.

t' = t as measured by the observer using a perfect clock in his own IFR.

V = the linear and constant relative speed (in the direction parallel to the x and x' directions) of the IFR being observed relative to the observer's own IFR.

C = the constant speed of propagation of light in a vacuum in the direction parallel to the x and x' directions.

(1-4) and (1-5) are usually ignored as contributing no additional information, because (1-2) and (1-3) are predicated on the direction of both V and C being parallel to the x and x' axes, and do not affect the y and z coordinates. Poincare derived equivalent equations in which the velocities may be at any angle relative to the x, y, and z coordinates.

(1-2) and (1-3) are the entire mathematical foundation of Einstein's Theory of Special Relativity.

(1-2) and (1-3) are correct, but they are incomplete/unfinished algebra. Both contain excess terms whose equivalents are known from (1-1). There is no apparent reason why they were not brought to proper completion. Their unfinished state led Einstein and many others into misinterpretations of their physical meanings. When the algebra is brought to its proper completion, the results are:

$$(1-6) \quad x' = x \sqrt{[(C-V)/(C+V)]}$$

and

$$(1-7) \quad t' = t \sqrt{[(C-V)/(C+V)]}$$

(1-2) and (1-3) vanish, taking with them the mathematical foundation of the Theory of Special Relativity.

As a particle physicist, Cole has doubtless often used an equation derived from the LT employing additional assumptions, namely the Mass Transformation:

$$(1-8) \quad M = M_0 / \sqrt{(1-V^2/C^2)}$$

(1-8) is essential in order to determine the behavior of charged particles in accelerators and similar situations. There is no doubt that it gives what seem to be the "right answers". That does not necessarily mean that it represents the true physical reason why those particles behave the way they do. It may come as a rude shock to Cole to learn that there are reputable physicists who do not believe (1-8) to be a valid statement of physical fact. There are rational, non-relativistic theories as to why charged particles behave the way they do as their velocity changes relative to accelerating fields; theories that do not involve mass changes.

Equation (1-8) can not be derived when (1-1) is properly observed, nor can it be derived from the Completed LT, (1-6) and (1-7). It is algebraically invalid.

Anyone truly intimate with the physical premise of the LT will immediately recognize that the situation of charged particles moving relative to accelerating fields does not conform to that physical premise. The LT is not applicable to that situation. (1-8), being derived from the LT, is not applicable to that situation. But (1-8) gives the "right answers" despite its fallacy and inapplicability.

There are many similar working formulas in science and engineering; they work, but they are not necessarily "true". To the practical scientist, all that matters is that they give the right answers. Particularly if there is no other known and accepted way to get the "right answers".

As a seeker after truth, I am not satisfied with "what works". I want to know the true facts of nature. Learning the truth is my sole motivation in my detailed study and analysis of the LT, and in seeking the opinions of others versed in my subject.

2) What's all this "glory" malarkey? Only a simpleton would believe that my discovery (or any similar discovery) will be

accepted by the science establishment during my lifetime, or that, when it is eventually accepted that it will be credited to me. Frankly, I don't give a damn. Knowing the truth, and sharing it with those perceptive enough to understand it, is enough for me.

3) There is nothing in my letter of 5 May which implies that the many bright people who have studied the LT and SR over the past 100 years are "unable to do algebra". I have asked myself hundreds of times, "how is it possible that I have been the first to make this simple discovery?" There are three possible answers:

a) I am not the first. (I consider this the most likely answer). It has been discovered many, many times. It is not "acceptable" to the science establishment, so it has not been published. It would leave much of today's theoretical physics a shambles.

b) I am the first, and there is no logical explanation for that fact. There is no law of nature that requires its truths to be discovered on some particular schedule.

c) I am wrong. So far, no one has presented me with sound algebraic argument to prove it.

4) I will welcome physically, mathematically, and historically sound, objective argument proving my algebraic arguments to be invalid. No authoritarian stuff, please!

Best regards,



Robert J. Hannon

ROBERT J. HANNON
28 July 93

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Dear Rick,

Just received 83 and 84. Thanks for publishing my articles. Here are replies to comments directed to me:

TO KEVIN SCHWARTZ

1) I hope you will soon be well, young friend!

2) I have nothing against Einstein. I "know" him only through a 630 page biography by Ronald W Clark and his own writings. If that biography is accurate, your quotations regarding his dissertation are apocryphal. Einstein showed no signs of any particular intellectual abilities up to, during his four years at ETH in Zurich, and a couple of years after. His grade average at ETH was 4.91 out of 6.00, or 82%. By today's standards his level of training and his grades would not have qualified for a doctorate. He was not offered a teaching job at ETH upon graduation, as was usual and as he expected. He was sporadically employed for nearly a year after graduation, before getting his job as a "Technical Expert (Third Class)" with the Swiss Patent Office, with a lot of help from family friends. Apparently, at that time (1900) he was considered a rather difficult young man of no particular talent or promise, somewhat resentful of and disrespectful toward authority figures, and the orderly lifestyle.

