#7
Formal talk-0623102006 Afternoon day 3
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Recording 7

Y: Alright. Turn it on. Before we resume our study of magnitudes, I'd like to read just a little bit to you from a paper. You and I were sharing this morning

B: (Biljana acknowledges)

Y: about these various quotes under the title of '*The Substance of Physical Existence*' paper I wrote in 1993. And the last quote is 'The Questions' by John Wheeler: "Are billions upon billions of acts of observer participancy, the foundation of everything?" And Biljana was just telling me that John just died in his late 90's. He was quite a doyen of radical physicist, and a good one. But then I wrote:
1:43

> (*The Substance of Physical Existence*)
>
> Introduction
>
> "We say the answer to that question in that last quote is 'yes.' The paradigm presented here states what those observers are and what their acts of participancy are. And explains the mechanism by which these acts form the foundation of everything physical. The observer participants and their acts are shown to be the primordial matrix, which is mater and not materia; the nothing out of which the universe appears; the reality behind the observed phenomena; the origin of the measurement like processes; the substrate; the Elohim; the one and many God that created the heaven and the earth.

2:45

> The substance of physical existence that is behind the observed phenomena being *nothing* from which the world is created cannot be a true nothing. From a true nothing something cannot be created: for if something could be created from it, it would not be that from which something could be created. That is not a true nothing. What is meant by nothing in "creatio ex nihilo" is that which is physically nothing. No material, no matter, no energy, no space, no location in time, no location in space, no quality that can be observed or measured. That the idea of theologians and physicists alike of creation from nothing is correct, we must admit the existence of that which is nonphysical.

4:05
The question becomes then,

> "What is that nonphysical existence that produces our universe with its particular characteristics and constants?" "What is the quality and

> quantity of the nonphysical substance that enables it to produce exactly this physical world and no other?"

And then, 'The Paradigm'. That's the introduction out of the 13 papers I have here I've written from my own enlightenment as it turned out.
4:53
B: Yes. It was like a poem, you know. It reminded me of the great Kartsutra the Buddhist recite every morning in Zen monasteries. In reality, no perception, no nose, no mouth, no emotion, no pain, no, no, no… you know that sutra?

Y: Yes.
5:18
B: It is the great Kartsutra. And it sounded like these Buddhist monks reciting; very, very inspiring. I just have a feeling this is some…how to say? Not transpersonal… is too weak a word. Some, and divine is not exact.

Bret: Transcendental?

B: Transcendental, maybe, yes… poem or at least…It is beautiful.

Y: OK.

B: "*Creatio ex nihilo*" actually, they say, "*Creatio ex nihilo*." So it is something; but it is not physical.
6:00
Y: Yes, and it has to be something.

B: Yes, exactly.

Y: Because if it was a true nothing, there would be nothing.

B: Yes. So this solves, actually, the greatest mystery of eternal philosophy, of perennial philosophy.
6:19
Y: OK. Now we take up our magnitude project, the last paragraph on page 25.
(Bottom of page 25 *The Lila Paradigm of Ultimate Reality*)

> The *average* number of states of knowledge (arrows) per nonphysical individual (K) is the square root of the inverse of the electromagnetic coupling constant (alpha) (**α**) plus 1: $\alpha^{-1/2} + 1$.

6:48
Y: That is the square root of the inverse of alpha plus 1.

> The measured value of the constant α^{-1} is 137.03599976 and its square root is about 11.70623764. This magnitude is the average number of arrows that cross over the largest circuit from a nonphysical individual to nonphysical individuals in that nonphysical circuit. Then, adding 1, which is the arrow in the circuit *from* each of the nonphysical individuals in the circuit, we get K, as 12.70623764.

7:50 (Top of page 26 *The Lila Paradigm of Ultimate Reality*)

Of course, some nonphysical individuals are placing themselves into many more states of knowledge of nonphysical individuals than others. KN, the total number of knowledge states (arrows), is $1.756748560 \times 10^{24}$. With, on average, this many (K) arrows (states of knowledge) per nonphysical individual, an extant, giant arrangement or network of nonphysical individuals is formed which includes nearly every nonphysical individual being *indirectly* connected *to* nearly every other nonphysical individual. The number of nonphysical individuals *not* connected to the network…

8:55

Y: in the *extant* network

…is given by: N/e^{K}, which is 4.19238×10^{17} or about 0.0003% of N; therefore, n is $N - N/e^{K}$, which is $1.382583329 \times 10^{23}$.

9:43

Y: Now given those fundamental numbers, we can figure out everything else in principle. I've figured out some of them. But, in principle, it should be able to do everything. But it's best designed for universal constants because K is an *average* number. To get an exact measurement of how big this table is or how much it weighs or exactly where it is, we would have to know the exact value of the number of cross over arrows of each individual in the circuit. And then we could, in principle, figure out everything in the universe. Not too likely.

10:32 (Top of page 26 *The Lila Paradigm of Ultimate Reality*)

This nonphysical network of nonphysical individuals is connected by nonphysical directed relations of states of direct knowledge; and, it is not located in time or in space, it merely exists (is extant), in the pattern determined by the nonphysical acts of the nonphysical individuals.

11:00

Y: So the extant, giant network is determined by the individuals as they are determining it. They don't change it from one choice to another. They just make whatever choice they make. Then you can look at that from a God's eye view *as if* it had changed from what it was to what it is. But there is no God's eye view. So you can't look at it like that. You can only mentally conceive of doing such a thing. But of the actual choices there is the extant choices; and that's all there is.

12:00

Each extant network situation has its own past and its own probabilistic future and is the extant network, and it's not in now. That is putting it in a background of the 'now' concept of time. Is that clear? So the word extant is used here rather than saying the current situation. It's the extant one; and that's determined only by these nonphysical acts of the nonphysical individuals. If you don't think of it that way, you're not accepting that they're doing it.

12:45

Due to the various indirect pathways in this giant nonphysical network that exist *to* each nonphysical individual *from* each nonphysical individual, each nonphysical individual can appear many times as some variety of *fundamental fermion* (leptons and quarks), complete with all quantum numbers.

13:30

Y: There are only 10^{23} individuals, approximately. So how did we get…? How many fermions are there? How about 10^{95}? So where did all these come from? Well, there are different pathways to…there are about…what?…ten to the ninety fifth (10^{95}) minus 10^{23} pathways on average between any one individual and all the other individuals so that each individual shows up on average about that many times. 'Cause people say, "Oh, you don't have enough individuals. You have to have one for each fermion." No, you need to have one unique pathway for each one.

The number of such fermions is $(Kn)^3(2N)^{1/2}$, which is 6 x 10^{84}

14:55

Y: That's an error. This is estimates based on measurements vary from about 10^{80} to 10^{87}. But those are charged fermions. If you include the number of neutrinos which do not carry a charge, you get up to about 10^{95}. But they're just estimates by physicists based upon the measurements they have of other things. They didn't count them. I just wanted to deal with that. OK. Did you want to take something out of the book?

15:53

B: Here in this book, *Modern Physics* by Tipler and Llewellyn, I have found this e to alpha (α); this is Bose-Einstein and Fermi-Dirac distribution defining fermion. This constant is found here. And this…so I think I have now better understanding of the formula we were discussing yesterday about e to K. e to K is n over n minus n when n, (no-capitalize,) the number n, (no-capitalize):

$$e^k = \frac{n}{n} - n$$

Y: Minus little n; yes.

16:40

B: Minus little n. So we have also here e to alpha (e^{α}) where alpha is the strength of, actual the ratio of the strength, which holds together protons and neutrons into the nucleus.

Y: The coupling constant.

B: Coupling constant…to the strength of…

17:11

Y: e to alpha.

B: Of the electron. So the way he uses here this Fermi-Dirac distribution is to use it for normalization. And, actually, this is what Baker or who (you) was writing this equation is actually doing.

17:32

Y: We would talk almost every day. And then he would write up the mathematics.

B: Yes, because this is very clear. This is brilliant. This is so simple. And it is clear. This is the total number of nonphysical individuals…

Y: and the ones not in…

B: and e to K is… e is the number derived of the substates which is also clear due to these pictures.

Y: (Yogeshwar acknowledges).
18:00
B: We have 1 and 1 over 2 factorial. This is e; and because we have K of those branches, this is e to K.

Y: See, this is my way of doing it. That's the way I do mathematics.

B: Yes, this is the right way to do it. This is how I do it.

Y: Yes, same thing.
18:21
B: …based on yours. But sometimes I wonder why. For instance, when you were talking now, you have mentioned the cross overs as significant configuration of the networks. Actually, strictly speaking, the cross overs are leading to pi(π). And the substates are leading to e. So I always wonder when I see either pi(π) used or either e. Is there a meaning or not? Because e are (is) obtained by observing the substates, and pi(π) is obtained by observing the crossovers.

