The Atheist's Riddle:
Language, Information and the case for Intelligent Evolution

Perry Marshall is author of the book Industrial Ethernet published by ISA, and is also speaker and business consultant. His background in control systems, communication systems, acoustics and networking protocols provides unusual insights on the Naturalism vs. Intelligent Design debate. What follows is a transcript of an April 2005 talk he gave in Chicago, part 1 of "The Atheist's Riddle."

Nice to meet all you guys, I don't know most of these faces so it's really great... we definitely have a very interested bunch of people here, because I am competing with a very beautiful day outside, and I recognize that, so I appreciate you being here. My talk today is called "The Atheists Riddle: Language, Information and the case for Intelligent Evolution."

I've always been a person who believes that when there're two sides of a vigorous debate, there are elements of both sides that are right. One word for that discussion is called the 'dialectic'. When there's a vigorous debate, there're also certain things that tend to get overlooked.

My path through life includes getting an electrical engineering degree specializing communication systems and control systems. I authored a book called "Industrial Ethernet" which is in it's second edition. It's published by the Instrumentation Systems and Automation Society (ISA), which is the largest trade association for process control engineers. So this is a book about Ethernet and TCP/IP and all the stuff at happens on the Internet and in computer networks. This book has a slant towards the industrial kind of person, but really, it's an Ethernet book, is what it is, and the co-author is a friend of mine named John Rinaldi.

I wrote this book about three years ago, and then about a year ago I kind of got pulled into this whole naturalism vs. intelligent deign debate because of a friend of mine. I really hadn't spent a lot of time thinking about it in quite a few years; it wasn't really that big on my horizon. I got kind of pulled into this, and we were having these discussions about, for example, "If we had 500,000,000 sparrows flying around and you had 500,000,000 years, don't you think that some of them could grow a new muscle, develop some mutation, that it would be beneficial and all this kind of stuff?" And all the usual things that come up in the creation/evolution debate.

And the fact is, I'm not the kind of guy to be particularly dogmatic about whether God made sparrows exactly the way they are on the very first day and they're still the same, or how much evolution might have, or might have not happened in the history of the world.

So I started investigating this and, curiously enough, I started finding out that the things that I know about digital communication, from Ethernet and Internet and all the packets that zing back and forth across the Internet - it all ties together, and it's all very relevant to the discussion.

In fact, if you look at it from that point of view, you have the ability to get down to some really core issues that, generally, are never really discussed. We're going to talk about 'What do languages and information theory say about evolution?'.

What is information? Have you ever thought about that? What is information? We all have this sort of qualitative idea about what information is, but can you define it? If somebody said, "tell me, define information, what is it? What does it consist of? Do patterns and information occur naturally?" and then new directions for the whole debate.

I think that all the wrong things are being argued about out there, and the argument that 's going on in most of the world between Christianity and secularism, or between any form of theism or secularism, is mostly focused on all the wrong questions, such that you'll never get to an answer.

That benefits people who want to sell books, because atheists, for example, they print more books and they sell more books, and the Christians, they print more books and they sell more books- I'm a marketing guy, remember? I know how all this stuff works- and they just throw money at each other. If you're an atheist and you publish an atheist book you can be sure that 90% of your buyers are going to be rabid atheists and then 10% will be rabid Christians trying to see what the other side is saying, and vise-versa; and then nobody in the middle buys any books at all, they just watch everybody go back and forth.

I think this is very interesting even just from that point of view, but I think this discussion needs to move forward and it needs to get down to first principle.

The starting point for this discussion is the difference between a pattern and a design.

Nature does have self-organizing properties, does it not? Mountains, tornadoes, hurricanes, fractals... there're all kinds of patterns that happen in nature. Crystals, snowflakes... not all patterns are designed. Snowflakes are not designed. Right?

But all designs have patterns. The difference between patterns and designs is the defining issue in getting anywhere in understanding this whole 'naturalism versus design' issue. So I'm going to talk about some naturally occurring patterns and talk about how they happen. This is a picture of stalactites:

Last summer, my family and I were in Luray Caverns in Virginia. I don't know if any of you have ever been there, but it's this place where one day some kids noticed that this mud seemed to be sliding into this hole and they had no idea where it went. They started digging around and they, lo and behold (this is the late 1800s), they find themselves in this huge, huge cavern.

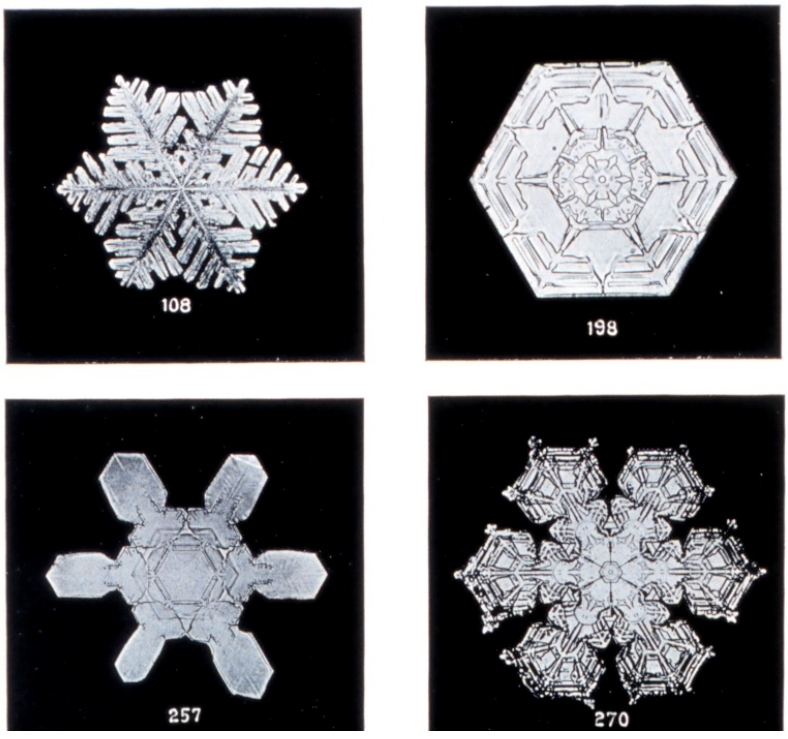
They take a candle down there and start looking around and, I mean, this thing is enormous! And it's been there for, looks like, millions of years, and what happens if you have a big hole in the ground and you have a bunch of rock and a bunch of minerals: water + minerals + gravity + time = all of these beautiful stalagmites and stalactites. It was really remarkable, and they had it lit up and you could go through there and it was 200 or 300 feet below ground. It was just amazing.