3) History and his own statements indicate that Einstein was unaware of the Michelson-Morley experiment and of most of Lorentz's work when he published his seminal paper on what we now call the Einstein Theory of Special Relativity (TSR): ON THE ELECTRODYNAMICS OF MOVING BODIES (1905). In Section 3 of that paper, he used prosaic algebra to derive his transformation equations (identical with what we now call the Lorentz Transformation). In 1905, TSR did not involve Minkowski "spacetime" or any geometry other than Euclid's. The "spacetime" concept is not fundamental to the TSR. Minkowski published his SPACE AND TIME in 1908.

4) My COMPLETING THE LORENTZ TRANSFORMATION (NOESIS 83) offers simple algebraic arguments that the conventional LT (the equations on which Einstein based his TSR) are algebraically incomplete/unfinished. When the algebra is properly finished, the conventional LT ceases to exist, wiping out the entire mathematical foundation of Einstein's TSR. All that remains are two simultaneous equations which are identical with the "relativistic" Doppler equations. These equations "prove" that C is invariant, but only because the derivation of the LT is, and must be, predicated on that belief.

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5) Einstein was not the first to derive $E = mc^2$. The same

relationship was derived as early as 1876, based on Maxwell's equation for the force exerted by radiation. The algebra of these earlier derivations was simple and straightforward. Einstein's "relativistic" derivation (based, by the way, on TSR, not General Relativity) was premised on an unexplained Energy transformation (derived apparently from the incomplete LT). The algebra of his derivation contains Einsteinian "magic".

Einstein's later non-relativistic derivation is based on the "law of aberration of light", which deals with an optical illusion.

Does $E = mc^2$? If so, why? Einstein didn't offer a clue. Assuming his algebra is valid, his physical premise (in his original derivation) is the usual two IFRs in relative motion at V , plus something in motion at C , of his derivation of the LT. That seems inconsistent with the physical situations in which we observe the conversion of mass to radiation.

6) Grand Unified Field Theories will fail so long as they assume there are "forces" other than electromagnetism. Einstein's one truly great idea is that gravity arises from the geometry of space and time near a mass. Gravity is not a "force". The weak and strong nuclear forces are substitutes for knowledge.

TO CHRIS LANGAN:

1) You are mistaken:

a) I have never looked for "relativity to emerge from the LT". Einstein derived his transformation equations (which we now call Lorentz's) to attempt to mathematically rationalize his mistaken idea that what he called "the (restricted) principle of relativity" (the laws of nature are the same in all inertial frames of reference) needed some sort of "transformation" to relate it to observation. He was convinced, for opaque reasons, that Maxwell's equations are not invariant in the Galilean transformation, and thus seemed to violate the (restricted) principle of relativity. The LT is a mathematical construct, predicated on a simple and specific physical model, and on the postulate that the velocity of propagation of EM radiation in a vacuum (C) is the same in all inertial frames of reference. Einstein originally derived his transformations using only simple, prosaic algebra.

b) The conventional LT is the foundation of what you call "relativistic logic". It involves conflicts with "common sense" because it is algebraically incomplete/unfinished. "Relativistic logic" is a fallacy, because it is not necessary to support the (restricted) principle of relativity. Nor does it actually support that principle.

c) I have never referred to the LT as a "premise" for anything but the Einstein Theory of Special Relativity (TSR). That is a statement of fact.

d) I have never been "idiotically stupid" in Special Relativity". I

have only sought the truth.

e) C has not been "found to be invariant" except by circular logic using a theory which is predicated on that belief.

2) In my COMPLETING THE LORENTZ TRANSFORMATION (NOESIS 83), I offer simple algebraic arguments that the conventional LT is incomplete. When the algebra is properly finished, the conventional LT ceases to exist, along with Einstein's TSR. All that remains are two simultaneous equations I call the Completed LT, which are identical with the "relativistic" Doppler equations. The Completed LT "proves" that C is invariant, but only because all derivations of the LT are predicated on that belief.

If my simple algebraic arguments are true, "Lorentzian relativism" is a fallacy. We then return to the Galilean transformation, which we never had any good reason to abandon in the first place.

3) The velocity of EM radiation in a vacuum (C) may be invariant, perhaps not. We have no physical proof. I think C may indeed be invariant, but C is only the unique speed at which EM radiation propagates in a vacuum. That does not mean that the only other form of energy is constrained to or by C. It does not mean that C is an asymptote to all other velocities. It does not mean that Einstein was right when he considered C to be a limiting velocity unattainable by any real body. It does not mean that C is the same everywhere, and/or everywhen. The numerical value of C may differ from place to place and/or from time to time.