Y: Good question.

B: Uh?

Y: Good question.
19:11
B: Yes. Because in this formula where pi(π), this elementary unit of time, was obtained, we had n multiplied by K minus 1 over pi(π) half. (Insert formula)

And this two is here. And this is on the degree d which is the depth. And it is all clear. But then he's using pi(π) which is obtained by crossovers. And now he's using A. Then also I wonder. This is one question, "Why not, for instance, e to pi(π)? And the whole thing to K? (Insert formula)

…which also had a logic in it? Only, the only explanation could be, not the only…the one of the explanations could be there are overlapping of these substates and cross overs.
20:13
Y: Ah hah!

B: There are overlapping. But we should know what we are doing where when he's searching for the all possible pathways.

Y: (Yogeshwar acknowledges)

B: For instance, then, yes, he needs e; and he needs pi(π) because there are two, maybe at least two, different sorts of configurations. Maybe, there is a third one. And at a certain point of time, I had an idea that might be another one added to these substates and to cross overs. But OK. This is good enough. This is excellent.
20:56
Y: Well, depends on which arrow of K you take. So K is one of them.

B: Yes.

Y: See, K is almost 13 arrows coming out on average from each one. So that starts off a different pathway.

B: Yes.

Y: And it goes to e and pi(π), just how I don't know. I think K is…

B: This is approximate because, yes, as I understand you, K is included into this. This is what you're saying.
21:35
Y: Yes, it is.

B: Yes, it is. And either it should be subtracted or divided by…

Y: I didn't quite hear it. Say it again.

B: I said in order to avoid this error of overlapping…

Y: (Yogeshwar acknowledges)

B: the connections, this K should be either subtracted, I said. But, maybe, divided is more closely; or at least, we should have an idea what we're doing.
22:06
Y: Right.

B: Why is here pi(π)? And why is here e?

Y: …is there e there?

B: Because in your explanation, you mentioned cross overs. And other than this, the idea is clear, yes. When I divide this N to e to K which is the all possible relations, then I obtain what is not related. Is it so?
22:27
Because there are, maybe, not so much although not so much doesn't mean much unless we have some estimation of the error. But there are still not connected individuals. There are individuals who are not connected to the network.

23:00
Y: Some were not.

B: And here he says, "The number." You say, "The number of nonphysical individuals not connected to the network is given by N over e to K."

$$N/e^{K}$$

Y: (Yogeshwar acknowledges).

B: To which I agree unless we decide to make it more precise. OK.

Y: I see what you're suggesting; and it might work out.

B: Because here, this formula, if our understanding is…

Y: (Yogeshwar acknowledges)
23:38
B: OK. Then this T of D might be, as well, N multiplied by K minus one [K-1], all these to dimension D over e[?]. We have right to do this as well because then this D should be obtained on the basis of substate instead of the basis of cross overs which also makes sense.
24:07
Or everywhere. We should have e to pi(π), and the n also e to pi(π) half, [$e^{\pi/2}$] actually. This is one point. Another is that I have found the connection between the formula we were using... also this number, you know. One plus, one plus, one over e is 1.37 [1+1+1/e] which resembles the number. Maybe, there is a connection.

Y: There might be.
24:45
B: Because this 1 over e [1/e]. I tried to make a demonstration yesterday. This is obtained when we have this picture. This resembles the magnitudes in a way. If this is T and this is Y of T, then this Y is K where K is the constant. Maybe, I should use another letter, 1 minus e or minus another constant T. This constant, let it be 1. So Y is (K?), 1 minus 1 e of T. And if we find here tangent, then the tangent being the relation of this one…we have Y is minus…

Y: You're saying the word tangent?

B: Tangent. What is the right word? Tangency.

Y: It just wasn't clear.
26:05
B: Ah hah! Yes, tangent. Y is (K?)… Y to minus 1 which is (K?) over e to minus 1. Now, it is to plus 1. It is 1 over e; and this is .037. So here, when we draw a line here, this segment is .037 of this one. I believe there is a connection because e is so…you see, because this resembles…this curve resembles the magnitudes.

Y: This is an asymptote? (Def. Asymptote - a straight line approached by a given curve as one of the variables in the equation of the curve approaches infinity.)

B: This is an asymptote, yes. Actually, 1 plus 1 over e is 1.37. And here I have met this 137. But you know this 137. Here for instance, here, "The range of the electromagnetic force is infinite, and in (it's) strength is about 1 over 137 times that of the strong interaction as we discussed earlier."

Y: Yes.
27:25
B: Something else… So this might be seen as a normalization he is doing, a kind of normalization. Or if we put this on the left side, and we have e to K multiplied by n minus n, should be n. This and this should be consistent. This is as we say. n minus n is the number of individuals which are not in the Hamiltonian.

Y: Yes.
28:18
B: And because in probability 'multiplying' means 'and', we might say, "The individuals which are not in Hamiltonian *and* the ones which are in the relations…" you know. Here this and this are not, are of different nature in a way because these are the relations, you know…

Y: These are the bosons…

B: These are the relations; and these are the number of the individuals. Is it possible? Is it correct?

Y: Yes. These are the bosons; and these are the fermions. They've become them.
29:06
B: OK. Then great! Yes. And the total number of nonphysical individuals is bosons. Once again, this was the bosons?

Y: No. This is the bosons, the relations.

B: Ah, the relations are the bosons.

Y: Yes.

B: The relations are the bosons; and these are…

Y: And the individuals…

B: and the individuals that are not connected.
29:35
Y: that are not connected; they would be like ghost fermions.

B: What?

Y: Ghost.

B: Ah, ghost fermions.

Y: Poltergeist.
29:51
B: Yes, yes. Ghost fermions. Fermions, ghost fermions. Yes, dark ones. I'm trying to understand these relations; and up to a level, I do understand. There is some meaning here with this remarks about pi(π) and (K?).
30:26
Y: OK. That's a good step. Let's do some more.

(Middle of page 26 *The Lila Paradigm of Ultimate Reality*)

3.2 Some Magnitudes of Constants and Other Phenomena.

> The universal constant, the Planck length (lp), is the total of all fundamental units of length generated by all the arrows that cross over the largest circuit and is given by: $e^{\pm}$ (K – 1) …

30:56
Y: Do you see that plus or minus ($\pm$)?

B: Here? Yes.

Y: That plus or minus ($\pm$) means charge. That is, we're talking about e here. We're talking about electric, plus or minus electric charge. So e is used both ways in physics. It's used in mathematics, of course, as the natural number. And here it's used to symbolize the electric charge. So …the electric charge ($e^{\pm}$) times (K – 1),

> where $e^{\pm}$ is the elementary electric charge expressed as length (see Misner, 1973),

31:41
Y: Now, if you're not familiar of how electric charge is expressed as length, there's about 300 pages as a subpart of Misner and Wheeler's book on gravitation that describe how that is the case. It's a simplification. It comes by taking the speed of light as 1 and Planck constant as 1 which you can do. Just say that is our definition of the unit. And you end up with the elementary charge is a length. Well, remember we had a circuit?

B: Yes.
32:25
Y: We crossed it over; and then we had a length?

B: Yes.

Y: That's the elementary charge when you add up all of them in an extant network. That is the electric charge.

B: You mean the length like this one, like 1-D space or…

Y: Yes.

B: OK.

Y: But *all* of them.

B: So, actually, when you said here, “I have electron; and I have positron.” So this means…
33:03
Y: So the strength of that electric charge is this number. I just read it. It is

> “where $e^{\pm}$ is the elementary electric charge expressed as length.”

And this is the length. All of these lengths that are in this extant with all the cross overs summed up equals the elementary electric charge.
33:37
This has been fine tuned. How many cross overs there are that’s fine tuned? Who does the fine tuning? All of us. We do it because we’re able to do it. That’s one reason. And the second reason is that we want it that way. Why do we want it that way? If the electric charge was significantly different than the value that it has, the universe would not at all be like this. There could be no living bodies at all. There could be… the evolution of suns and stars would be so short if it was any smaller. If the value of the electric charge was any smaller, the lifetime of a star would be so short there wouldn’t be time for life to evolve. It would be less a billion years.
34:52
So the electric charge value or strength has been fine tuned by us purposefully in order to have living forms so that we could sit here and talk with each other even though we’re only making a few states of knowledge of others; and most of them are indirect. We do the fine tuning. And that fine tuning (Yogeshwar gets the graph out.) is on this graph. If you were to randomly select where the arrows go, you would get this curve. This is log. Would you read that?

B: Yes.

Y: Out loud.
36:07
B: ‘Log Number of Not Denied Information States For x Agents’.

Y: So these are states of direct knowledge. And it’s the log value of it. The curve looks like this. This says… Can you read it?