They had pools of water and when they were perfectly still it was a perfect mirror image of what was below and what was above. Very cool. Stalagmites and stalactites, they happen all by themselves. All you need is this process and time.

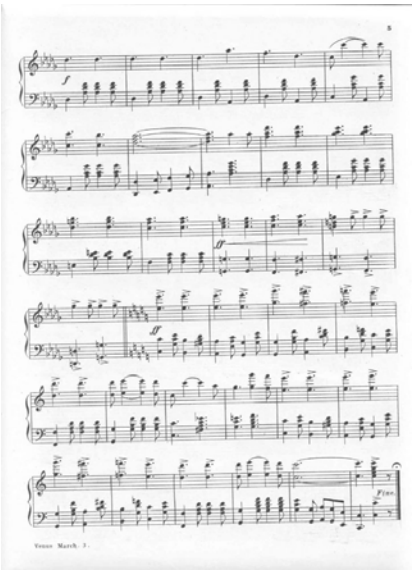
Tornado: there's a funnel cloud. Hot air + cold air + moisture + time, you get tornadoes and hurricanes. I'm not much of an astronomer, but from what I understand, there're hurricanes going on all over Jupiter, all the time. They just go and go and go and go, right? When the right conditions happen in the earth, you get a tornado, like in the Midwestern United States.

You get the right conditions, and hot air in the right place, warm air in the right place, a certain amount of moisture: you get a hurricane. It happens, and it happens without anybody designing it.

Snowflakes: all you need is the right temperature of air, certain variations of the temperature, water, gravity, wind; you get snowflakes. And every single one is different. They grow symmetrically, and you can go buy snowflake books and you can just turn the pages and turn the pages, and there's snowflake after snowflake after snowflake.



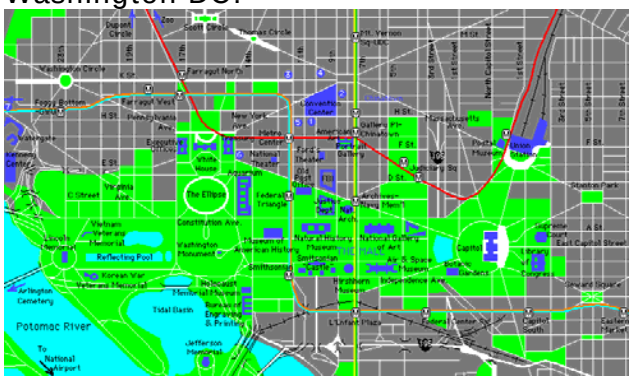
And it happens all by itself, and nobody has to design that. Now let's talk about music.



I got this little picture of a sheet of music, and I got a picture of a band. Now, music can be represented in at least two forms, right? You can hear it, you can also write it on a piece of paper; and they're the same thing. Now if somebody decides to play it differently than the way it was written down, then it's going to be different, but at least in principle, the symbolic representation of music mirrors the actual implementation of music and it has two forms.

Of course you could come up with different nomenclature for representing music; we have the standard bars and notes and the quarter notes and eighth notes and the time signatures. But music exists in these two forms.

Washington DC:

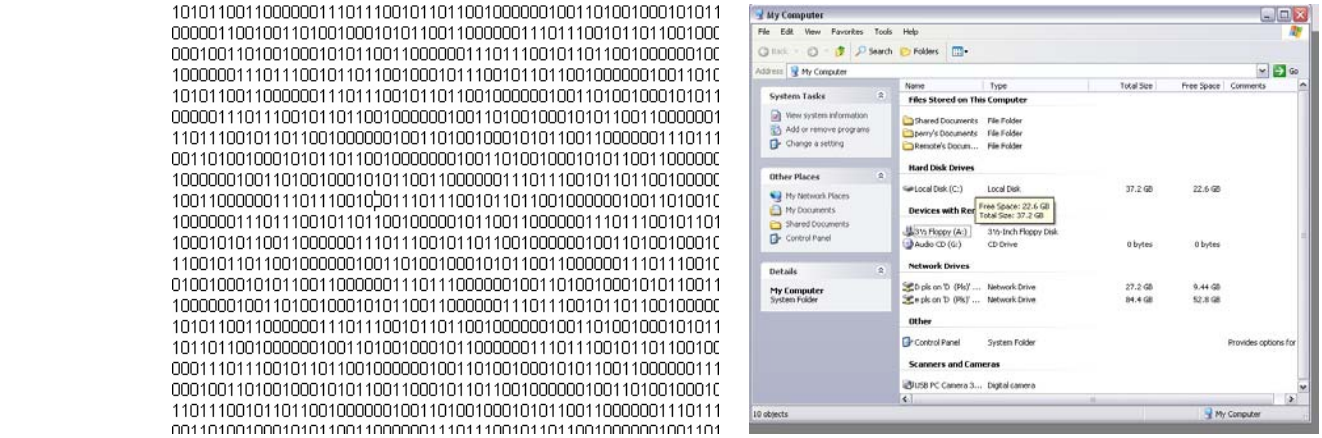


What you have here on the left is a map of Washington DC, what you have on the right is a photograph of Washington DC. Now the map could have been created for the purpose of this discussion before it was built, it could be created after it's built, but one represents the other.

There are different ways of drawing a map, but they all tell you that Pennsylvania Avenue is at a certain place and certain streets cross it and all the maps of Washington DC are going to have that. There is a symbolic

representation and there is an implementation of Washington DC and they both match each other.

Microsoft Windows:



On the left you have a bunch of ones and zeros. That is the essential nature of Microsoft Windows. On the right you have a picture of a screenshot of, you know, one of the menus in Microsoft Windows.

So there is the representation of Microsoft Windows, which could be on a CD, it could be on a hard drive, it could be on a Zip disk, it could be transferred over the Internet, but that symbolic representation is always the same; and then there's the implementation.

You always have these two versions of something: you have the representation of it, and you have the reality of it.

Chinese:

拥抱 - yong1 bao4 = to hug
哥哥 - ge1 ge = older brother

Now this is interesting because, with Chinese, there are in Chinese there are two different symbolic representations of Chinese: this 'yong bao', ' to hug', this 'ge ge', 'older brother'. 'Yong bao'.

I'm probably butchering the tones of Chinese, you know, the way that you say the vowel, there're four different ways to say each vowel; and I'm probably saying 'fell of a horse' or something... but on the left you have the Chinese character.