4) Until someone offers sound algebraic proof that my COMPLETING THE LORENTZ TRANSFORMATION is wrong, I will believe that I have "defeated the boundary conditions of SR" using only the same simple logic of prosaic algebra by which those "boundary conditions" were invalidly imposed in the first place.

5) The "topology" on which the LT, and therefore TSR is predicated is that of Euclidian space and time. There is no "curvature" of space or time involved, no "compression of metrics", no "closure of the space with respect to its definitive predicates". Those fallacies arise only from misinterpretation of the incomplete LT.

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28 July 93

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Dear Rick,

Reading Michael Price's interesting article TRAVERSABLE WORMHOLES (84), renewed my impression that many who talk of Black Holes and Wormholes are not really familiar with the original, basic physical premise of such ideas. I offer this brief discussion, which may be enlightening to some, aggravate others, and may even stimulate some scholarly debate.

All of the following is conventional wisdom, although some may be "old fashioned" in the eyes of a few. I have not introduced any of my unorthodox views.

Objects equivalent to "Black Holes" were postulated toward the end of the nineteenth century, based on Newtonian physics. Those ideas seem quaint today.

The twentieth century concept of the Black Hole started with Einstein's Theory of General Relativity (TGR), which is actually a theory of gravity. Like many advanced ideas, Einstein's TGR was predicated on quite a few assumptions, all of which are logical, but many had (and have) no basis in observation of nature. Einstein assumed, among other things:

- a) Minkowski Space-Time, and
- b) Physical interaction between a gravitational constant associated with mass, and the four vector dimensions of space-time, and
- c) A simple physical model of a gravitating body: a perfect sphere of a perfect fluid, alone in empty space-time. The sole resistance of this sphere to its inward-directed gravitational acceleration is its hydrostatic pressure.

The mathematics required to describe this concept become very complex. So complex that it used to be said that only a very few people fully understood the TGR. Conceptually, TGR is not that all hard to grasp.

Einstein published his TGR in THE FOUNDATIONS OF THE GENERAL THEORY OF RELATIVITY, Annalen der Physik, 49, 1916. A few months later, Schwarzschild published the first rigorous solution of Einstein's GR equations. Sixteen solutions are possible, but some may be redundant.

Schwarzschild's solution has two parts: the External Solution, which deals with all of spacetime beyond the surface of the sphere outward; and the Internal Solution, which deals with the interior of the sphere. Physics is based on the External solution over the internal solution.

Most theories pertaining to Black Holes, White Holes, and Wormholes are based, at least indirectly, on the External Solution. It relates the pseudo-Riemannian metric of space, ds^2 , as a function of r , which is the radius of the ball, and the mass of the ball, m , and time, t , as perceived distant from the sphere:

$$ds^2 = -(1-2m/r)dt^2 + dr^2/(1-2m/r) + r^2d\Omega^2 \quad (1-1)$$

Theoretically, the sphere becomes a Black Hole if and when it collapses under its own gravity so that the escape velocity at its surface exactly equals C . Then EM radiation can not escape from the sphere: it is "black".

We can use (1-1) to determine the radius at which the escape velocity equals C . This radius is called the Schwarzschild Radius (RS). Only the second term on the right-hand side of (1-1) relates m and r with velocity (dr^2/dt^2 is the square of the velocity dr/dt):

$$ds^2/dt^2 = -(1-2m/r) + (dr^2/dt^2)/(1-2m/r) \quad (1-2)$$

Setting $ds^2/dt^2 = k$, and ignoring $-(1-2M/r)$, which approaches 0 as r approaches $2m$:

$$k = (dr^2/dt^2)/(1-2m/r) \quad (1-3)$$

Setting $dr^2/dt^2 = (dr/dt)^2 = C^2$, when $r = RS$

$$k = C^2/(1-2m/RS) \quad (1-4)$$

Therefore $RS = 2km/(k+C^2)$, and since k is much smaller than C^2 ,

$$RS = 2km/C^2 \quad (1-5)$$

Equation (1-1) is valid for all values of r greater than than $2m$.

It is interesting to note that Schwarzschild had earlier derived (1-5) using only the equation for escape velocity based on Newtonian physics.

When r is equal to $2m$, it is called r_0 , and it represents one of the two "singularities" (infinities) of the solution (the other occurs when $r = 0$). The significance of these singularities is more readily seen in the corresponding equation which relates the radial velocity (dr/dt) of a unit particle falling freely in the gravitational field of the sphere:

$$(dr/dt)^2 = (1-2m/r)^2 [1 - (1-2m/r)/(1-2m/R)] \quad (1-6)$$

where R is the radius at which the particle is released with no initial velocity relative to the mass. As r approaches $2m$, dr/dt approaches 0, which means that it will take an infinite time for the particle to fall inward to the "singularity" represented by $r = r_0 = 2m$, as observed by an external observer. However, an observer falling freely within the gravitational field of the gravitating mass (the sphere) will perceive that it takes but a finite time to reach the event horizon by his own clock, (that is, in terms of his proper time, T) because to the observer:

$$(dr/dT)^2 = (1-2m/R) - (1-2m/r) \quad (1-7)$$

which approaches $(1-2m/R)$ (a finite quantity), as r approaches $2m$.