B: ‘Selected at random’, ‘Random Distribution Curve’
36:39
Y: Alright. But it’s not random; it’s *highly* skewed. And this is the skewed curve here, goes like that. And that’s because the average individual has, instead of 10^{21} or 10^{22} states of knowledge, they have on average about 13. That is K. And we’ve done that because by doing so, we’re like somebody

who is running the game of life. You know that one we talked about with the… with the automata.
37:30
B: Yes.

Y: If you make it, certain choices, you get things moving around like they're alive. That's why they call it, 'The Game of Life'. Well, this is 'the Game of Life'. And we've made choices such that not only the electric charge has certain values, but the size of the universe has certain values so that there can be living beings that move around and talk to each other. And we talk to each other through them.
38:03
So these are... this is the curve here. There's two individuals here. This is one individual who is accepting so many others that there's a state of knowledge of almost everyone. And here's two individuals that are accepting 10^{15} of them. And there's four individuals that is in a state of direct knowledge of about 10^{11} others. And on and on and on like this until we get back over here where the most individuals, about 10^{15} individuals, are making 2 states of direct knowledge of two others. That is, they have 2 arrows coming out from them.
39:08
This is the average person that you'll find. These are the dumb ones that are only choosing one, just enough to get connected to the extant network. Then these are connected to three. And when they get up to about five, they become superior people, intelligent and somewhat wise people. The geniuses are in this class, and the super geniuses here. And you get siddhas and divine individuals here like Buddha and Jesus and the Immortals and the perfect Buddha's. You might have the Messiah in here some place, Christos. Stapp thought this was a wonderful thing. He says, "Oh, I understand this. I agree with you completely on this."

B: Who, who?

Y: Henry Stapp.

B: Ah, Stapp. Uh huh.
40:23
Y: He says, "Let's talk about motion. I already know about this." I thought, "Oh, no. The worse question he could possibly ask me!"

B: So you observed this as in one curve? One curve or not or (?) representation?
40:44
Y: Yes. This is one curve. The reason it's in discrete units is because there's one/two individuals that you accept.

B: (Biljana acknowledges).

Y: And this is an estimate of what the number of individuals are (that are) accepting six others. The number of individuals that are accepting four others, that number might change some in this band. But it still ends up with approximately… This is the edge of chaos. You know the work on artificial life by the Santa Fe Institute?

B: The Santa Fe Institute?

41:41

Y: Institute. They've done this research work on artificial life. And they discovered that using chaos theory… discovered there's an edge to chaos. If there's too few connections in a system, it freezes up. If there's too many, you get chaos.

42:07

B: It depends on the non linear dependency we are observing.

Y: Exactly. And there's a certain value which is the edge which they call Lambda.

42:22

B: Lambda or Lambda-C or Lambda. I have this actually. I have in my book; and I teach it. For instance, it looks like this. It looks like this. This is the logistic curve.

Y: We've seen this before, haven't we?

42:40

B: Yes. And this is the edge of chaos, lambda-C. And this is chaos. Actually this is not just chaos this is ergodic behavior. Ergodic, meaning it is a period…
(Note; Ergodic - of or pertaining to the condition that, in an interval of sufficient duration, a system will return to states that are closely similar to previous ones.)

Y: It is what?

B: Ergodic behavior. This means this is not totally random…

Y: Yes.

43:04

B: But there is a period; but this period repeats itself after thousands, thousands of thousands of years. So, practically… although practically means nothing in mathematics and new science.

Y: (Yogeshwar laughs).

43:19

B: Practically means nothing. You should be strict. But still, practically, (from engineering point of view) this is practically random. Although there is a period; but this period repeats itself after thousands of thousands of years and not strictly, but in statistical sense. So this behavior is ergodic. And this is edge of chaos. But where this edge of chaos will occur depends on the nature of non-linearity in question.

Y: It depends on the value of N also.

B: Yes.

44:00
Y: Where it is. If N is higher, this will move this way. If N is lower, it moves this way. I used it when I figured… using the alpha, was able to determine that it's at this point because K comes out to be about 13. That's the corner here.

44:22
B: We should know the equation upon which this graph has been obtained. We should know the equation in order to know the edge of chaos.

Y: I had him do one. And he wrote a program to get the shape of this curve.

Bret: I have it some place. Is it the first one?

Y: I think it's in that folder I gave you.
45:00
B: Uh huh. This is algorithmic number.

Y: That folder for 'Biljana would be interested'.

B: Yes. Shall I go to it?

Y: Yes, you get it; and I'll run in here.

Don: Bret, the Lila papers are in here. There's both a pdf. and an Open Office version.

Bret: I may turn out to have it already. I'll find out in a second. This is something I have.

B: These are similar automata. This is 'The Game of Life'. This is the three rules for transition from one state to another in *The Game of Life*.
46:05
Bret: Is that following Wolfram's work?

B: Wolfram? It has connection, yes.

Y: This is it?

B: Uh huh. Here is the curve, this curve. And the age of chaos is Lambda-C.

Y: Uh huh, lambda, yes.
46:36
B: This is obtained… But you should know the equation. This is obtained from this one. For instance, XN plus 1 equals alpha XN 1 minus XN. (Insert formula) This is the equation. And for this equation, the edge of chaos is this one: Lambda 0.7 depends.
47:00
Y: This is in your book.

B: In my book, yes. I teach this.

Y: You did this. This is your doctorate work?

B: It is connected because my doctorate work was in non-linear systems; but this is something else.

Y: Yes.
47:20
B: This is the equation. This is the logistic curve. And when you mentioned to me that the Hamiltonians could go like this, this Hamiltonian could be inter… what is the word with this one?

Y: Many pathways.

B: Many pathways. But when we have three oscillations, then we might come to the edge of chaos. Three curves oscillating are needed or three values.

Y: Ah, three?

B: In order to have chaotic behavior.

Y: Why is that?

B: This is for continual curves; for discrete, no, it is not the case. And this is why you have…

Y: Ah.
48:14
B: Why this is for continual? Because when you have the curve and you want ergodic behavior. Ergodic behavior means a behavior like this one in the phase plane where these are states. So, if I want chaos, then I want the space to be limited somehow. It has to have borders; otherwise, I'll go to infinity and never come back. In order to have an attractor as you mentioned (there are attractors and repellers.), in order to have attractor, the curve should be bended. It should bend; it should be twisted somehow. It should come back.

Y: Uh huh.

B: There should have a mechanism to bring the curve back into the limited space.
49:07
Y: Yes.

B: And in order to do this and not to intersect the curves… in this behavior should not intersect each others if we observe them in a three dimensional space.

Y: Why?

49:22
B: Because there is a theorem for uniqueness; and as I mentioned, a theorem for uniqueness and…

Y: Dr. Langton did this work originally. And I have his book.

B: Ah, OK. Great! Yes, this is very difficult proof. The proof is very difficult.

Y: (Yogeshwar acknowledges).

B: So, in one point in phase plane where these are coordinate of space, just one curve might pass.

Y: (Yogeshwar acknowledges).

B: There is not allowed, according to the theorem for uniqueness in existence of solution, two trajectories to pass over one point.

Y: So, it's a three because of three dimensions?

B: Yes, yes, exactly.

Y: OK.
50:07
B: So in order to find the way out… For instance, this curve starts to go. And these (they) each should be bended because of the limitation, because we want attractor; if we want attraction, it should come back.

Y: Yes.
50:22
B: But then, it either would intersect each other, and this is not allowed according to the theorem for uniqueness and existence; or it should go to infinity. And then we don't have attractor.

Y: (Yogeshwar acknowledges).

B: So if we want attractor, this should sneak somehow. This should find a way into the third dimension.

Y: Yes, I see.
50:45
B: So the minimal number of variables have (has) to be three in order to have chaotic attractor for continual curves. And for discrete? Yes, because there is a way around all… between the individuals, in a way.

Y: Now, this is what Bret did.

B: (Biljana acknowledges).

Y: This is N is 10,000. K is …

B: 12.7

Y: Which is assuming alpha is correct.

B: Yes.

Y: Then KN. And what (is it) this says? 'Non' what?

B: Non random.
51:27
Y: And this is the result.

B: Great.

Y: Which is the same as this. But this N is 10^{23}; and this N is 10,000.

B: And here? And here on the axis?
51:56
Y: The same. Same as this: log, log.

B: Great.

Y: So, I take it, you still have this somewhere.

Bret: Potentially. But I don't know which one it is that we're discussing. Is this the circuits or…? No, this is…

Y: Well, it's the one, whatever one it is that…

Bret: Thresholds?
52:17
Y: …we were looking to see if I had this right, if it worked out. I don't know how you thought of it. We'll talk about it. But you said we should *know* what is the basis of this curve.

B: Yes, yes.

Y: And writing a program based upon the Lila principles, this was the result.

B: Uh huh.

Y: There's a lot of good things like that in here.
52:52
B: Wonderful. I have seen some illustrations…

Y: Did you read "Lifting the Veil"?