Now the Chinese character is not the same as an English letter. It's more like a word or a part of a word. You take several Chinese characters together, two or three, one or two or three maybe, and they'll represent a word. Or sometimes they'll represent two words, it's not a direct correlation. But in the case of these words, these characters mean 'older brother.' Notice they don't mean 'ge ge' they mean 'older brother', okay.

That's what the picture means. Then, this, the second one, where it's written in English letters, 'ge ge', that is called *pin yin*, and *pin yin* is the English representation of the sound of it.

Now most Chinese people don't deal with pin yin, they never learn it. They might learn it later, but when kids learn to read, they don't sound out words the way our kids do. The see a picture, the picture means 'man', the picture mean 'country', the picture means 'dog', so the parent says, 'that means dog' and they teach them how to write that symbol, and they say whatever 'dog' is; whatever the word is.

Pin yin is a way of dealing with the fact that English and Chinese are represented completely differently. In English we represent the sound of a word. In Chinese, they represent the thing that you're talking about. So it's two completely different things, but here, they mean the same thing. 'Ge ge', same as 'older brother' in English, same as this pictorial symbol.

They all are representations of the sound. Now, I've got the sound on my computer too. But you could hear the person talking in Chinese. So you have the representation, and then you have the implementation.

Now think about this, when you say 'older brother', that word is not an older brother. It is an agreed upon convention that we use to refer to an older brother, okay? So the printed word is a representation of the sound, and the sound is a representation of the thing.

So, I showed you two kinds of things. I showed you things that are based on patterns: stalactites, stalagmites, tornadoes, snowflakes, and I showed you things that are based on information: music, Washington DC, Chinese characters, older brother, language.

These things are fundamentally different. There is a huge chasm between the two. Patterns come from chaos.

I remember, about fifteen years ago, my wife went to the library and she bought this book on fractals. Do you guys know what fractals are? There're the funky computer patterns that generate and little spirals coming out of them, and spirals off of the spirals; and sometimes they create beautiful color patterns. Sometimes they look a little bit like trees or a little bit like plants, but they're very computerish.

So my wife brings home this book on fractals and chaos and I didn't know anything about it. And I start reading this book and it starts showing me all these examples of things that are chaotic. It's got, of course, fractals generated by computers, it shows snowflakes and hurricanes and tornadoes, it shows stalactites and stalagmites and waterfalls and turbulence and patterns of the sand in the desert and rivers, like little streams running into bigger streams, running into creaks, running into rivers.

And it talks about, for example, how long is the coast of California? Well, as the crow flies, it's like 2000 miles. But wait, what if you walked down the coastline with a little wheel and you measured it, and you followed every little thing, it might be three or four times as long. But what if you followed it

at microscopic detail and you followed every little place where the water goes in and out of the sand?

Well, eventually, you'd end up with a line that almost infinitely long. A two-dimensional line becomes almost three-dimensional because it's chaotic. And 'fractals' comes from the idea that it's 'fractionally dimensioned'. It's not two-dimensional, it's two and a half dimensional.

Member of Audience: The patterns are self-replicating at different scales.

Perry: Yes.

Member of Audience: They're partially dimensional, partway between two dimensional and three dimensional.

Perry: Yes, and the thing about fractal patterns is, you zoom in, and see the same pattern, the very same pattern, very similar pattern again, you zoom in very similar pattern, you zoom in, and so, it's really fascinating. They're unpredictable in certain ways, but they're very predictable in other ways.

So I'm reading about this and it's explaining that there's kind of a philosophical aspect to this too, where, there are no straight lines in nature, there are no perfect circles in nature, that everything kind of has this fractal aspect to it; and I had never thought about this before.

And I remember the very next morning, I went out to my car and it was a cold day in December, and I looked on the top of my car and there are all these ice crystals, these snowy looking ice crystals on the roof of my car; and I go, 'my goodness, they're everywhere!' Ever since then, I've not been able to look out the window and not see fractals.

You look at a tree, think of a tree, you look at a tree, zoom in- it still looks kind of like a tree, you zoom in, you zoom in, you zoom, you're in the leaf and you're looking at all these little things and you see that pattern over and over and over again. Now, none of the patterns are exactly replicating, they're never exactly the same, but they're similar.

So everything on the left side comes from chaos, you see. Mathematically speaking, all you need is a non-linear differential equation and you can get chaos. Patterns are based purely on matter and energy. Fractals and chaos happen all by themselves, just putting matter and energy together.

And then another thing is, there's this similarity, where, the tree looks like the branch, which looks like the twig, which looks like the leaf, but in the world of chaos, nothing ever happens exactly the same way twice, okay? And I'll come back to this point in a little bit. It's never exactly the same.

Member of Audience: Aren't they really questioning that now, that they do believe that there is more than one snowflake that is identical... or that there's more than one...

Perry: There is a very small statistical probability that yes, that does happen... so yeah, somewhere in the world there might be a snowflake, but

But the point I'm making is that the snowflake doesn't make a copy of itself. And fractals, they don't actually make copies of themselves. They are just produced by the same process.

And you change the littlest thing in the initial conditions, and the results are completely different. Part of this came from Ed Lorenz at MIT, he coined the term 'butterfly effect'. And the butterfly effect was this... he's trying to model weather, trying to predict weather and he's putting all the equations in the computer and he finds out that, if he changes the slightest thing at the beginning, two weeks later, the weather is completely different. So what he came up with was this term called 'the butterfly effect', where, a butterfly somewhere could start a hurricane somewhere else, or a butterfly somewhere could cancel out a hurricane somewhere else later, and nobody would ever know.

That the world is unpredictable, you can't plug all the numbers in because you never know the numbers accurately enough. Patterns require no though.

Now, information has a different set of properties. Information is based on language. All of these examples on the right have a component of language.

Language always involves matter and energy and will. I'll talk more about that later, but they always require some mental process willing something to be done. In the world of information, you can make exact copies. Any process that makes exact copies, so far as I know, is a mental process in some respect.

Information can be transmitted via multiple media and it doesn't change. If I send you an e-mail, you can forward the e-mail to ten of your friends and it doesn't change the content of the e-mail at all. You could print it out on a piece of paper, it doesn't change the content at all. It could go through a hundred different kinds of Internet connections on the way there, and be converted in a hundred different kinds of formats, whether it's fiber optic, radio waves, satellite, Ethernet, it still says the same thing.

It could be read out loud, it could be read over the telephone, it could be shown on a TV screen or computer screen, it's still says the same thing. This is a property that only information has. Patterns do not have this property.