(1-6) tells us that as far as we external observers are concerned, it will take all eternity (infinite time) for any object, whatever its mass, to collapse to its Schwarzschild Radius. That means that we can never observe a true Black Hole.

On the other hand, (1-7) tells us that an observer falling freely in the gravitational field of a sufficiently massive object could see it collapse to its Schwarzschild Radius, and himself fall to that radius, in a finite time. However, a physical observer would be ripped apart by tidal force long before he or it got anywhere near the Schwarzschild Radius, unless the mass of the sphere is extremely large. Chart A give the theoretical values of the Schwarzschild Radius (RS), surface gravitational acceleration (a) at RS, surface gravity in Earth Gravities (g), and Density (g/cc) for Black Holes of various masses in multiples of the mass of the sun.

CHART A
Theoretical Parameters of Black Holes of Various Masses

MASS, SUNS	RS, M	a(RS), M/sec ²	a(RS),g	Density, g/cc
3	8.9×10^3	5.1×10^{12}	5.2×10^{11}	2.1×10^{15}
3×10^2	8.9×10^5	5.1×10^{10}	5.2×10^9	2.1×10^{11}
3×10^5	8.9×10^8	5.1×10^7	5.2×10^6	2.1×10^5
3×10^8	8.9×10^{11}	5.1×10^4	5.2×10^3	2.1×10^{-1}
3×10^{10}	8.9×10^{13}	5.1×10^2	5.2×10	2.1×10^{-5}
3×10^{11}	8.9×10^{14}	5.1×10	5.2	2.1×10^{-6}
1×10^{12}	3.0×10^{15}	15.2	1.6	18.7×10^{-9}
1.55×10^{12}	4.6×10^{15}	9.8	1.0	6.6×10^{-9}
3×10^{12}	8.9×10^{15}	5.1	0.52	2.1×10^{-9}

The Schwarzschild External Solution is the origin of the General Relativistic version of the Black Hole. It plainly tells us that such an object would require infinite time (as perceived by an external observer) to collapse to the point at which the radius of its mass equals the Schwarzschild Radius.

This means that there has not been enough time, since the beginning of the universe, for any object to have yet collapsed to its Schwarzschild Radius: there can be no true Black Hole in our universe.

How about Wormholes? The theory requires the existence of the exact opposite of a Black Hole, that is, a White Hole (which, in some theories, must have a negative gravitational field) elsewhere in the universe, and that the second singularity ($r=0$) of a Black Hole be somehow connected to the second singularity ($r=0$) of a White Hole. The "connection" is a "Wormhole", which presumably connects two very distant points in space-time. That connection, it is assumed, does not exist in conventional space and time, and can be traversed on a very short time. (Why non-conventional space-time always involves much shorter time is never clear).

Assuming that Black Holes, White Holes, and Wormholes exist, a real, physical observer could possibly be protected so as to survive reaching the Schwarzschild Radius of a Black Hole having a mass of the order of 30 billion suns, but the gravitational acceleration further in toward $r=0$ relative to a mass of any magnitude would increase toward infinity, implying that no real object could reach the input end of a Wormhole.

It should also be noted that $r=0$ means a dimensionless "point". An observer would also become a dimensionless point if it could survive to reach $r=0$.

Some physicists deal with such anomalies by telling us that "the laws of physics no longer apply inside the first singularity" ($r=2m$). Some of the same physicists then proceed to tell us about what goes on inside that radius, using the usual laws of physics, which no longer apply.

About 40 years after Schwarzschild published his original solutions (1916), others (Kruskal and Szereades) modified the mathematical coordinate system of that solution in the vicinity of the Schwarzschild Radius, so as to make the interface between the internal and external solutions "more easily understood". This modification did not affect the validity of the external solution. The time required, as seen by an external observer, for collapse to the Schwarzschild Radius remains infinite, and the Escape Velocity at the Schwarzschild Radius remains equal to C . The modified coordinates do alter the effects that would be perceived by an observer falling to the Schwarzschild Radius in the gravitational field.

Einstein did not share the view that the Kruskal-Szereades coordinates significantly alter the meaning of the Schwarzschild solution. Other theorists, however, seem to believe that a change of mathematical coordinates can change physical reality, and use the Kruskal-Szereades coordinates as the basis for theories that permit the existence of true Black Holes in our universe. Other theorists have modified Einstein's original simple model, adding electric charge, a magnetic field, and rotation. The solutions to the modified equations yield some of the premises for White Holes and Wormholes.

In my opinion: There are no true Black Holes in our universe. There never will be. Our universe is quite different from Einstein's simple model on which he predicated his TGR Field Equations. Since there are no true Black Holes, it is unlikely that there are any White Holes or Wormholes.