B: This one not… I have seen the ones with your writings. Your handwritings.

Y: There's a lot of them.

B: Wonderful.

53:15
Y: There's motion. We'll get to that before long. OK. We can go on now?

B: Yes.

Y: Where were we here? We were talking about some magnitudes; and we were talking about…Ah, yes.

53:44 (Bottom of page 26 *The Lila Paradigm of Ultimate Reality*)

> …electric charge expressed as length (see Misner, 1973), which is the total of all fundamental units of length generated by one arrow crossing over the largest circuit from *one* nonphysical individual in that circuit, which is given by λ_{ce}/Kn, where λ_{ce} is by the Compton wave length of the electron,

Y: You don't know what the Compton wave length is? Ah, if you took a particle and expressed it as wave, the wave length is the Compton wave length.

B: (Biljana acknowledges).

Y: So if you took an electron, it has a certain wave length.

B: (Biljana acknowledges).
54:31
Y: If you put them through a slit, then electrons will interfere with each other and show the wave nature of the electron. You measure the wave length. That's the Compton wave length. So the Compton wave length divided by Kn,
54:52

> where λ_{ce} is the Compton wave length of the electron, which, in turn, is the number of fundamental units of length generated by only one arrow crossing over the largest circuit from each nonphysical individual in that circuit, which is measured as 12.426310215 x 10^{-12} m

55:18
Y: And there's the value for the Compton wave length with the minus sine on one line and the exponent on the next line. Is there a way to stop that from happening, that kind of thing, in a program?

Punita: What?

Y: It says 10 to the minus 12th meters. Anyway it's very…

Punita: Where it's broken.

Y: Yes, where it's broken.

Punita: I see. Yes, I can. I'll fix that.
55:54

Y: Someday.

> So, the Planck length is 1.616796549 x 10^{-35} m. This ten-digit value is a prediction.

56.02
Y: I'm predicting the Planck length to ten digits. Whereas, their measurements only go four. So those last six digits are a prediction.

> The current CODATA value gives four digits of 1.616 x 10^{-35} m for the Newton's gravitational constant.

56:44
I got into… I sent this around to a number of people doing research on Newton's gravitational constant, 'big G'. And here's the whole folder on 'big G', the formulas. I even wrote up some papers on it and sent it around to people doing research; and a couple of them did reply. And he says, "I'm doing an accurate measurement. And yours is slightly too high. Mine is right and yours is wrong." He thought I was looking for a grant.

B: (Biljana acknowledges).
57:33
Y: I was just looking for somebody to talk to, yes, using the *relata* Relation Paradigm to compute the Planck length using the Compton wave length, alpha, e and pi. And that's the equation for the Planck length. So, there's all that, that your people in Macedonia can look at. Alright. Let's talk about the age of the universe.

58:21 (Bottom of page 26 *The Lila Paradigm of Ultimate Reality*)

> The age of the universe (tu), as it appears in the consciousness of a nonphysical individual that is in the largest circuit, is the number of two-arrow substates, i.e. fundamental units of time…

58:44
Y: We've already talked about that.

> (Top of page 27 *The Lila Paradigm of Ultimate Reality*)
> …which that nonphysical individual is presented with in its consciousness.

So to speak.

> This number is determined by the number of arrows in the largest circuit, which is the same as n, and by K, which is the average number of arrows extending from a nonphysical individual. This number, nK, is cubed…

59:17
Aha!

> … because at least one nonphysical individual in the largest circuit has at least three arrows originating from it across the largest circuit and any such arrows in excess of three are observed as energy, instead of as additional dimensions of space and time.

59:40
Y: (install graph) Circuit. Cross-over. Second cross-over from that individual; third one. First time around, you get just n. Second time around, you get little n squared. Third time around, you get little n cubed. After that it's not a spatial dimension anymore. It's a limit of three. This is 1D, 2D (dimension), 3

dimension. But it's the same pattern each time that's being repeated. So the first fundamental pattern is being recursed. You know recursion?

B: Yes.

1:00:50

Y: So this is the first recursion. This is the second recursion of the original. So, how much space is being created with each one? Well, it's n on the first; n cubed (squared) on the second; and n^3 (cubed) and including K.

1:01:39

This is the original pattern here. Now, for the second… that's the first arrow, or one arrow. But that is recursed, that same pattern. It's just a blown up version of this. Instead of n, it's n squared. So all the values are squared. So you get… instead of just this curve to here, you get the next curve which goes like this to here. And now the age of the universe is older. Instead of being this many arrows, it's this many. And then on the next recursion, it goes like this. And so you have this many. So the age of the universe is n cubed. I think I explained it a little bit in the text itself.

1:03:12

> This number is determined by the number of arrows in the largest circuit, which is the same as n, and by K, which is the average number…

Y: So

1:03:20

> This number, nK, is cubed because at least one nonphysical individual in the largest circuit has at least three arrows originating from it across the largest circuit and any such arrows in excess…

Are experienced as energy

1:03:35

> …of three are observed as energy, instead of as additional dimensions of space and time. The magnitude of the fundamental unit of time (t_q) is given by $tp/(2N)^{1/2}$, where $(2N)^{1/2}$ is the number of states of knowledge needed to expect a substate of two arrows to exist, as in A → B: therefore, the number of time units is $(Kn)^3$ times t_q (or the quantum of time).
> However, this is decreased by a factor of $\pi/2$;

1:04:20

Y: We've seen that one before.

> therefore, the age of the universe, tu =…

Y: is…

B: 2 over pi(π)

Y:

1:04:38

$2/\pi[(Kn)^3 t_q]$, is 12.6516 billion sidereal years. This is a prediction. The *average* current value measured for tu, using various methods (cephid stars, globular clusters of stars method, WMAP microwave background, and uranium decay in stars), we get an average value of 13.7 plus or minus 0.7. **(NOTE: the paper said the following:** is 13.2 ±0.7 billion years).

1:05:22

Y: So my prediction is within the margin of error that their measurements show. I get 12.7. The average of all the different measurement methods is 13.2. Whereas, the MAP system, MAP instrument itself measured 13.7 which is just outside. But they're certainly very close.

1:05:57

So I think we're on the right track there for the age of the universe. These recursions turned out to be very important because, otherwise, we have a universe that is only 10 to the minus 30th of a second long. In order to get an age of the universe of billions of years, we have one recursion, two recursions of the same pattern. And that's because it's recursed because of each dimension added repeats the experience multiplied by for each one of the arrows of the previous one.

1:06:42

So, you get a whole set of… you get an N number for every arrow crossing over; you get n. Then you get n squared number of them making N cubed all together. This also explains the difference between virtual particles and the isolation of quarks into a quark bag. Do you know about that? That is, they can't get quarks off by themselves. They come in groups of two or three.

B: Uh huh.

1:07:30

Y: At least they do on Star Trek. I'm kidding. Anyway the confinement, as it's called, of the quarks into two in a meson or three quarks is explained by the recursion. You have a one dimension universe, a two dimension universe and a three dimension universe. The quark confinement…they're confined to two dimensions. I'll show you some details on that later. All that comes up from the age of the universe. Now here's a wonder.

1:08:25

The relative strength of the electromagnetic force to the gravitational force (EM/g) is given by: this formula: $(Kn)^2/(\pi/2N)^{1/2}$, so EM/g = 6.6223224 x 10^{36}.

Y: Now, you may know that they've had this great wonder of why the gravitational force is so much weaker than the electromagnetic. It's weaker by a factor of 10^{36}, weaker.

1:08:54

And there's these physicists that just tear their hair saying, "We don't understand how this could possibly be!" Well, here's the explanation in one brief sentence: The relative strength of the electromagnetic force to the gravitational force (EM/g) is given by Kn squared, divided by the square root of pi (π) over 2N (insert formula). So the ratio of the electromagnetic force divided by the gravitational force (g) is 6.6223224 times 10^{36}.

The measured value is 6.6 times 10^{36} ('t Hooft 1980).

1:09:52

B: This is great! So actually, when talking about electromagnetic force, you take into account the number of individuals into the circuit …

Y: (Yogeshwar acknowledges)

B: …which is N and the number of the relations…

Y: The arrows extending.

B: …of arrows extending for these individuals. And this…

Y: And 2 pi(π).

1:10:29

B: Ah, 2 pi(π) is for the gravitational force as it is written here.

Y: It is the what?

B: Maybe I understood it wrong. You make here a ratio between the electromagnetic force and the gravitational. Isn't it so?

Y: Yes.

B: So pi(π) belongs to gravitational; not to electromagnetic as it is written here.

Y: Both are involved here. The square root of pi(π) over 2N, divided into Kn squared.