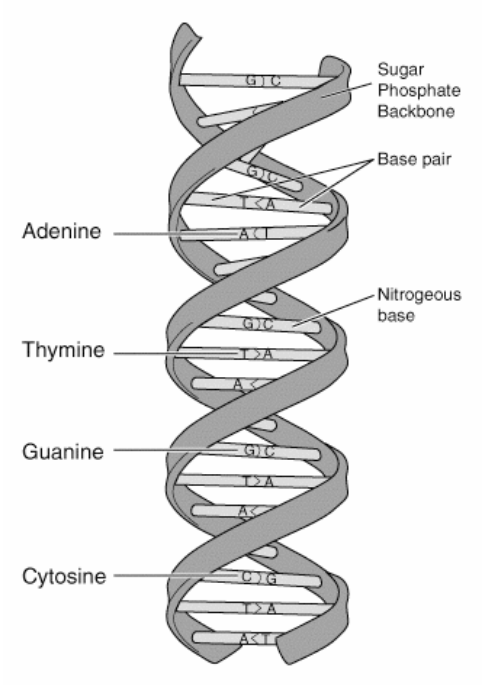
It's not possible to make a completely exact copy of a pattern without using a mental process to make a copy... very interesting little observation there; and it requires thought. Somebody has to think in order for a language to exist.

So, the fundamental questions of evolution are: can patterns lead to designs? Can a pattern turn into a design? Or can a pattern become a language? Is DNA a pattern or is DNA a design? This is really the question. This is the question right here, this gets at the core of it.

How do designs evolve? Designs evolve. Has the Toyota Camry evolved over the last twenty years? Sure! Has Microsoft Windows evolved? Yes, it's gotten bigger and bigger and bigger. Designs evolve, languages evolve- how do

they evolve? How does evolution actually happen if we go look at examples of evolution that we actually know about?

So let's talk about DNA.



I'm just going to give a very simple explanation, some of you guys are Biology professors, you could explain it much better than me.

I'm only really interested in the information aspect of DNA, but basically, it is a helix. It has chemicals bridging the gap, and it's got four chemicals, adenine, thymine, guanine and cytosine. Those four chemicals create a four letter alphabet. And they encode all the information necessary for life.

In the very simplest microorganisms, there're about 500,000 letters in the DNA. In the very simplest ones, they've got about a half a million. In a human being, or a very complex, advanced mammal: 3 billion. So you've got a little string of letters 3 billion characters long. And it makes copies of itself by dividing and then basically a soup of these chemicals, a complementary one, attaches itself to the detached portion. It's like a zipper that creates a new zipper as it unzips; and it makes a perfect copy of itself.

It's really amazing, I've never seen it happen in a microscope, but nobody can really talk about this without having a little bit of a sense of awe.

But here's the thing: just because you have a molecule DNA that's got all the right things to make DNA, doesn't mean, necessarily, that those letters mean anything. You could have alphabet soup or alphabet cereal and you could pour it out on the table and you could string them all on a line, it doesn't mean that they say anything. So DNA has two properties: Yes, it is a molecule with all these chemicals and amino acids and proteins and everything, but it is also an information encoding/decoding system with a message.

Now most of the discussion about where the first life-forms come from is all about the chemicals. What I never seem to hear anybody talk about, is where did the code come from? That's what we're going to talk about today.

All those letters, 500,000 letters, for a very tiny microorganism like nanoarchaeum, which is so small that it's a parasite and can't even live without being attached to something else, but it's got 500,000 letters that all say something. Yes you, you had a question:

Member of Audience: You just said that DNA is perfectly replicating, is that what you said?

Perry: Most of the time.

Member of Audience: But not all the time. Because there're the mutations...

Perry: Yes, we're going to talk about mutations. It's supposed to make perfect copies of itself. In sexual reproduction, it does not make a copy of itself, it makes a combination of the mother and the father. But in asexual reproduction, it makes a copy of itself, right? The mutations are very interesting, and that's going to be a big part of this discussion in part 2. Does that answer your question?

Member of Audience: Well, I just, I thought you said perfectly replicates itself, because it doesn't copy itself correctly.

Perry: Yeah, it does...

Member of Audience: It doesn't though.

Perry: Like 99.9% of the time.

Member of Audience: That high?

Member of Audience: Far more than 99.9% of the time.

Perry: Well, my son was born with club feet; and that probably came from a mutation that got into the human genome and then, now we have to straighten them out.

Member of Audience: Is that by design or chance?

Perry: I would be tempted to say that's by chance, however, I don't know that for certain.

Member of Audience: Can easily be done by certain chemicals also.

Perry: Oh, yes, so we're going to come back to that. So that's basically how DNA works. DNA is not a pattern. It is a code, it is a language. And really, no competent biologist would disagree with that.

Linguistic analysis has been used extensively to help decode the human genome. DNA actually resembles human language in many ways; it's very intriguing. It's got a four character alphabet as opposed to a 26 character alphabet. Now computer languages have a two letter alphabet: one and zero.

DNA has A,C,G and T. DNA is an encoding and decoding mechanism, and tools that are used to study languages and computer programs are used to study DNA.

A nucleotide corresponds to a character.

A codon corresponds to a letter in English.

A DNA gene corresponds to a word in English.

DNA	**Language**
Nucleotide	Character
Codon	Letter
Gene	Word
Operon	Sentence
Regulon	Paragraph

So when you read an article and it says they found a gene for obesity, what they're saying is that there's word in there that says, 'fat'. That's what they're looking for, they're like, 'this represents all the stuff that makes you you, so how much of this is like a specific instruction to make you a certain way?'

So there are genes that make you skin red, yellow, black and white. There are genes that decide how tall you are and how short you are.

Now I am not a geneticist and I can't unpack all this, but I can just tell you, that as a person who's studied computer communication protocols and as a person who basically writes for a living, this is definitely a language.

An operon corresponds to a sentence, and a regulon corresponds to paragraph, so one strand of human DNA has basically a whole encyclopedia set worth of information.

And it gets perfectly copied almost almost almost every time. In my body, when one blood cell divides and turns into two blood cells, that is asexual reproduction, and it makes a perfect copy of itself, except as you get older, little by little by little by little it starts making imperfect copies of itself and you get old. Because you don't heal up as well, because the instructions aren't all there anymore.

So, this brings us to the question: what makes a language? Has anybody ever asked you, 'what is a language'? How do you know if something is a language or if something isn't a language?

This is what language consists of: the fundamental property of any language or code is that *it symbolically represents something other that itself*.

Today's newspaper or this little card right here- this is printed on paper and ink, but the message has nothing to do with paper or ink. It refers abstractly to something else.

Now think about this: if you don't have an abstract representation of something else, you don't have language. If there is not language, then you cannot have any abstract representation of something else.

