

John Dobson's Equations of Maya

We end the year with study of Jnana Yoga, an approach to spiritual realization through discrimination, reason, and release of the unreal. The goal is liberation, freedom from all limitation. Jnana (Advaita Vedanta) teaches that doubt, fear, and misery are caused by seeing inaccurately.

John Dobson — astronomer, student of human history, and Vedanta philosopher — wrote:

“Modern cosmologists usually take non-existence for granted and hope to get the Universe out of nothing. But must we assume that in the absence of the Universe and in the absence of space and time there would be nothing? Or can we, without so rash an assumption, find clues to what might remain if instead we take existence for granted but leave out space and time? Could what remains, through apparition or maya, appear as this Universe? Can we, from what remains, get a Universe of gravity, electricity and inertia?”

If you can't explain it simply, you don't understand it well enough. — Albert Einstein

Dobson was a master of explaining Advaita Vedanta simply. This morning I will read and discuss his detailed, yet very clear descriptions of how Brahman appears to us as this Universe.

“There cannot be two existences, only one.”

— *Swami Vivekananda*

Introduction

Dobson wrote this paper for the 100th anniversary of the 1893 Parliament of Religions at which Swami Vivekananda so eloquently proclaimed that all religions are true and that the proof of one is the proof of all.

Dobson said: “Can we, by now, (also) square science with religion? In particular, can we square relativity and quantum mechanics with Swami Vivekananda's Advaita Vedanta? Since there cannot be two worlds -- one for the scientists and one for the mystics -- it must be that their descriptions are of the same world but from different points of view. Can we, from the vantage point of the swami's Advaita (non-dualism), see both points of view? Swami Vivekananda said that science and religion would meet and shake hands. Can we see things from his vantage point?”

“Since the notion of maya or apparition as the first cause of our physics is central to the swami's Advaita, I have chosen as my subject ‘The Equations of Maya.’ Can we find them in our physics? According to the philosophy of the Advaita Vedantins, as the swami himself has said, there cannot be two existences, only one. And maya is, as it were, a veil or screen through which that oneness (the Absolute) is seen as this Universe of plurality and change.

The Equations of Maya

“First, we have to know what equations are. Second, we have to know what the Vedantins mean by maya. And finally, we have to take a hard look at our physics to see if any of our equations can be taken as descriptive of maya.

WHAT ARE EQUATIONS?

“So, what are equations? They are a kind of mathematical shorthand. They are just brief statements, usually in symbolic form like $2 + 2 = 4$. If you put that in English, it reads, "two plus two equals four." There's nothing scary about it. But essentially, there are two kinds of equations: mathematical equations, like the one just mentioned, and the equations of our physics. But mathematics is not about anything. Two oranges plus two oranges equals four oranges is about oranges, but $2 + 2 = 4$ is not about anything. Now physics is about something; it is about how matter behaves. So the equations of physics are about the behavior of matter, and that's what concerns us here. Newton's famous equation, $f = ma$, put into words, means that the force required to accelerate an object is proportional to the product of the mass of that object and the rate of change of its velocity. That means that when you're pushing a car to speed it up, how hard you have to push depends on how heavy the car is and how fast you have to speed it up. All that is contained in that little statement, $f = ma$. It's just a kind of shorthand, and it's not scary.

WHAT IS MAYA?

“We've talked a little about equations; now we have to talk about maya. What do the Vedantins mean by maya? First, we know from the Upanishads (4) that it is made of three gunas: tamas, rajas, and sattva. Tamas has its veiling power, avarana shakti in Sanskrit. Rajas has its projecting power, vikshepa shakti in Sanskrit, and sattva has its revealing power, prakasha shakti in Sanskrit. Now this language, "veiling" and "revealing," is the language of perception, not the language of manufacture.

You can't make anything out of a guna as the Sankhyans wanted to do. These three gunas, of which maya is said to be made, are just three aspects of a misperception. They are not substances, like wood, stone, or gold, out of which objects could be made. They are simply three aspects of an apparition.

In order to mistake a rope for a snake, you must fail to see the rope rightly; that's the veiling power of tamas. Then you must jump to the wrong conclusion; that's the projecting power of rajās. You yourself project the snake. But the length and diameter of the rope are seen as the length and diameter of the snake; that's the revealing power of sattva. If you hadn't seen the rope, you might have jumped to some other wrong conclusion.

But many of the Vedantins, when they write about the veiling and projecting powers of maya, leave the revealing power out. You look in the books -- you'll find they leave it out. But you cannot leave it out or the theory would be lame and the Universe wouldn't run.

So we see from the Upanishads that maya is made of three gunas, that it is a misperception, a kind of magic, and that the Universe is therefore apparitional, like the snake for which a rope has been mistaken. But why does the apparition take the form of this Universe? Why do we see the physics that we see? Partly it is the gunas and partly it is space and time.