1:11:17

B: OK, but N is down or up? The equation is K multiplied by n which is how it should be because in one of the previous articles it is written… It is not squared; but it is n multiplied by K minus one, which is not correct. This is correct. Maybe I am wrong. I just try to understand this.

Y: (Yogeshwar acknowledges).

B: As I understand it…

Y: I didn't explain in the text here

B: (Biljana acknowledges)

Y: how I got this; how I derived this.

1:12:03

B: Yes, but in principle we have a ratio between something representing the electromagnetic force…

Y: The electromagnetic force…

B: or in terms of Lila Paradigm, this is the… what is the name? The denominator and what was…

Y: The numerator.

B: The numerator.

Y: Yes, and this is the denominator.

B This is the denominator.

Y: Yes, but it…
1:12:31
B: In the numerator, you have electromagnetic force…

Y: But it's squared.

B: It's squared, OK?

Y: You want to know why it's squared?

B: Because everyone related to everyone else?

Y: Well, that's part of it. But it's because it's a recursion.

B: Ah yes. You were explaining here; this and this.
1:13:00
Y: Yes. Electromagnetic force is a two dimensional phenomena.

B: OK, great. This means I have one bifurcation. And once I go through this, and second time I go through this.

Y: And that's why it's squared.
1:13:21 (insert graph)
B: OK. So this is this one. This is referring to electromagnetic force.

Y: Yes.

B: And the other one down in the denominator…

Y: It is related to the gravitational force.

B: N is here or here?

Y: It's big N.
1:13:36
B: Yes, I know. But whether it is pi(π) over 2N, or it is pi(π) halved multiplied by N…it is not clear here.

Y: It is pi(π) divided by 2N.

B: I know. I know now, I know. If I am not wrong, because this is actually…this comes from the combinatorics. We have already stated that in combinatorics which have been used. We have K root from K factorial N. Isn't it so? If K is 2, then I have square (or one half) square root of 2 factorial N. And this is square root of 2N.
1:14:23
Y: Right.

B: So, this is it. And pi(π)? Ah, pi(π). Huh, pi(π) belongs to the electromagnetic force in the ratio.

Y: Yes.

B: So downstairs, or in the denominator…

Y: Yes.
1:14:52
B: In the denominator, we have this combinatorics: square root of 2 factorial N (insert formula) which is square root of 2N which is referring to gravitational force.

Y: Yes.

B: And it is 2 because graviton is like this.

Y: That's right. You've written it correctly.
1:15:15
B: It is just 2 in the circle. And upstairs, or in the numerator, we have Kn. It is squared because it is two dimensional. And now pi(π). Where is pi(π)? It should be corrected, though. Because, at least…

Y: Well…
1:15:43
B: …according to my understanding, because it is not clear here. Is it square? As it is written here, it says…actually, we have K multiplied by n squared over square root of pi(π) over… (Insert formula) But where is N? I don't… (Insert formula)
Punita: I don't.

B: Is it here or is it here?
1:16:14
Y: It's the probabilistic out of the totality of all N.

B: Is it pi(π) over 2N…?

Y: No.

B: …or is it…?

Y: It's pi(π) over 2N.

1:16:25
B: In order to have the combinatorics for 2…

Y: It doesn't show the combinatorics there because there's been some cancellation.

B: Maybe, but pi(π) should be either in or outside.

Punita: The question is, "Is it the square root of 2N? pi(π) over the square root of 2N?"

Y: The way it's written is…it's pi(π) over 2N, the square root of that.

1:16:54
Punita: OK.

B: Maybe, it is so. But then I don't see for now the…

Y: Yes. The reason why, as I said, I haven't explained how that is related to gravitation.

B: Yes, I understand. But I try to understand it somehow visually. Maybe…
1:17:13
Y: This is a compressed… from cancellation.

B: Yes, I know. But until now I had this ability to see what it is behind it…

Y: Yes, you have.

B: And so I'm trying to do it now.

Y: And I don't know how you do it.
1:17:29
B: Maybe, I do something from the mental realm. But, mainly, it is so. pi(π) should arise from the graviton being part of the circle. I believe so because when…

Y: It is…

B: …referring to gravitational force, you have this configuration.

Y: Yes.

B: And this configuration is part of the circle. And this circle causes (us) to have pi(π) in the formula.

Y: That's right.

B: OK. Then great!

1:18:08
Y: That's where the pi(π) comes from, the fact that it's clear across here. It's not a little one here in the middle. It comes clear across.

B: Ah yes, uh huh.

Y: Yes, like that.

B: OK. This is great result. I mean this is convincing.

Y: And we'll do…
1:18:37
B: This is more than enough for a paper.

Y: Too much.

B: Too much.

Y: Yes, I think it's too much.

B: It's too much.
1:18:43
Y: So I tried to break it down. We'll just talk about big G. But there's only four guys in the world that are working on big G, on the Newton's gravitational constant. It's just the nature of the world. The last paragraph here…
1:19:02 (Middle of page 27 *The Lila Paradigm of Ultimate Reality*)

> The relative strength of the strong force to the gravitational force (S/g) is given by: 3(K-1) EM, which is 2.3256744 x 10^{38}. The measured value at 10^{-16} m

The distance (10^{-16}m) because this value changes depending… This is considered the fundamental value.

> is 2.3 x 10^{38} (t' Hooft 1980).

1:19:41
Y: …is the strength… how many times more the strong force is than the gravitational force. They have trouble measuring the strength of the forces. But it's just 3(K minus 1). Gives you the strength of the… how much stronger the strong force is than the gravitational force is 3 times K-1. Well, they don't have K. But we have K based off of alpha and N. So alpha and N are implied here. That is K. OK. What do you want to do?
1:20:40
B: Whatever you say.

Y: Do you want to show us something? You got one more Gödel or…

B: Uh huh. Maybe, if you want to.

Y: Well, if they can take it.

Punita: Sure.

B: Uh huh. OK.

Y: We've covered a lot of territory today.

B: Yes.
1:21:00
Y: You guys didn't answer. You want more Gödel.

Punita: I nodded.

Bret: I don't know.

Y: Well, we'll find out then.

Bret: That's right. That's the only way to know. I can tell you what I think; I can't tell you what will happen.

Y: Oh. You can tell a MIT boy. They all talk like that from MIT. They're thinkers.
1:21:32
B: I have found the PDF file. So how should we arrange…

Y: I'll come around.

B: And this chair for Charles**.**
1:21:44
Y: Well, somebody is going to have to stand up unless they want to bring around another chair. I got lost about two/thirds of the way through when I was going through this one myself. I couldn't follow the M where you left off. The M, the U's.
1:22:32
B: I have presentation on Theory of Relativity of… so, as I said yesterday, Gödel's Law of Incompleteness has the idea to show us the impossibility to build a formological system, in other words, a robot which will be able to speak about itself.
1:23:06
Our aim is to build a consistent and complete system. Consistent, as I said, meaning everything which is produced by this system should be true. And complete meaning every truth outside the system should be representable into the system. So there is no truth outside the system. Once we have such system which is consistent, this means everything produced by the system is

true and complete, this means there is no truth outside the system, then everything we put as an input, every assignment or task we put as an input to this system in the language understandable for the system, then the output we get by the mere power of the system will be true because there is no truth that is outside the system and because the system doesn't lie.

Y: So this is our goal. We're going to try to do that.
1:24:10
B: This is our goal, yes. We are trying to do it. And many mathematicians through the history of science were trying, but were not able to do it. So we are starting with simple systems. In order… and each and every one of these simple systems has a message, has a meaning to it. And all these messages will be needed in order to give the final statement. So first we start with 'MU' riddle which is clearly pointing to Mumonkan, to Zen stories written in the 9^{th} century by Mumon.

Y: Yes.
1:25:03
B: Because the riddles are very similar to this one. This is the same as an Intensive. You are asked this: "Who am I? Who am I? Who am I? Who am I?" You are an infinite…

Y: Self referential.
1:25:15
B: Self referential. Until you find a way out by a break through… And so we are trying to do this in (by) mathematical means.

Y: (Yogeshwar acknowledges).

B: But to do this is not so easy. We need…for instance, we need uniqueness. And Gödel found it. He has, actually, in a way, the 'whoness' of equations.

Y: Oh? Can you show me?

B: Yes. I was thinking of him those days, you know – these days. (Yogeshwar acknowledges). He succeeded in it. Actually, he has, in a way, these attributes in mathematical way. And this is one of his ingenious ideas. But first of all, this MU riddle. This is designed to show, to make us differentiate between working into system, the work done by the system itself, by its own power. This means with the power of its own symbols and equations.
1:26:20
For instance, I have a certain axiom; and it is the starting point. And I have laws, Legitimate Rules for Transition. And all of these rules, as I said last time, are theorems. And every and each (each and every) one of them is a theorem. So the conclusion will be true. But one thing is the conclusion made by the system itself with its own means; and something other is to contemplate about the system outside. This is the difference between human intelligence and artificial intelligence.