So if we went outside to the solar system to some other solar system to some other planet that doesn't have any life, there is nothing on that planet that represents anything other than itself.

Rock is a rock, and it doesn't mean anything else. A star is a star, or cosmic radiation is cosmic radiation, it contains no symbols, it contains no alphabet.

So a language is a symbolic representation of an idea, it requires a transmitter and a receiver, or a speaker and a listener. You cannot have language without those two things. If you do not have a transmitter and a receiver, a speaker and a listener, you do not have a language. It's a two-ended thing.

It has an alphabet, and all languages have an alphabet; it might not seem like an alphabet, it could be computer code, it could be pheromones that attract one insect to another, but it has an alphabet, it has a set of symbols that are agreed by the sender and receiver to mean something.

In Linguistics there's a four-layer model and the lowest layer, which contains the alphabet, is called **statistics**. It's the statistical level of the language and the reason they call it 'statistics' is this: If I open a book, a book written in English, I will find that the letters 'e' and 'a' appear a lot more often than the letters 'q' and 'x' and 'w'. There is a statistical probability of how often these things appear. So the alphabet level of a language is called statistics.

All languages have **grammar**. In Linguistics, it's called 'syntax'. Every language has a syntax, there're rules of certain things that come before other things, there're certain things that never come after certain things. 'I' before 'e' except after 'c', or, if it's possessive you put an apostrophe in it and stuff like that. Syntax.

The third thing that all languages have is **meaning**. The message that comes out has to mean something. It's a request or a command, it communicates a complete idea; and in Linguistics this is called **semantics**.

The fourth thing that all languages have in common is **intent**, which linguistics call **pragmatics**. You say, 'please bring me a cup of coffee', your intent, is to get a cup of coffee. There's always a reason why.

So when a cell reproduces itself, the intent is to make a copy. There is a purpose. So, language always has these four things; and if you don't have

these four things (statistics, syntax, semantics, and intent), you don't have a language. You need a transmitter, the receiver and the symbolic representation of something.

Most languages also have error-correction and redundancy. I talk about this in my Ethernet book; you'd be amazed at how many error-correction mechanisms are employed to get my e-mail to you.

There are layers and layers and layers of error-correction and in the computer world error-corrections are done by little things called 'checksums'; before it sends it, it runs it through this little formula and comes up with a number and then it sends it and then the receiver runs it through the same formula and it checks to see if the number is that same, and if it's not, it says, 'send that to me again please' and then it sends again. That's how computer languages usually do it.

In human language, English is about 50% redundant. What that means is, if I'm talking to you on a cell phone and it's cutting in and out, we can still understand each other even if I'm only hearing you about half the time. Why? Because in English, there're multiple things in your sentence that point to the missing part that your brain can fill in.

German is about 33% redundant; that means Germans have a harder time talking to each other on their cell phones than English people, but if they have a clear connection they can say it faster.

Because, remember, they've got all these long long words.

Member of Audience: That's true unless you're trying to give somebody a telephone number and then you don't have a lot of redundancy. One number and you've lost it.

Perry: That's right, that's right, if they miss it, it can't be reconstructed. That's why people's voicemail boxes say, 'please leave your number twice, so I hear you clearly.'

So DNA, is it a pattern or is it a language? Well, it's obviously a language. It's an encoding/decoding system. Who ever heard of an encoding/decoding system happening between rocks? A DNA molecule symbolically represents something other than itself. Ever cell in your body has a symbolic representation of the entire plan for you. Pretty amazing. It has alphabet, syntax, pragmatics and semantics and it can be copied and even stored in other media with no loss of information.

I used to work for a company that sequenced DNA. They made DNA sequencers and sold them to researchers. You can sequence DNA and read all those little letters and store them on a computer disk and, at least in theory, you could take that information and go back and recreate the DNA.

Now whether you can physically do it or not, that's a technical challenge, but at lease conceptually, you could make a copy, you could store it. You could assign codes: A,C,G and T are yellow, orange, blue and purple respectively; you could represent them as other letters; when I say 'A' you know what that

is, even though ‘A’ is not adenine, adenine is represented by ‘A’. So you can make copies, and you don’t lose any information.

So which is it more like? Is DNA more like stalactites, tornadoes and snowflakes, or is DNA more like music and maps and computer programs and Chinese?

As you can see, the pattern in DNA is not *like* a language, it is a language. It’s an encoding/decoding system.

Let me talk about interesting properties of language. I’m going to start at the bottom and work up here.

Formal	**Casual**	**Example**
Pragmatics	**Intent**	You’ve got a green light
Semantics	**Meaning**	Did he steal that car?
Syntax	**Grammar**	The car is red / Is the car red
Statistics	**Alphabet**	Morse Code / ASCII / Pin Yin

On the alphabet level, anything on this piece of paper here... I pick up this of paper and it’s got this information, I could represent this piece of paper in Morse code. Would it change what it means? It wouldn’t change a single word. My alphabet would just be different.

I could represent it in ASCII, which is the most common way of representing letters and numbers in computers; like, ‘A’ is 01000001, and ‘B’ is 01000010 and all the characters on your keyboard are represented by ASCII. If I represent this in ASCII by saving this in a text file on my computer, it doesn’t change the meaning of this at all, even though the alphabet representation inside the computer is completely different.

I could represent Chinese in Pin yin, it doesn’t change anything that it means.

On the syntax level: *the car is red,* or *is the car red*? Same words, I move the ‘is’ somewhere else, and the statement becomes a question. That’s the rules of syntax in English for asking a question. You move the verb somewhere else, the syntax changes, now, even though the alphabet is the same, and even though it’s got all the same words, the meaning changes.

On the semantic level, this example is interesting, ‘did he steal that car?’

Now you can inflect it, you can say, ‘*did* he steal that car?’

You can say, ‘did *he* steal that car?’ or
‘Did he *steal* that car?’ or
‘Did he steal *that* car?’ or
‘Did he steal that *car*?’

I just sad five different things, same letters, same words, same sentence, different inflection, different meaning.

Now I go up to intent. If I say, ‘you’ve got a green light’, what do I actually mean? Well, I might mean that, we’re sitting at a stoplight, and I saw a green light, and we can go now. It might mean that you proposal just got approved, or something like that. It might mean that you’re holding a green light bulb in your hand.

It’s the same sentence, the same syntax, the same alphabet, the same semantics, but the intent is different depending on the context.

Now here’s another one:

This screen shows you, screwing up one layer, but leaving the other layers okay.