Swami Vivekananda said in one of his lectures (6) that the Universe is the Absolute seen through the screen of time, space, and causation (kala, desha, nimitta). He said that time, space, and causation are like the glass through which the Absolute is seen, and when It is seen on the lower side, It appears as the Universe. So not only is the Universe apparitional, it's the Absolute seen through time and space, and that allows us to understand why the physics of the Universe takes the form that we see...

Now Swami Vivekananda's statement that the Universe is the Absolute seen through the screen of time, space and causation allows us to get some interesting information, albeit in negative terms, about what he calls the Absolute. Since it is not in time, it cannot be changing. Change takes place only in time. And since it is not in space, it must be undivided, because dividedness and separation occur only in space. And since it is therefore one and undivided, it must also be infinite, since there is no "other" to limit it.

Now "changeless," "infinite," and "undivided" are negative statements, but they will suffice. We can trace the physics of our Universe from these three negative statements. If we don't see the Absolute as what it is, we'll see it as something else. If we don't see it as changeless, infinite, and undivided, we'll see it as changing, finite, and divided, since in

this case there is no other else. There is no other way to mistake the changeless except as changing. So we see a Universe which is changing all the time, made of minuscule particles, and divided into atoms.

But because of the revealing power, the changelessness, the infinitude, and the undividedness show through. The changeless shows through in us as our yearning for peace and security and it shows in what we see as matter as its mass or inertia. The infinite shows in us as our yearning for freedom, and it shows in what we see as matter as the electrical charge on the minuscule particles. And the undivided shows in us as love, and it shows in what we see as matter as gravity and the attraction between opposites like positive and negative electrical charges.

The Universe is "wound up" against gravity only because the undividedness shows through. And it is "wound up" against electricity only because the infinitude shows through. Gravity, electricity, and inertia are simply the nature of the underlying existence showing through, just as the length and diameter of the rope show through in the snake for which it has been mistaken. What we see as energy is simply the underlying existence showing through. Everything that happens, happens because of that.

Causation

So we have seen, from the Upanishads, that maya is made of three gunas. The Sankhyans call it prakriti, the first cause, and we have seen that the first cause must be apparitional. As Swami Vivekananda said, the Universe is the Absolute seen through the screen of time, space, and causation. Here I need to say a few words about causation, because what we ordinarily see as causation is not apparitional. It is transformational.

Chevys do not arise by apparition; they come from Detroit. Although, as we have seen, the first cause of our physics is apparitional, it leaves us with a Universe wound up with energy, and the transformations run on of their own accord. Gravity arises by apparition, but falling is transformational. The gravitational energy is transformed to kinetic energy without any change in the amount.

As you may know, philosophical systems, in India, are catalogued according to their understanding of causation. The Sankhyans were Parinamavadins. They believed in parinama, transformational causation, like making milk into buttermilk. The milk is transformed into buttermilk. The Advaita Vedantins are Vivartavadins. They believe that the first cause is vivarta, apparition, like mistaking a rope for a snake. Now these are very different things. When milk is transformed into buttermilk, it's a change that takes place in time. It's a happening, and there's a shelf life on your buttermilk. There's a date on it.

But mistaking a rope for a snake is not a happening in that sense. It is not that you mistook the rope for a snake yesterday and now there's a snake in your kitchen and you don't dare open the door. It's a mistake you are making now; it's something you're doing now.

Transformational Causation

Now the rules that govern transformational causation are very well understood at the universities. The energy that goes into an operation at the beginning comes out at the end. Although the form of the energy may change, you never get any new energy that way. It's like pouring gold. You melt it and pour it into a set of forms. Then you remelt it and pour it into another set of forms. You never get rich that way. No matter how many times you remelt it, you never get any new gold.

Transformational causation is like that. What you put in at the beginning comes out at the end. It is governed by the conservation laws. Whether it's matter, energy, momentum or electrical charge -- whatever you put in at the beginning comes out at the end. And since the Universe is made out of energy, the changes of which are governed by these conservation laws, the Universe cannot have arisen through transformational causation. It cannot have come out of nothing.

Apparitional Causation

But what I have referred to as apparitional causation is a very different thing. When you mistake a rope for a snake, the rope is not transformed into a snake. It's just a mistake, and it's something you're doing now. So the question is not: "How did the Absolute become the Universe?" That can't be answered. The Absolute has not become the Universe.

The question is, "Why do we see it that way? Why do we feel that we are bound? Why do we continue to make this mistake? Why are we unable to see through the apparition?" And that can be answered.