Y: And a robot.

1:27:03
B: And it is not always so easy to distinguish between them two. You don't know always what is human thinking and what is result of artificial intelligence.

Y: Right.

1:27:17
B: And in order to build up this skill, in order to be able to differentiate, this MU riddle has been designed to teach us to differentiate between working into the system which is mechanical mode, or thinking about the system which is intellectual mode.

Y: So who worked this out Gödel or you?
1:27:42
B: Gödel and Dr. Hofstadter. The MU riddle is by Hofstadter. The thinking is of Gödel but Hofstadter had courtesy to make it easier for us to understand. And he invented this system.

Y: OK.
1:27:58
B: So in this MU riddle, we have initial axiom which is MI. We start with this one. This is an action. This is the starting of the system. And we have 4 rules. The first rule says, "If you have M and the sequence of symbols, then you are allowed to multiply this sequence." For instance, if you have MIU you are allowed to do the sequence MIUIU. Out of this sequence, you obtain another sequence MIUIUIUIU. And so on and so on. So there is one rule.

Y: So that's what's developed there.
1:28:45
B: Uh huh. Yes. These are the branches of possible outcomes of the sequence of using the rules. Now, there is a second rule which says… this is the second rule actually. The first rules says, "If the sequence is ended with (I) you could add U to it." And so on. The third is, "If you have two (U's) you can erase them." So whenever in the sequence we meet two (U's), we are allowed to erase them.

Y: (Yogeshwar acknowledges).
1:29:31
B: And the fourth rule says, "If you have three (U's) in a sequence, then you could, you are allowed to, replace them with U." So these are some simple rules to use here. But once you start using them, you will discover that it is not possible to obtain MU or (moo?) which is the objective.

Y: Ah hah.
1:30:13
B: The assignment is starting by ME and (by) using these four rules, you are supposed to find MU.

Y: But you don't.
1:30:24

B: But you don't. But there is a difference. If you start working as a robot… so if you work in mechanical mode as the robot should do,

Y: (Yogeshwar acknowledges)

B: then very easily, then you will fall into infinite loops. So all these branches or at least some of them are infinite. Some of them come to the same sequence. And they are falling into an infinite loop.

Y: I know some people like that. (Everyone laughs.)
1:30:58
B: And so when working in mechanical mode, you are stuck. There is nothing you can do. But when you think over the rules, you should realize that the rules are designed in such a way that it is impossible for you to obtain MU.

Y: (Yogeshwar acknowledges).
1:31:20
B: For instance, it is said in one of the rules that when we and sequence of three (I's) (I, I, I), we are suppose to replace them with U. The other rule says when you have a sequence M and X, X meaning a sequence of allowed symbols, then you are allowed to obtain MXX. But this leads to numbers of (IS). For instance, I start with MI which is the starting point. Then the second is MII; then MIII; then MIIIIIIII. Then by applying the second rule I have U here. By applying the second rule, once again I have U here. And still there are two left. And whatever I do, I could never be released from these (I's).

Y: Yes.
1:32:22
B: I could never be released from these (I's). And the objective is to be released from (I's) and obtain MU. So by similar thinking, you could find out that it is impossible. But now I'm working in intelligent mode, clearly. Now, I'm outside the system thinking about the system. And in order to be able to (use?) Gödel's proof, you must differentiate between (the) two.

Y: Hm.
1:32:53
B: Because what is Gödel's objective? He's aiming towards a system, a formological system or a robot which will be so sophisticated and so developed that in it, it will be possible to define a sequence, talking about a sequence, talking about other sequence or mathematical statement or whatever

Y: (Yogeshwar acknowledges)
1:33:27
B: a logical statement, which is referring to another statement and finally, a statement which will be able to refer to itself.

Y: Uh huh. And that's the connection to the Lila Paradigm.
1:33:44

B: Yes. And at a certain point, you should encounter with the genuine paradox. But, in order to do this, we must build the mathematical tools. And it requires a lot of puzzles like this one. So first we must differentiate. In order to understand Gödel's Law is to differentiate between working into the system which is mechanical mode and which is what robots do

Y: (Yogeshwar acknowledges)
1:34:13
B: and intelligent thinking which is thinking about what the robot is thinking.

Y: (Yogeshwar acknowledges).

B: Because when we are aiming toward self reference, we should bump (run) into this. And so we must be very skillful. We must first develop our skill to differentiate between thinking about the system and what is the system capable of by itself. So this is the small puzzle. And it is referring to MU, Rumanian and the Zen koan. (Mu mean no, or none, or it is a meaningless question, in Japanese.)
1:34:52
Y: (Yogeshwar acknowledges).

B: Because, actually, this is the Zen story about Zhaozhou when he…

Y: About

B: …asks, "Does the dog have a Buddha nature?" (Yogeshwar acknowledges) And Zhaozhou said, "MU."

Y: Yes, I remember the koan.

B: So this is why this is title 'MU Puzzle' because you should cut the intellectual…

Y: Nonsense.
1:35:21
B: Nonsense, yes. And so then there are different formological systems. But it takes time to go over them. So I'll just go briefly.

Y: (Yogeshwar acknowledges).

B: It requires, for instance, three or four hours. And each and every one of these formological systems has an objective. For instance, this 'PQ Dash' formological system is a way to show how with simple means you could build a formological system which is capable of arithmetic operation of summarizing or of subtracting or multiplying.
1:36:11
So first of all, if we are ambitious, if our ambition goes beyond now-a-days mathematics, then our new mathematic should contain the whole mathematics of today and something new. So our new system, first of all, should be capable of whatever today's mathematics is capable of. So we

should include the whole arithmetic's, the whole Boolean algebra and go beyond this.
1:36:50
So this first system, PQ system… Then there is another PQ system, and so on. They are designed to build a formological system which is capable of what today's mathematics is capable of summarizing arithmetical operations.

1:37:18
Then we include Boolean algebra into it because arithmetic operations are not sufficient. We need logic. So all the logic… And this is needed in discrete mathematics very much, and so on. All the logical functions: or, nor, negation…

Y: Right; and, or…
1:37:40
B: …exclusive, and so on and so on. So the whole logic is put into the system. And it is considered known to the system. And we go further on. Now these pictures…this is why I was insisting on the positive state of choosing not to be in state of direct knowledge. For instance, if you have a black background with a white paint, you write A. You have one quantity of information. Information is: logarithm of one over P where P is the probability that this event for which we are searching information will happen, will occur.

Y: Hm.
1:38:35
B: This is very nice. Also it could be used. For instance, I know that tomorrow the sun will rise on east.

Y: (Yogeshwar acknowledges).

B: So the probability that the sun will rise on (in the) east, no matter I am now in Australia for the other half of year.

Y: It still rises in the east.
1:39:00
B: It still rises in east. So the probability is one. So the information is logarithm of one is zero. If you tell me, "Biljana, tomorrow the sun will rise on east," this is of no use of (to) me. This is zero information.

Y: (Yogeshwar acknowledges).

B: But if you explain to me…

Y: But I can tell you that it rises in the northern sky rather than the southern sky.
1:39:21
B: If you tell me on lottery you will… this and this and this numbers will gain (win). You know for which probability is very, very, very, very, very, very, very small. Then you give me tremendous information because I will become a millionaire. So the information is this one. And now, back to this. So, I have a

certain quantity of information in this one. This is A. So I know this is A. But I could as well use a white background, a white paper and work with a black paint. And then I will obtain the same A. So this was why I was insisting on whether the complimentary graph has meaning. Maybe…

Y: I remember.

1:40:21
B: So, this is to show that…this is to build for us a skill to be able to differentiate between theorem and non-theorem. This is the meaning of it. All these bricks later on will have more meaning to them. You know, this is all which we need in order to understand the Gödel‘s Theorem.

Y: (Yogeshwar acknowledges).
1:40:46
B: So these are shapes and negative spaces. And there are pictures showing. For instance, this one. When we first look at it, it is a number of black stains, black figures. But if we look differently, if we look at this white, the white figures, the white, the background actually...

Y: Mail box.
1:41:19
B: Mail box, yes. So the way you are looking, either we are talking about theorems or non-theorems. It creates a difference. Now, there is a… this is also interesting, but it takes time. These systems, these formological systems, require that everything you define into this system should be defined in positive way. This means it is not allowed for a robot to say to him…
1:41:53
For instance, the way we are finding the prime numbers, the way *we* are finding… we humans (so, now we switch to human intelligence) the way we are thinking about prime numbers is: this is a complex number; this is a complex number; this is a complex number; this is a complex number; this is a complex number. All that is not a complex number, is a prime number.
1:42:26
Y: (Yogeshwar acknowledges).

B: But this logic is not applicable to a robot.

Y: Hm?