Formal		**Casual**	**Missing This Element, but still has the other elements**
Pragmatics		**Intent**	-
Semantics		**Meaning**	Julio cranks his sky for wooden cheese
Syntax		**Grammar**	Dogs jumpy or strangers afraid of you should avoid definitely
Statistics		**Alphabet**	The Paomnnehal Pweor Of The Hmuan Mnid

So the bottom one, if you read that, it says, ‘The Paomnnehal Pweor Of The Hmuan Mnid’, and all of the letters are scrambled.

But you can still read it. Why? Because English is redundant and because your mind has some pretty remarkable pattern recognition ability from doing crossword puzzles and stuff. So you don’t have any problem reading it. But the alphabet is completely screwed up here.

Syntax: If I say to you, ‘dogs jumpy or strangers afraid of you should avoid definitely’, the syntax is completely wrong in that sentence, right? But don’t you kind of get the idea of what it means? You can kind of piece it together?

Or how about this one, ‘Julio cranks his sky for wooden cheese’. I tried this on my four-year old, I turned to him and I said, ‘hey Caden, Julio cranks his sky for wooden cheese.’ And he looks at me and he goes, ‘that doesn’t mean anything!’ And I go, ‘Caden, you’re right, high-five!’

It has perfect alphabet, it has perfect spelling, it has perfect syntax, but it doesn’t mean anything. All the verbs are in the right place and all the nouns are in the right place, but how does Julio crank a sky and what is wooden cheese?

Now the top one is interesting. Now somebody correct me if I’m wrong, but I believe it’s impossible to say anything without intent.

See, if I made a sentence that I said didn’t have intent, I would be intending to say a sentence which is meaningless, which means that it still had intent.

So how can I intend to not intend? I can't come up with a way of putting anything in that blank. Try to tell me something without intending anything.

I kind of wonder if this isn't a little critique on post-modernism right here. Everything has intent. You might not know what the guy meant, but he intended something!

Information is always distinct from the medium that carries it. Whatever you're sending through the Internet, or whatever's coming to you over the AM radio has nothing to do with the electromagnetic waves. That's just part of the process but has nothing to do with the information. Information can be stored and transmitted by matter, like in a book, or stored and transmitted by energy, like through sound or light, but information is not matter and information is not energy. It is a different entity unto itself.

Matter and energy all by themselves cannot produce information. They can make tornadoes, they can make hurricanes, they can make Jupiter swirl, they can make rivers and rocks and all kinds of stuff, but none of those things contain any information, because they don't contain any symbols that represent anything other than themselves. Mark, you have a question?

Mark: Yeah, you might have just answered it, I was just going to say, doesn't the existence of a tornado on a planet like Earth tell us something about the weather conditions on that planet, and in so doing has information?

Perry: Here's the thing, it's a subtlety, but it's important: This room is about 70 degrees, right? *70 degrees* is a symbolic conception of the room. It's not the room, it's not the air, it's a representation of it. All the air in this room is, is molecules vibrating. That's all it is. And it represents nothing other than itself vibrating.

70 degrees is a human conception. I've had some of this stuff on the Internet for a little while, and I get e-mails from people and they say things like, "But the number pi, that's information."

No, that's a human construction of interpreting a physical constant. A physical constant itself is not information. The power of gravity is not information, it's just a force. We conceptualize it. When I put a thermometer in the room, now I've created an encoding/decoding system which produces information, which now I deal with.

When we say 23 degrees Celsius, or we say 73 degrees Fahrenheit, it's only language that let's us do that. We are so immersed in language every day that we don't realize that there's a whole universe out there, a whole galaxies, that don't have a smidgen of the language in them at all. Just like they don't have plants or animals or anything, we're so immersed in it, we don't even realize.

Member of Audience: What about Marshall McLuhan's idea that the media is the message?

Perry: Well, I'm a little fuzzy on that, but, as I understand, that's a philosophical statement. The media, some guy named McLuhan said the media is the message. Isn't that a statement about what you see on TV and what you hear on the radio?

Member of Audience: Like, for example, when a church, for example, goes for projection screens, the media is a message to the congregation that, hey, we're state of the art with everything around here.

Perry: In the human realm, information is never devoid of a context. You know how I talk about these four layers of information? In the human world, there're many many many many many many layers of information.

Member of Audience: I wanted to make the comment that the term I've heard used to describe the concept is that the information is not reducible to the media. So it's irreducible. So in other words, the letters on a piece of paper are irreducible to the ink and paper. You cannot reduce them to just ink and paper.

Perry: Yes, yes, yes, and from a mathematical point of view, this little postcard is more complex than a whole planet. Because a statistical process cannot produce anything like this, even as simple and short as it is.

Member of Audience: Well the word 'complexity' really means information.

Perry: Complexity is a confusing word, because that word is often used to blur the distinction between a pattern and a code. What I think all this evolution debate and all this gets down to, is: don't blur the distinction between a pattern and a code. You could have an enormously complex rock formation, that could take you gigabytes of data to represent, or to videotape, or to store or represent in any way, but it doesn't contain any information, even though it's complex.

Member of Audience: But if you go into the human realm it's the same, like a complex system must have more information than required to represent it.

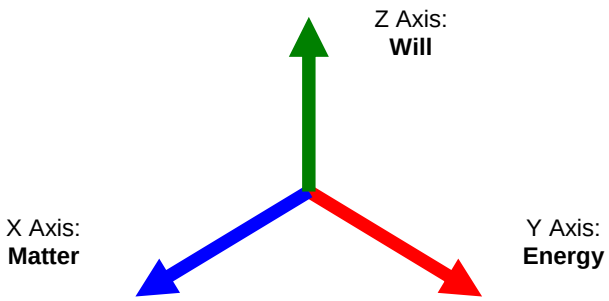
Perry: Yes, yes. Now, Norbert Weiner is known as the father of modern cybernetics. He was an MIT professor, he said this statement, and I think this is profound:

"Information is information, neither matter nor energy. Any materialism that fails to take account of this will not survive one day."

The idea that information can come from a purely materialistic process is a materialistic philosophy that is not founded on any factual data or science.

Information is language with syntax, semantics, pragmatics and statistics. A simple linguistic definition of information, it symbolically represents something other than itself with an agreed upon convention of symbols between a transmitter and a receiver.

That is information. Nothing less than that is information. As you look around you, kind of like me waking up and seeing fractals and never being able to not see them again, as you look around you, you will start to see that there are all kinds of things that involve information, and there're all kinds of things that don't. There's a world of difference between the two, but they're all mixed together and most of us never contemplated the difference until maybe today.