But we don't need such objects in order to eventually be able to explore the universe. My COMPLETING THE LORENTZ TRANSFORMATION (NOESIS 83) offers simple algebraic arguments that imply that there is no known limit on the velocity of real physical objects.



A REPLY TO GEORGE DICKS AND ROBERT HANNON BY CHRIS COLE

We are facing a crisis.

George Dicks and Robert Hannon have, in the preceding several articles, attempted to prove several very remarkable things: that there are finitely many integers; that there are more integers than there are even integers; that there are as many reals as there are integers; that there are twice as many positive reals less than 2 as there are positive reals less than 1; that there is no limit to the velocity of physical objects; that special relativity is wrong; that there are no forces except electromagnetism; that black holes do not exist in the universe. If any of these things are true, we all have a lot of world-view deconstruction to begin.

I am being coy. This is not the crisis to which I refer. I am not persuaded by the arguments given, and I doubt that any other Mega member is. The "conspiracy of silence" amongst the membership is simply due to not knowing what to say. I too do not know what to say, and I have broken this silence only twice. Several months ago I tried appealing to physical intuition with a simple gedanken-experiment demonstrating time dilation. This attempt was simply brushed aside. Most recently, I attempted to "cut to the chase." This did nothing but generate bad feelings. Neither of these attempts worked, but I don't think the silent treatment is working either. If the trend represented by the preceding articles continues, our historical policy of publishing everything we receive will be put to the test, as these authors grow more and more wordy in their demands to be listened to. This means that Rick will have to resort to censorship, which I think we would all prefer to avoid. Also, as the signal to noise ratio decreases, we will lose readership.

So, I will try a new tack. If George and Robert want to be listened to and responded to, I will do so. But in exchange, I want one concession: no more than two pages per month from any one author on this debate. I know that you may be offended by this, but the limited amount of space in *Noesis* requires it.

I beg the indulgence of the readers for whom the following is old material. Just skip to the next article.

Since I too am limited in space, for now I will pick only one point each from George and Robert.

George Dicks attempts to show that there are finitely many integers, or at least that Euclid never proved otherwise. He agrees that if every integer has a successor, then there is no largest integer. But he questions that every integer has a successor. Indeed, obviously the largest integer has no successor. So, simply assuming, as Euclid does, that every integer has a successor begs the question.

But what kind of number is this largest integer? Why can't I add one to it? Why can't I add it to itself? Why can't I multiply it by itself? I thought I could do these things to any integer. And it is not just this one integer that I can't perform these operations on. In your world, integers lose their properties as they get larger. For example, consider the integer that is half of the largest integer. I can safely add it to itself, but I can't do this to its successor. And how about the square root of the largest integer? I can square it, but not its successor. Whatever strange and wonderful numbers these are, they are not the integers I am accustomed to.

This is not to say that you cannot make up new kinds of numbers and play with them. Aside from the somewhat pedestrian integers, rationals, and reals, people have invented many other kinds of numbers and found them to be very useful. Quaternions, for example, describe rotations. Other numbers that I have read about are octonians, non-standard reals, and Conway numbers. Also, you can put numbers into structures such as matrices and tensors and study their properties. So you might want to explore the properties of these new numbers you have invented. Just don't call them "integers" or "natural numbers." Those names are taken.

Robert Hannon derives from:

$$(1-1) \quad x/t = C = x'/t'$$

$$(1-2) \quad x' = (x - Vt) / \sqrt{(1 - V^2/C^2)}$$

$$(1-3) \quad t' = (t - Vx/C^2) / \sqrt{(1 - V^2/C^2)}$$

the equations:

$$(1-6) \quad x' = x \sqrt{[(C - V)/(C + V)]}$$

$$(1-7) \quad t' = t \sqrt{[(C - V)/(C + V)]}$$

Robert wants a simple, objective reply to his question: "What is the error, if any, in the foregoing?"

In these equations, C is the speed of light, V is the speed (along the x axis) of the observed Inertial Frame of Reference (IFR), (x,t) are the distance and time in the observed IFR, and (x',t') are the distance and time in the observer's IFR. What is not clear is what distance and time are being measured.

(1-2) and (1-3) are the standard Lorentz transformations. In these equations, (x,t) and (x',t') are the coordinates of the same event that is being observed from two IFRs, provided that the two IFRs are defined so that at time 0 in both their origins coincide.

But what about equation (1-1)?

Robert states that (1-1) is the simplest algebraic form of the postulate that the speed of propagation of electromagnetic radiation in a vacuum is the same in all IFRs. From this I conclude the following: at time 0 in the observed IFR, a photon is released from the origin and travels along the x-axis until it, say, strikes a wall at distance x and time t. In the observer's IFR, the sequence of events is the same, except that the photon hits the wall at distance x' and time t'. Then equation (1-1) will be correct, since the photon will be traveling at speed C in both IFRs.