B: This is not possible to say to a robot, “Everything that is not this and this…”

Y: Uh huh.
1:42:40
B: “…is what you are searching for,” because he will fall into an infinite loop. So everything should be given to him in a positive manner.

Y: (Yogeshwar acknowledges).

B: And this creates lots of problem while you come to the final destination which is Gödel’s theorem.

Y: (Yogeshwar acknowledges).
1:43:00
B: So this is formological system which is specially designed to produce primes; but in positive manner. And it is quite different thinking of the manner we usually use. It is not allowed to form complex numbers, and to say, “M multiplied by N is a complex number. Everything else is prime.” You should do it in positive way. And this is very difficult to do.

Y: (Yogeshwar acknowledges).

B: And this shows how to do it.

Y: OK.
1:43:39
B: Then further on propositional arithmetic. There are the rules involved building logic, building everything which has been done by George Boole when building his Boolean algebra which is in the logic (sequence?) is done here also. Because, first of all, if we are aiming to have a perfect robot which will be able to answer the question, “Who am I?” then first of all we require the whole mathematics. This is done with this PQ system, TQ system and so on. So arithmetic has been included. Then, further step is to include logic into it. So logic is included.
1:44:34
So this propositional arithmetic, and these is something we might need when building a discrete mathematic, as you mentioned.

Y: (Yogeshwar acknowledges).

B: Some of it may be of use.

Y: Hm.
1:44:53
B: So second step in building a perfect robot is to include logic. So these are the rules including logic. This might be of interest. You know Cantor when we were discussing continuality and discreteness.

Y: (Yogeshwar acknowledges).

B: Whether the universe is based on discrete elements as in Lila Paradigm…

Y: or continual.

B: or continual. This dispute lasted for over 100 years in mathematics and in science; and it still lasts, actually.

Y: (Yogeshwar acknowledges).
1:45:30

B: I'll tell you about this, maybe, later on. But I wanted just to say Cantor's definition of infinity, of infinite set, is very interesting. Cantor… the usual definition of infinite set is: I have a set of elements. For instance, this is set of elements. For instance, in this room there are three chairs. If the number of elements is finite, then this set is finite. And we say, "Everything… the set which is not finite is infinite, is infinite. The set of elements which is not finite is infinite." For instance, the number of individuals is finite.

Y: (Yogeshwar acknowledges).
1:46:25
B: But Cantor doesn't do it this way because it includes negation. Actually, he says, "Every set which is of same power." And there was expression for it which is 'active potential with prime' with… what are the… the whole numbers…the set of…

Punita: Whole numbers?

B: Not real numbers.

Punita: Integers.

Bret: Integers, whole numbers, real numbers…

B: Natural; one, two, three, four.

Punita: Integers

Y: Integers?
1:47:13
B: Integers. Uh huh, OK. So every set which is active potential to the set of integers is infinite.

Bret: Countable.

B: Yes. So you must be able… so this is…

Y: Depends on what you mean by the word 'is'.

B: Huh?
1:47:42
Y: Well, you say, "It *is* infinite." I can conceive of an infinity of such numbers. But do they exist? If you mean by the word 'is' do those numbers exist or is it just an idea of them?

B: OK. This is another point.

Y: Yes. And when I read Cantor I couldn't see that he really discussed the point.
1:48:10

B: What he discusses, according to my understanding… actually, the main subject of the dispute between Cantor and Kronecker was: Kronecker said, “God created the whole number. Everything else is human creation. So it does not really exist.”

Y: (Yogeshwar acknowledges).
1:48:40
B: This is Kronecker’s understanding. He’s for discreteness. Even Pythagoras said, “God gives us bricks. Everything else is human invention.”

Y: (Yogeshwar acknowledges).
1:48:55
B: But he had integrity enough to deny his own words when he discovered that, “if this is one, this is one, this is square of two which is not a whole number.” And so he had dignity to say, “I was wrong.” But Kronecker… so Kronecker’s view is very similar to this one. He says, “Only thing that exists is the whole number. All the other is human invention.” But Cantor believed into the reality of rational numbers and…
1:49:39
Y: Depends on what you mean by reality. If a conception of something is a reality, well, that’s one thing.

B: acknowledges).

Y: You could say that what exists is the concept of it; that does exist.

B: But does that mean that it exists?

Y: Yes, exactly.
1:50:02
Y: Good questions. Now you could make an assumption either way. And you can develop useful things from either way.

B: From your assumptions, yes.

Y: Uh huh.

B: OK
1:50:17
Y: But how is it? Is there an ultimate reality? Well, I… we’ve been trying to talk about it.

B: This is Korzybski. Korzybski said, “The geographic map is not the territory.” The territory is the territory. And the map is the map of the territory.

Y: That’s right.

B: **(?)** is…

Y: It’s not difficult to me.

B: Yes. So this is too long, you know. But I'll make the story short.

Y: Yes.
1:50:50
B: There are two. Finally, by building more and more complex formological systems, finally we arrive to Typographical Number Theory which is TNT symbolically meaning it has potential to ruin itself because finally we come to our destination to define statement, talking about a statement.

Y: (Yogeshwar acknowledges).
1:51:14
B: And now Gödel has two genius ideas; and these are: first of all, this is what I meant by he came to 'whoness' of the equations.

Y: (Yogeshwar acknowledges).
1:51:27
B: He finds a way to differentiate one proposition from another. He proposed… or maybe he needs a step further, but still he went further enough. He finds a way to give identity to every statement, to every mathematical statement. For instance, if I have X is X plus one. This is a mathematical statement although it is not correct.

Y: (Yogeshwar agrees).
1:52:06
B: It is correct in programming. X is X plus one. Now if I give a number to this, if I say, "This is one." If I say, "Equal is one, one, one. X is one. Plus is 23; one." Then, if I perceive this one, one, one, one, one, 23, not as a sequence of symbols but as an arithmetic number, then the whole picture changes.

Y: (Yogeshwar acknowledges).
1:525:46
B: So this is not just sequence of symbols. For instance, in our MU puzzle we have just three symbols: MIU. If I put three for M, one for I and zero for U, then MEUEU becomes three one zero one zero. And now if from this one, I obtain, by using the rule, the next sequence, I could obtain MIUIUIUIU which is three one zero one zero one zero one zero. But this one is a number, not a sequence of numbers. And from this number to this number, I could arrive with arithmetic. I could multiply this by 10 to 4^{th}…

Y: (Yogeshwar acknowledges)
1:53:40
B: and plus zero, zero. Then I could obtain this one. So my logic is… so the stepping from one statement to another is transformed into arithmetic…

Y: Alright.

B: …which is a great step towards what we want to do. This might be very difficult, for instance, for… if I had cosine of this one or a statement for that matter. It could be a logical statement. For instance, “This table is made of wood.”

Y: Alright
1:54:21
B: It could also be translated into these symbols. So the first idea was that he denoted a number to every statement and arithmetic to moving from a statement to another statement.

Y: (Yogeshwar acknowledges).
1:54:41
B: This means that now I could do the whole job mechanically. So instead of using, instead of working in intellectual mode thinking about the system, this is all mechanical now because this is all arithmetic now.

Y: (Yogeshwar acknowledges).
1:55:02
B: First of all, I have identity for all the statements; this statement, this statement, this and this. This statement, this statement, this and this. This statement, this statement, this and this. So, all of these are different; this is one thing. In a way, the ‘whoness’ of the equations.
1:55:22
Second, I do not have to think now. I do not have to use human intelligence. Now, this all is into the robot because all is arithmetic. So this is one idea of Gödel; and it was necessary to do.
1:55:42
And the other idea was that he provided for the process to be finished, provided for us to avoid falling into an infinite loop, provided finiteness of the process by defining ‘proof pairs’. ‘Proof pair’ is, for instance, I start from MI. Then I go MIU, then MIUIU, and so on and so on. And I arrive to something, to MIUIUIUIU. This is the sequence. If this whole sequence is denote by M, and the final statement is denoted by M, then these two form a proof pair.

Y: Uh huh.
1:56:38
B: This means the end is provided. This means, “I’m sure it will end. I’m sure I won’t fall into an infinite loop,”

Y: (Yogeshwar acknowledges).
1:56:52
B: which is easily possible when I ask, “Who am I?” for instance. The object and subject are the same. And this is what I want to do in the formological system, a robot who will be able to say, [I].

Y: (Yogeshwar acknowledges).
1:57:07
B: This means a robot is nothing else but the formological system. He’s a statement in final degree. So I should be able, if I want to do this, I should be able to define a statement which will talk about the statement in mathematical means by working mechanically.

Y: I see.
1:57:31
B: In order to do this, one step is to be able to differentiate this statement. And this is done by Gödel's numeration. It is a whole system here about Gödel numeration. Now, this is the logic. So mathematical induction should be involved. But this takes three hours or four hours. And after we go… so this is, for instance, a Gödel's numeration in TNT formological system. For every symbol he gives a number.