So I look at it like this: matter is on one axis of an x-y-z plane. Energy is on the y-axis, and information is on the z-axis. In order for information to exist there has to be a will, otherwise you're just confined to just being on the x-y plane.

If you don't have a mental process, creating information without a mind is like driving your car to the moon. You can drive a car north, south, east and west, but you cannot drive a car *up*. You have to have something that lifts against gravity to do that.

That's the fundamental issue here; you can have chaos, with all these patterns, mountains, the stalagmites, the stalactites, the snowflakes. All those things exist on the matter-energy plane, but as soon as you want anything symbolic, you have made a quantum leap to a mental realm. They material realm cannot get you there.

So, William Paley and David Hume (I'm really oversimplifying these guys here) - basically, this is what they said:

William Paley said, 'If I walk around in the woods and I find a watch, I know that that watch didn't just happen. How do I know that? It has an obvious purpose, of keeping time. Therefore it has a designer. Therefore, since life has a purpose, life has a designer too.' That's Paley's design argument.

But David Hume said, 'hey wait a minute, the analogy between a watch and life is weak.' He says, 'you can't prove to me that life has a purpose, therefore you can't prove to me that life has a designer, therefore the design argument fails.'

So I've added my own amendment to this debate. This is my contribution to the Paley-Hume debate. I finally resolved it after 200 years:

The definitive difference between a naturally occurring pattern and an intelligent design is the existence of language, code or symbols – the processing of information.

Language is the ingredient that is present in a design and absent in a mere pattern. Watches and life both have language in common. Why? Because a watch either has a blueprint on paper, or it at least has a blueprint in somebody's mind that preceded the making of the watch.

All language comes from a mind, and the fundamental property, therefore, of designs, is that an *idea precedes implementation*.

And language is the expression of ideas or the recording of ideas. Some kind of language is required for ideas to even exist.

If an idea exists in the form of a language before the idea is implemented physically, then it's a design. And the way you know is you look for a conception that precedes implementation. And if that is true, there is a language, therefore there is a designer. There are no documented exceptions to this.

So, this is my atheists riddle:

"Show me a language that doesn't come from a mind. Just one."

Member of Audience: An atheist would say DNA.

Perry: And I reply, 'But you do not know that. That is your hypothesis – that is the very thing you must prove.' You have to *prove* that DNA did not come from a mind. And all you have to do is show me one example that demonstrates that your hypothesis is validated.

My reasoning is this: somewhere, in some field of science, if a naturalistic process can produce a language, then there must be some mechanism in engineering, mathematics, physics, chemistry, cybernetics or some other discipline, some way in which a language, code or protocol can come from a natural process.

So I'll grant you all of science, any field you want, any book in the library you want, you go dig around… you don't even have to produce life in the lab; just show me one language that doesn't come from a mind.

Member of Audience: English language you mean?

Perry: I mean everything. Languages of all kinds. Codes, protocols, computer programs, etc.

Member of Audience: A materialist thinks that everything is random processes, that we evolved from random processes, so everything we do results from a random process.

Perry: Creating codes and protocols is not a random process, it's a mental process. Let me give you an example. Because I've worked in the industrial market, for several years, I sold networking cards that go in industrial computers that run robots and they had all these weird protocols.

They weren't Ethernet, they were stuff like DeviceNet and Profibus and Modbus and Foundation Fieldbus. I'd get all these calls from customers, it seems like every company in the world, they invented some computer protocol to run their machine that wasn't compatible with anybody else's.

There are a gazillion computer languages, as you all know. There's C and JavaScript and Pascal and there's FORTRAN and there are dead languages that never caught on.

All of those things are languages. Every different version you can save a Word document in, DOC, RTF, HTML, PDF, Word 2003, Word 97, every one of those things is a different language.

So you ask, how is language created?

Somebody has to agree on a protocol between a sender and a receiver.

If I save this document as MS WORD, I send it to you, you open it using the right program and you can get it back. Microsoft Excel is a language, HTML is a language, PHP is a language, TCP/IP is a language, UDP, all these funky computer file formats like DLL's, there're all languages.

And then you have human languages, and then you have dogs barking. You know, dogs barking is a language too, because one dog and another, by whatever process (a mental process), they agree... the male dog knows what the female dog sounds like when she's in heat, and he's, like, *on her*, right?

Or take spider webs, I understand there're certain kinds of spiders where the pattern on the web tells the other spider some kind of signal.

All of these things, they're languages. And so, you can make up a language, you can make up Esperanto, you can make up Pig-Latin, but it always requires agreement between transmitter and receiver.

Somebody gives you a computer file, and they don't tell you what the extension is, they don't tell you anything about it, then all you got is a bunch of ones and zeros and you got no idea how to open it, right?

Has anybody ever sent you a file and they forgot to put the extension on? The extension in your computer is what tells you what language it is. If you went and you surfed around on your hard drive, you'd find that there're like a hundred different languages on your hard drive. And they're all a convention of symbols between a sender and a receiver. No language is just random.

Member of Audience: If someone created a language with no one else's consent it would still be a language?

Perry: Yes, but it would still be an agreement to themselves.

Member of Audience: That's not necessarily chaos.

Perry: Of course it's not chaos. I can create a language.

Member of Audience: It still has meaning?

Perry: It may... of course the question is, why would I do that? Well it may be that I want to remember what I did last year. So I could write a diary in a language that I make up myself, and I don't have to tell anybody about it. But when I go back and read it, I become a receiver instead of a sender.

Member of Audience: I was thinking about languages of the mind and I know that linguists make a distinction between what humans do and what animals do, because humans can be flexible in their code systems. A dog cannot say anything other than, 'I am in heat' or 'I want a drink of water', that's the only thing they can communicate. It's a little bit like holding up little signs that have pre-written messages on them. It can't rearrange the sign to make a completely new message.

Perry: Right. Now I don't know how rigid that boundary is, I don't know if maybe animals can come up with maybe a certain amount of original language; I imagine if two dogs were mates for twenty years they would learn each others' patterns and they would understand each other. But it only goes so far, where humans have this immense capacity for language.

J.R.R. Tolkien learned a new language every year. His whole entire series, The Lord of the Rings, the characters, he invented the languages, and then he developed characters and cultures to match the language he had invented!

Now that freaks me out. I'm thinking, good grief, how does anybody get that smart? I understand that he was contracted to do a commentary on the book of Job and he hadn't even learned Hebrew yet. So he went and learned Hebrew and he wrote a commentary on the book of Job, and then some scholar said, 'this is the best commentary anybody's ever written on the book of Job.'