However, (1-1) holds only for this particular event in this particular experiment. If the photons were not released at time 0, or if they are released anywhere along the x-axis except for the origin, or if they travel in any direction except along the x-axis, then (1-1) does not hold. Given all these restrictions, then, indeed, you can plug (1-1) into (1-2) and (1-3) to derive (1-6) and (1-7).

But this is not what Robert wants us to do. He wants us to replace (1-2) and (1-3) with (1-6) and (1-7), and use these new equations to transform the coordinate of any event (x,t) in the observed IFR to the coordinates (x',t') in the observer's IFR. These are his replacements for (1-2) and (1-3).

This is nonsensical. You cannot take an equation involving coordinates of a particular event as seen in two IFRs, substitute them into the Lorentz transformation, and get anything other than equations involving the coordinates of the same event. (1-6) and (1-7) are true, but they are not general coordinate transformation equations. They are equations telling you how to transform points on the trajectory of a photon that is moving along the same axis as the observed, synchronized IFR and that was released from the common origin at the common time 0.

THINKING ON THE EDGE FROM RICHARD MAY

Dear Rick,

Mega member Kevin Langdon told me that he liked what I'd written on Taoism & Confucianism, so perhaps it has some redeeming value, even though the intended reading audience was presumed to have IQ levels below Aleph Nine.

Mega members R. May, Ferris Alger, Bruce Whitney, Chris Harding and M. vos Savant are also members of I.S.P.E. Perhaps a few others have escaped my span of fleeting attention. I think I may be the only Mega member included in the anthology *Thinking on the Edge*.

All best,
Richard W. May

SMALL EXCERPT FROM MAY'S CHAPTER IN *THINKING ON THE EDGE*--

THE INNERMOST AND BEST THINKING OF SOME OF THE WORLD'S MOST BRILLIANT MINDS

Thinking on the Edge is an anthology of thoughtful essays that cut through the usual boundaries and borderlands of "conventional wisdom." It has come to exist because I incautiously promised to publish a few papers submitted for a seminar of ISPE members.

The International Society for Philosophical Enquiry is a worldwide high-IQ organization spanning 26 countries. Its entrance requirement is an IQ at or above the 99.9th percentile of general intellectual functioning (one in a thousand). Membership advancement requires exceptional creativity in working toward high accomplishments and contributions that benefit civilization.

For several years, a few ISPE members who also attend the Annual Gathering (AG) of American Mensa (ISPE is not associated with Mensa, but many ISPE members belong to Mensa) have been meeting informally amidst the bustle of the Mensa AG. As a contribution to ISPE's growth, I thought I might try to formalize that ISPE meeting and call it "The First ISPE Symposium." Members were to present papers which would be read at the gathering and then published. I thought about a dozen papers might be received. What a surprise when ISPE members submitted 109 papers, totaling nearly 700 pages! Of those, 51 were selected for publication.

The papers in this book thus represent the best recent thinking by members of the ISPE. *Thinking on the Edge* is the first anthology of thought from a high-IQ society ever to be widely published. This seminal achievement signals the beginning of ISPE's transformation into one of the great philosophic/scientific research organizations in the world—for such is my vision.

FOUR EASTERN PHILOSOPHIES

Richard W. May

The word Taoism corresponds to the Chinese *tao chia*, which means the philosophical school of the Tao. If one knows what is meant by a philosophical school, the problem is now "merely" that of defining the Tao itself!

Defining the Tao is paradoxical, rather than merely difficult. The Tao by definition cannot be defined or reduced to a linear sequence of symbols. As Lao Tzu's *Tao Te Ching* states: The Way which can be named is not the real Way; the Tao which can be "Taoed" is not the eternal Tao. This is not simply a peripheral difficulty, but the essence of the Tao itself. The word "Tao" points to a level of reality that is both beyond and within, both external and internal in nature, and transcends both symbolic and analytic thought and their associated states of consciousness.

"Tao" when used by Lao Tzu means the way of nature, and it is the way of nature with which the sage is held to be identified. (Tao had other meanings if used by other schools, such as the Confucianist.) Thus Taoism means of, or pertaining to, the philosophic school of the way of nature, i.e., the way of the sage and the child.

What can be said of the way of nature? What are its principles, if indeed they can be formulated in words? One principle is *wu wei*, which means literally "not-doing," or *wei wu-wei*, "doing-by-not-doing," to differentiate it from mere passivity or inaction. This principle of *wu wei* underlies the internal martial arts of judo, aikido, and tai chi ch'uan, wherein the strength, weight, and force of the opponent are turned against him by stepping aside or not resisting, "doing nothing," at just the right moment. The Chinese phrase, "opening the door to let in the thief," illustrates this principle. If the thief is pressing on the door of one's abode, and it is unexpectedly opened, then the lack of resistance causes the thief

to lose his balance and fall on his face! *Wu wei* is expressed in such phrases as "going with the flow" or "don't push the river" i.e., the idea of "not forcing" nature or life.