Y: (Yogeshwar acknowledges)
1:58:13
B: And this number is easy to remember. And so we have come to the point to have identity for each statement. This is number one rule. And the second genius idea of Gödel is the proof pair. He provided that the sequence of statements will come to an end. So by introducing proof pairs into the formological system which has the objective to be consistent and complete, we have done a giant step towards our objective. So this is the second idea of Gödel.
1:59:07
And finally, when we have this, we have this. Then further on he defines a special operation which is not known in the rest of mathematics, in ordinary mathematics. And this, this is arithmequinification. This is possibility. Once I have a number for this statement, for instance, 'A is always less than zero' is a statement. If I translate it into Gödel's numbers, I got a number like this one. For instance, 'A is 262 and so on.' This is a number. Now, if to this A which is – this is an open statement, this meaning, "it could be true, it could be not true." It depends on A. In order to close this statement, I should either give here identifier to say, "For every A this is so," or to say, "There exists an A for which this is so."

Y: (Yogeshwar acknowledges).
2:00:21
B: Either I should do it this way or I should denote a value to A in order to be able to say whether this is true or not.

Y: (Yogeshwar acknowledges).

B: If A is minus one, then this is true. If A is hundred, then this is not true. So I must close the statement.

Y: (Yogeshwar acknowledges).
2:00:40
B: And so, if I close the statement in this way, that to A, I (show the) denote the number of the statement itself. Then I have self reference.

Y: Hm.

B: Then I have self reference.

Y: Hm.

B: Then this is a statement talking about itself.

Y: Ah hah.
2:01:10
B: You remember when in the first session, you were talking about a first person experience?

Y: Yes.

B: It is connected with this.

Y: Uh huh.

B: It is connected with this. And Hofstadter, the author of these interpretation of Gödel's theorem, who is a very famous scientist, he said, for instance… and this is where from comes the understanding of science that consciousness might be a product of the neurons. He says, "I have here a very simple statement…" This is Mumon named here. He has a statement. For instance, this one might be an example. "I have A here." This is translated into Gödel's numeration as a number.

Y: (Yogeshwar acknowledges).
2:02:12
B: 2625, so it is a number. Now, I feed this equation with its own number.
I feed this equation. I close the equation in order to make it either false or true because this way it is open. And I do so by feeding it with its own number.

Y: (Yogeshwar acknowledges).

B: And this operation is called arithmequinification.

Y: Identification?

B: Arithmequinification. It is a…
2:02:44
Bret: Could you write the spelling of the word?

B: Uh huh. This is a story about it also. It is 'arithmequinification'.

Y: Never heard of the word.

B: Why quinification? Because Quine is both a scientist, a mathematician, a logician and both…

Y: Oh, Quine, yes.

B: This is the queen from ‘Alice from Wonderland,’ you know, because the queen in Alice from Wonderland…

Y: The queen.
2:03:22
B: The queen, yes. The queen is; he is very… I don’t know the English word. He’s very tricky, very…

Y: Yes, I know her.

B: Sometimes she says something, then something else which is not logical. She’s moody. Moody, maybe, is the word.

Bret: Unforgivable.
2:03:44
B: So it is arithmequinification. So this is why Hofstadter came with this, introduced this. This is his invention. He said, “This operation I propose to be titled ‘arithmequinification’.” Both pointing to Quine who was logician doing these paradoxes.

Y: (Yogeshwar acknowledges)
2:04:14
B: And both this is queen from ‘Alice from the Wonderland’. So we came to the point when it is possible for a theorem to say, “I am not a theorem.” But prior to this, I started to talk about first person experience.

Y: (Yogeshwar acknowledges).
2:04:32
B: They say, Hofstadter says he belongs to the current stream of scientists of artificial intelligence which means he’s materialist.

Y: (Yogeshwar acknowledges).
2:04:48
B: He says, “If this simple, very, very, very, simple statement could be interpreted in two levels, (and it is possible) I could say, ‘MU’…I could write ‘MU is 30’ because I said for M I’ll put three.

B: (Yogeshwar acknowledges)
2:05:11
B: For U I’ll put 0. So this sequence of symbols which could be meaningless now has a meaning. And it’s a number. Even more, it has identity.

Y: (Yogeshwar acknowledges).
2:05:26
B: Now, it has a name.

Y: (Yogeshwar acknowledges).

B: It is unique. It has ‘who’ and uniqueness.

Y: (Yogeshwar acknowledges).
2:05:32
B: For instance, this note is W. This is 8. So it has identity now. And now I could state or I could ask, “Is 30?” I could either ask, “Is MU a sequence in MIU system?” We have seen it is not. Or I could put this as, “Is 30 a number in TNT theory?”

Y: (Yogeshwar acknowledges).
2:06:05
B: So, a same sequence has two levels of interpreting.

Y: (Yogeshwar acknowledges).

B: And now, Hofstadter says… We are moving towards first person experience. Hofstadter says, “If this simple statement could be interpreted in two levels…” And I could say that now I’m talking about the statement.

Y: (Yogeshwar acknowledges).
2:06:33
B: I have moved over **(?)** intelligence. So the human brain which has, how much? 30 million…11, I believe.

Y: 11 billion.

B: 11 billion neurons.

Y: (Yogeshwar acknowledges).
2:06:52
B: Then the human brain which has 11 billion neurons and much more relations between them…

Y: Yes, it’s five thousand for each one.

B: five thou… maybe. And more. This is…

Y: Five thousand for each. Each neuron has five thousand connections on average.

B: e to p(π), actually. Isn’t it e to p(π)?
Y: Is it…

B: Because these neurons could be observed as nonphysical individuals.

Y: Yes.
2:07:30
B: So this is e to pi(π); e to pi(π) relations. e to pi(π) possible relations. Then he asks, “Then I could say that one of these interpretations could be intuition or sorrow or even consciousness.” He says, once again, “If a simple statement as Mumon” – and there is a special…

Y: (Yogeshwar acknowledges)
2:08:00
B: statement he shows… "Has two possible interpretations, two level of interpretations, one which is literal and the other one which is more symbolic and moving towards intelligence." Then I ask myself, "The brain which has 11 millions of neurons and e to pi(π) or 5000 or whatever relations between them. Then how many levels of interpretations are possible out of the brain?" And he says, "One of these sophisticated interpretations could be sorrow or intuition or even consciousness."

Y: (Yogeshwar acknowledges).

2:08:51
B: He says, "One level of these interpretations could be consciousness." So he says, "I belong to materialism."

Y: Uh…Wrong. (Everyone laughs). One of them could be consciousness.

B: Yes.
2:09:12
Y: Well, he could also… it could be that it's not… consciousness is not one of them. It is different in its ultimate nature than all the rest of those.

B: (Biljana acknowledges).
2:09:25
Y: Consciousness is of a different order of thing altogether than what those are referring to.

Bret: He's ignoring the elephant in the room.

Y: Who's rule?
2:09:37
Bret: He's ignoring the elephant in the room when he says, "This statement could have two different interpretations." To who? The statement only has meaning to someone or something that can apprehend meaning. So the statement alone is not the only thing that's involved in his discussion.

Y: Not only apprehend meaning, but can apprehend.

Bret: Right. That's the elephant in the room.

Y: Yes, because these can't apprehend anything.
2:10:06
B: (Biljana is asking someone something in the background while Yogeshwar is talking).

Y: Yes, I know about Hofstadter and Dennett.
2:10:14

B: Ah. Dennett. Yes. Consciousness Away, *Consciousness Explained and Away*, the title of the book, because he wanted to explain consciousness. But then, he saw it was not possible.

2:10:30

Y: At the Tucson conference on Consciousness, Dennett was in the audience. And Tromberg was on the stage giving a paper. And at the end of the paper, he pulled out this hair dryer and said, “It looks like a hair dryer, but it’s a consciousness meter.”

B: Consciousness?

Y: Consciousness meter, a thing for measuring consciousness.

B: Ah meter; consciousness meter.

2:10:55

Y: And he pointed it at different people that were sitting in the front row. And he goes along like this, “Well, this one registers about 5, this one 9, this one…Oh Daniel Dennett. It did a zero.”

B: Great.

Y: So much for Daniel Dennett. Well, thank you.

B: There’s much more…

Y: Oh, not tonight though. Not today. We’re over time already.

2:11:25

B: OK. Thank you so much.

Y: You do a marvelous job. Do you take 17 hours to teach this?

B: Yes, 17 hours and at Master’s level for Master’s candidates.

Y: Ah hah. That’s a real service you’re doing to do that for them. ‘Cause it’s the key idea. And it’s complicated enough that their minds will be all absorbed into it. And they’ll say, “But, but, but, but.”

B: Sometimes they just copy, you know. They have papers and copy.

2:12:04