On December 14th, 1882, Vijaykrishna Goswami asked Sri Ramakrishna this question: "Sir, why are we bound like this? Why don't we see God?" And Sri Ramakrishna answered:

"Maya is nothing but the egotism of the embodied soul. This egotism has covered everything like a veil. 'All troubles come to an end when the ego dies'. If, by the grace of God, a man but once realizes that he is not the doer, then he at once becomes a jivanmukta. Though living in the body, he is liberated; he has nothing else to fear."

What Is Egotism?

So maya, the first cause, is made of three gunas and consists of seeing the Absolute through the screen of time, space, and causation -- and we continue to see it thus because of egotism. What is this egotism?

Those of you who have read Erwin Schrödinger's little book, *What is Life?*, may already see that egotism is a genetic invention to keep a living organism alive. The defining characteristic of a living organism is that it must be able to direct a stream of negative entropy upon itself. It must find and use a source of energy less scrambled at the start.

Entropy is a measure of the scrambledness of the energy. Every living organism scrambles the energy in its environment. Negative entropy is a measure of the usability (the unscrambledness) of the energy. We get our negative entropy by eating and breathing. The plants get their negative entropy from the Sun. In most transformational processes, the scrambledness of the energy goes up. The entropy goes up. It never goes down.

At least locally, entropy is going up; the Universe is running down. Every living organism must direct a stream of negative entropy upon itself to stay alive; so life is impossible except in a situation that is going from bad to worse. If you want to enjoy the "good old days," do it now! All living organisms live in this cascade of increasing entropy by directing streams of the increase through their forms. And egotism is a genetic invention required by this necessity.

Prime Directives

The prime directives of the genetic programming are to direct a stream of negative entropy upon the organism and to pass on the genetic line. And the egotism required for the fulfillment of these prime directives is what Sri Ramakrishna referred to as the "unripe ego." The discrimination is made between the organism and its environment for the sake of fulfilling these directives.

Sri Ramakrishna, when speaking to men, referred to these prime directives as "woman and gold" -- "gold" for directing a stream of negative entropy upon the organism, and "woman" for passing on the genetic line. When speaking to women, he said "men and gold." He often said, when speaking to men, "maya is nothing but woman and gold."

Genetic Programming

It should be noted that this language -- "genetic programming" -- was not current in Sri Ramakrishna's day. So far as I know, some of the first things that were published on the

subject of genetics were Mendel's experiments, and I don't think they hit the press until 1900. But if we translate Sri Ramakrishna's remarks into that language, they say very clearly that maya is nothing but our genetic programming.

You remember that the question was not how the Absolute has become the Universe, but rather why do we continue to see it that way. And the answer is that it is because of egotism, and that egotism turns out to be nothing but our genetic programming. It is this genetic expectation that keeps the wool pulled over our eyes. It is the expectation that by following the dictates of the genes we'll reach the peace and security of the changeless, the freedom of the infinite, and the bliss of the undivided. But that is just a genetic mirage.

We are programmed to eat, breathe, and mate. But not so fast! It goes in steps, and the male programming for passing on the genetic line goes like this: In the absence of females, seek females; in the presence of females, select. In the presence of a selected female, start a conversation. Ask her where she's from. Ask her where she's going. Ask her out to dinner. And the rest you know. We are all descended from ancestors who were programmed this way and who passed on the genetic line. So much for that problem. But how about our negative entropy?

Negative Entropy

We get our negative entropy by eating and breathing, and we get it from the plants. The plants get their negative entropy from the Sun. They make reducing agents for their own use, and dump oxygen out as waste.

We munch down the reducing agents and huff and puff on the oxygen, and run around on the canned sunlight. And we feel that we are the doers. It's just a genetic mirage. We are not the doers. It is just recycled sunlight.

Sometimes when you read in The Gospel of Sri Ramakrishna that he says that we are not the doers, you might think that he is asking us to pretend that we are not the doers. No, he never makes that kind of mistake. He is not asking us to make-believe anything. **He is asking us to discriminate between the real and the make-believe and to let the make-believe go.**

I once wrote to Swami Yogeshananda that this earth can't bloom a flower. Without the Sun, no plants would bloom. Without the falling hydrogen, no suns would shine. And without the entire Universe, no hydrogen would fall. I said that this whole Universe blooms the flower. By this whole Universe, the robin sings. But by what blooms this

Universe? It is the nature of the Absolute showing through in space and time that blooms this Universe. It is the revealing power of maya. The dream is in the dreamer, and the dream is alive.

So, it's the genetic programming that keeps the wool pulled over our eyes. But our genetic programming comes in batches, and that gives us a loophole -- a genetic loophole. No other animal on the face of this planet has a childhood like yours.