Another principle of the Tao is *Li*, which expresses the concept of the organic pattern of nature, the lines of grain in jade or wood, the path of least resistance manifest in the swirls of water, the Gestalt of natural forces in matter.

Another principle of the Tao is the *Yin-Yang* dichotomy, in which all of nature is held to be divided into two polar but complementary antagonistic forces of Yin and Yang. Yin is indicated by an ideogram signifying the shady side of a hill, Yang by an ideogram signifying the sunny side of a hill. Yin and Yang correspond to female and male, night and day, soft and hard, earth and heaven, centrifugal and centripetal, negative and positive. Unlike certain Western dichotomies, neither Yin nor Yang can exist without the other, nor is one superior to the other. Nor is any quality or entity *pure* Yin or *pure* Yang, but any is both, with one always predominating in relation to the other.

Te is another principle of the Tao, translated as "power" or "virtue," and also means "going with the flow," not forcing nature or human nature, i.e., moving with nature: sailing with the wind rather than rowing, as one example. *Te* is also the power of the sage who does not interfere but allows what is necessary to be accomplished through inward calm and identification with nature.

The Taoist concept of *nature* is philosophically fundamental, although different from Western thinking. The Chinese word for nature is *tzu jan*, which literally means "self-thus," or "that which is so of itself, spontaneously." This notion of nature contrasts with the Judeo-Christian one, in which nature is not so of itself, but is a creation of the Creator God or, according to earlier thought, the Demiurge. Another significant Taoist philosophical concept is *hsiang sheng*, "mutual arising." This is a principle in which two or more phenomena are associated with one another ("arise mutually"), but no causal relationship exists between them, at least not explicitly. Statistical relationships among phenomena is one example of *hsiang sheng*. Alan Watts speaks of multiple, mutually dependent simultaneous causes rather than a causal relationship. The Jungian concept of synchronicity could be seen as a special case of *hsiang sheng*.

The inherently indefinable nature of the Tao is suggestive of Gödel's Incompleteness Theorem, which implies that there are true propositions that cannot be proven within a given axiomatic, deductive system, or simply that there are inherent limits to the extent of our possible rational

knowledge. Gödel's theorem and Heisenberg's Principle of Indeterminacy in physics imply that there are real and *inherent* limits to our deductive and inductive knowledge, even in mathematics and natural science. Ancient Chinese philosophers have anticipated this in their *recognition and acceptance of the indefinable* as a basic construct, and their high valuation of *intuition* (in addition to reason and observation of nature), which are among the distinguishing characteristics of Taoist philosophy.

BIOGRAPHICAL MATERIAL FROM CHRIS HARDING

STINCTIONS:-

- 957- A founding member of the Rockhampton Astronomy Club.
 957-1962 Built several telescopes culminating in a ten inch f7.2 newtonian.
 962- Named one of Astronomical Society of Queensland's most prolific observers work appearing both here and overseas.
 970- Rated as the 2nd most creative member of International MENSA in a published listing by Professor I.J.Good when MENSA had 16,000 members.
 974- THE FOUNDER of the International Society for Philosophical Enquiry which has since received publicity in over 300 publications eg TIME MAGAZINE, PARADE MAGAZINE and OMNI and has received mention in some 25 plus International Reference Works (two by the US Government) and is listed in such works as The Encyclopedia of Associations; World Almanac and book of facts; Ulrich's International Periodicals Directory; Bowker International Serials Database; and Yearbook of International Organizations, his role as Founder being detailed in the history of the Society in 'THINKING ON THE EDGE' edited by Kapnick & Kelly published by Agateanon Press Burbank California in 1993.
 Elected Mentors to the Society have included : Prof. Raymond Arthur Dart; Dr. Glenn Jay Doean; Dr. Robert L. Sadoff; Dr. Ralph Slovenko; and Dr. Alan N. Sabrosky; while Honorary Members have included Dr. Paul R. Ehrlich.
 980-1991 Work in Psychometry had been made use of by a number of High IQ Societies.
 981- Founder of The 606 Society a short lived group -many of whose members were to form the basis for the Mega Society which he was also later to join.
 982- Joint Author with his brother Adrian Paul Harding of a Computer Program called LONGGOLD which proved able to predict (for many years) moves in the price of Gold as well as a wide range of other commodities and stock market indexes and currencies since then. Up to \$500 million had ridden on its predictions at any one time, and one investor was willing to provide \$100,000 worth of computer equipment for continued research in 1986.
 982- Poetry published in "A FIRST ANTHOLOGY" and in 1988- "2200 YEARS UNDER CAPRICORN" both by members of the Rockhampton Writers Club.
 982-1988 LISTED in 7 editions of the GUINNESS BOOK OF WORLD RECORDS under Highest IQ for a personal performance in sitting an Intelligence Test and Featured in their 1985 edition, his signature being one of those published in the exclusive and unique 60 millionth copy of the [1988] edition auctioned for charity.