So language is this immensely rich thing and when you think about it. Think of the difference between a lousy writer, and a mediocre one, and good one and a really good one and, say, a riveting novel.... There are all the ingredients of language: rhythm, poetry, onomatopoeia, literary references... and the better a writer is, the more of these ingredients he can pack into a single sentence or paragraph.

But again, it's a top-down mental process, so language really is the defining thing. So the riddle for atheists, 'show me a language that did not come from a mind,' I like to say this is so simple any child can understand it, but this riddle is so complex, no atheist can solve.

You can't solve this riddle without a mind with a capital 'M'.

Let me tell you what made all these ideas gel for me. This is a book by Werner Gitt called *In the beginning was information.*

He's a German guy, this book was translated from German into English, and the translation is very good, you wouldn't guess that it's a translation. He's a professor who's basically got the same education background as me, but he's been doing it forty years longer.

I am not an expert in cybernetics, but he is; he researches robotics, automation, and machines. So he wrote this book, and I don't know how I stumbled across this, but I was searching for something and I bumped into this book and I bought it.

And I've got to tell you, every two or three years, for whatever reason, I'll read a book that just goes, wham! Ding-a-ling-a-ling, lights and bells and whistles going off in my head. That is what reading this book was like for me.

Now, if you are not a technical person, you would not feel that way about this book. I'm an electrical engineer, I wrote a book on network communication protocols and stuff like that. So there is a whole world that I already understood, but haven't fully explained. In the information technology world there's this thing called a seven-layer-model and it starts with the volts on the wire and it works it's way up to all these levels of information.

It shows how information is represented in computers and how encoding/decoding systems work and how error-correction systems work, so all this was already in my head. I read Gitt's book and it was, like, *boom*. All of the sudden, my eyes are open to this whole distinction between information and patterns, and I've been grinding away on it for a year now.

So here I am talking to you about it, and obviously, I think it's a really fascinating subject. So, if you want to get ahead, and skip a few steps before our next meeting, then you should pick up this book; as I've processed and implemented it in my world and dialogued with people about it, I've added some of my own things, which we will talk about next time when we get together. Because there's a whole additional set of questions that come up when you ask about, okay, *what about evolution*?

What about DNA? What can happen? What cannot happen? And what are the limitations? I'll show you the first slide just to give you an attempt:

"A Christian and an Atheist go to the zoo."

That sounds like the opening to a really bad joke.

Or maybe you don't need to go to a zoo if you've got a Christian and an Atheist; a Christian and an Atheist talking to each other is a zoo. And it's more entertaining, and you could go online and read all kinds of chats.

But that's kind of the way that I've framed the next part of this, which really gets to some interesting questions.

Again, if you were geeked by this discussion, then 'In the beginning was information' by Werner Gitt, is a great book.

I would also mention as sort of a second note, that Gitt's book is actually an extension of one of the most important papers ever written in electrical engineering, a paper called 'The mathematical theory of communication' by Claude Shannon. Now let me explain what this is about, a 50,000 foot view.

This was a paper written by a Bell Labs guy named Claude Shannon in 1948. This book lays the foundation for the entire digital age we live in. It formalizes the mathematics of sending and receiving information digitally.

So this book, all the equations, and this is, this is a book full of integrals and statistics and all this kind of stuff, this would not be something that anybody but an engineer would want to read, but here's what this book is about:

This book tells you - if you've got a 56k modem and you're trying to get on the Internet, how fast can that connection go? How many ones and zeros can you get through there and how much information does that represent? And if you've got a certain amount of noise on the line, how much redundancy do you have to have in your data in order to keep it error free?

How much do errors compromise your communication, how much uncertainty is introduced when there's noise and static on the line? It tells you how much music you could store on a CD, it tells you the limitations of bandwidth and data storage, and it does it all and it starts with basically a linguistic model of understanding language.

Now Shannon only deals with the bottom two layers, which are statistics and syntax, he deals very little with the actual meaning of the message, and he says in the preface that, we don't deal with the meanings of message, which is an important part of this, he's only dealing with the level a computer would understand.

What Werner Gitt did was say, 'OK, now that Shannon built the base, let's formalize the next couple levels so that we have a workable way of dealing with information, which helps us understand some of these evolution questions.'

So that's what this is. When I started I started reading this, then I went out and started looking on the Internet, and I started finding that all of the people trying to argue with Werner Gitt have very fundamental mathematical flaws in their arguments. I found that they just do not understand what is being said, or in some cases they're purposely trying to manipulate it. So, it's really a profound thing.

Proof of intelligent design is language. It's that simple.

Member of Audience: Will we be able to discuss mutation at some point?

Perry: Yes, yes. And I'll give you a tool to go play with. I hired a programmer, he set up a little website, it's called www.RandomMutation.com.

And what I'd like you to do, is go to RandomMutation.com and play with it. And, you know, go get some text and paste it in there, and see if you can get it to say anything that it didn't say before. You'll have fun.

Member of Audience: If I could ask about your website, besides the one you mentioned.

Perry: Well, I have my personal business website, www.perrymarshall.com, which doesn't really talk about any of this to any extent. But I have two other websites that you guys would be interested in.

One is called www.CosmicFingerprints.com, and it was sort of inspired when Hugh Ross came to Chicago. I've got to tell you guys, I was driving down interstate 88 one night with a cassette tape in my car, listening to Hugh Ross ten years ago give a talk at Willow Creek and that was another one of those epiphanies, because he's talking about the Big Bang and physics and the days of creation and fitting it all together, and it was one of those major breakthroughs. So I love Hugh Ross.

So when Willow Creek did the cosmic fingerprints thing, I put together a little mini-series called 'Where did the universe come from?' If you go to www.CosmicFingerprints.com you get this little enticement, and you can sign up for it, and it sends you an e-mail everyday for five days and it talks about the Big Bang and the fine-tuning of the universe and it talks about information theory just a little bit.

Then it's got a transcript of Hugh's talk that I heard on that tape eleven years ago. www.CosmicFingerprints.com.

The other site I've got, is, I've got a site called, www.CoffeeHouseTheology.com and that is a seven day e-mail series called 'Seven Great Lies of Organized Religion.'

At the beginning, you remember when I talked about an Atheist writes a book, he sells it to a bunch of Atheists, a Christian writes a book, he sells it to a bunch of Christians and all the undecided people in the middle just kind of ignore everything?

I think it's very important to talk to the people in the middle. It's become a really fascinating tool for dialogue because when people get an e-mail, a lot of times, they reply to it and it creates conversation.

So, you can go there and you can check that out, I think you'll find it interesting and, hey, this has been great, two hours, you're very patient.

Speaker: Thank you, let's thank Perry.

[applause]