- 984- Sold Rental Rights to a modified version of his Harding Stress-Fair Compatibility Test (HSFCT) as the Career Suitability Profile (CSP) and writings on a unified field theory of Society to Management Strategies Inc. of New Jersey USA for the USA and Canada (as a management tool) - which by [1989] was used by the WORLD COURT OF LAST RESORT in a study of Death Row prisoners' s [by 1991 being subject to a resolution at the Annual Meeting of the American Bar Association in Atlanta Georgia that it be further investigated and findings be made available to American lawyers and to ABA members - part of this resolution being that the test be used "to help decide a prisoner's eligibility for sentencing, parole, and/or clemency"] -the original HSFCT finding its intended use as a measure of inter personal compatibility in [1989] through the Australian "Butterfly Connection". The original test was also used by Staff Strategies of North Perth Western Australia from 1991 onward.
- 984- Joint Author of Computer Program MIQ-Solver which scored 160 IQ in the Eysenck numerical test and solved half the problems in the Super Brain test it was matched against and which was widely publicised at the time.
- 985- Appeared on the British TV program Record Breakers for his own personal I.Q. rating in an intelligence test.
- 985- Work in Psychometry listed with Educational Testing Service of Princeton New Jersey.
- 985- Received Mention in the book "OPMI I.Q. Quiz Contest" for contributions in the field of Psychometry.
- 985- Termed a "Super Genius" by the journalist Chris Pritchard (the term echoed by Kerry Terrebbonne in the November 1992 (Issue 3) of the Journal 'DATH' who went on to describe a striking similarity between him and that of Albert Einstein), and "one of the greatest geniuses of our time" by Dale Adams in TELICOM (page 19 Vol IX No.8 for March 1988), and "He is a distinguished Philosopher and researcher whose credits are almost overwhelming" by John Duncan in the Journal of the Pacific Region of Intertel [Issue 92 1989] and as "the legendary Dr. Christopher Harding" in vol. iv, no. 7 of the July 1991 issue of the journal of CAMELOPARD Society [reflecting the extent to which he was known at the time to the High I.Q. Community], and ranked with Marilyn vos Savant, Anton Anderssen and Eric Hart as one of the world's 'centa-megarians' by Kevin L. Schwartz in Noesis - The Journal of the Mega Society Number 73 November 1992.
- 985-1987 Appeared in Washington Post and in a number of International Papers.
- 987- Poetry published in OF PENCHANTS AND PASSIONS TERRORS AND TEARS in an anthology by Members of the I.S.P.E. which volume was dedicated to him by its private publisher.
- 988- Works accepted for listing on the Australian and the International Ideas Registry.
- 988- Initiator of the Whiting Scholarship Fund in order to honor the memory of the late Steve Whiting.
- 988- Entrant into the Order of St. John the Baptist of America and in the same year to rank of Chevalier of the Order of Knighthood of the Ordre Souverain et Militaire de la Milice du Saint Sepulcre through Confederation of Chivalry.
- 989- Poetry and biography were accepted for inclusion in the 1989 edition of American Poetry Anthology and again in their 1990 edition.
- 990- Elected to the Rank of a 'Senior Research Fellow' of the I.S.P.E. "in recognition of repeated and consistently superior achievements, creativity, and service through several years".
- 990- Received a personal invitation from Dr. Meredith Seaw to make an information deposit to the Z. Smith Reynolds Library Winston-Salem NC to the D. Meredith Seaw collection.
- 990- A Founding member of the Cleo Society.
- 991- 2nd February - bestowed the title of BARON of the Royal Order of the Bohemian Crown. (Registered Number R 581 IS).
- 991- 10th May - bestowed the title of Commander Knight of the Lofsenic Ursinus Order [a prestigious institute dating to the 7th century] which was also obtained by invitation through the International Parliament for Safety and Peace.
- 992- Co-authored "The Ultimate IQ Book" (a book of puzzles and tests) [with Marcel Fenstra of the Netherlands and Philip Carter of the U.K.] which is due to be published by Cassell in August 1993.
- 1993- attained Il Rango e Le Insegne Di (Count) Conte - Count of San Ciriaco Italy of the Ordine Di S. Ciriaco (e registrato sotto il numero 111/1) - also receiving the medal of the order.
- 1993- Invited by the International Test Commission to display his test products at the exhibit area in St. Hugh's College At Oxford University in the UK in June.
- 1993- Awarded title of "Vice-King" of Olypoetry (which bestowed upon 6 other members of the Olypoetry movement) his character gaining favourable mention in the book "Collected Victor Durin" by this internationally recognised poet (page 182 vol. 6 1993.)