Childhood

We have a whole batch of programming for being children, and another whole batch for being adults, and a third whole batch for being parents. But no one has a childhood like yours. And we owe our childhood to our parents. Directing a stream of negative entropy upon ourselves and on our children falls mostly to the parent batch. Passing on the genetic line falls mostly to the adult batch.

But the children are free. Children do not direct streams of negative entropy upon themselves -- "Mommy does it." And children don't pass on the genetic line -- "Mommy does it." Children don't follow the prime directives. If you ask a child what he's going to do, he says, "I'm going to play. That's what kids do." As Sri Ramakrishna said, "The ego of a child is nothing like the ego of a grown-up man." **You see, they both make sand castles at the beach; then the kids run through them with their feet, but the grown-ups take pictures.**

The Beach

We owe our childhood to our sojourn on the beaches of north-east Africa, where we were probably marooned on an island a few million years ago, and where, in the absence of the jungle, we were forced to eat at the beach. It was there, when our body language failed in the surf, that we learned to talk. And it was there, to accommodate the change, that we prolonged our childhood. (9) That is why our parenting batch is so different from that of other animals. And that is why the curiosity and the wonder of our childhood never comes to an end. We are the children of children who never grow up. And there is an escape route through this genetic loophole. Don't forget it! Children don't follow the prime directives of the genetic programming. And neither did Sri Ramakrishna. Although he practiced all sorts of spiritual practices, his native way to go was to think of himself as a child and of God as Mother.

THE EQUATIONS OF MAYA

We have talked a little bit about equations and a great deal about maya. Now we have to take a hard look at our physics to see if any of our equations can be taken as descriptive of maya.

First of all, let me remind you that the physics of the last century -- the physics of Swami Vivekananda's day -- was nothing like the physics of this century. In those days it was taken for granted that the mix of the chemical elements in the Universe had been given at the time of creation -- if there was a creation -- or had been around forever -- if there was a forever -- and that if you just kept shuffling the mix long enough, it would come out in the present configuration again.

The swami sometimes referred to that view. Don't take it as "gospel truth"; he is just quoting the scientific view of his day. In those days it was taken for granted that the Universe consists of real particles with real mass and real energy moving through real space in real time. It was taken for granted that mass and energy were different things, that space and time were independent of each other, and that if we knew the present position and momentum of the particles, we could predict the entire past and future of the Universe. No one thinks like that now. There have been some major revolutions in our understanding of physics since then, and they began just after Swami Vivekananda passed away.

Relativity

In the winter of 1895-96, Swami Vivekananda met Nikola Tesla and asked him if he could show that what we call matter is just potential energy. The swami said, "I am to go and see him next week to get this new mathematical demonstration," (10) which apparently never came.

It is probably unfortunate that Tesla didn't get it shown, because if relativity theory had arisen out of a suggestion by Swami Vivekananda, the history of modern physics might have looked very different. The notion that what we see as matter is just potential energy was published as an appendix to Einstein's relativity paper ten years later...

In 1905, Einstein changed our geometry from 3-D to 4-D. He put time into our geometry where it belongs. Time and space come into the geometry as a pair of opposites, so that if the space separation and the time separation between two events, say here-now and there-then, are equal, **the total separation between those two events is zero.**

Euclid assumed that space separations are objective, but Euclid's geometry is a theoretical geometry about a theoretical space that does not, in fact, exist. Space separations, and separations in time, are not objective. Observers moving with respect to each other measure different distances between there and here, and different times between then and now. What is objective is the total separation, the space-time separation, between there-then and here-now.

The equation looks very much like Pythagoras' equation for the hypotenuse of a right triangle. In Pythagoras' equation you square the two sides of the triangle, add the squares, and take the square root of that sum. But in Einstein's equation, to get the space-time separation between two events, you square the time separation and subtract it from the square of the space separation, and take the square root of that difference. (11) So that if the space and time separations between those two events are equal, the total separation between them is zero. And that puts the separation between the perceiver and the perceived at zero, because always we see events away from us in space by the trick of seeing them back in time in just such a way that the total separation is zero.

That separation equation, as I see it, is one of the equations of maya. If this Universe is apparitional, like a dream, then the separation between the dreamer and the dream must be zero.

It was this change in the geometry that allowed Einstein to realize that what we see as mass (matter) is just potential energy. $E = mc^2$. That is the equation that Swami Vivekananda hoped to get from Tesla. **So now we see that matter (mass), as well as energy, is just the underlying existence showing through in the apparition. So that equation, too, is an equation of maya. (12)**

There are many things which are easier to see now than they were in Einstein's day before the discovery of neutron stars and before the suspicion of black holes went public. It is easy to see now that the gravitational energy transformed to kinetic energy in the fall of an object to the surface of a neutron star would be a tenth of its rest mass, so that the energy released in the splash of a ten gram marshmallow on a neutron star would be enough to vaporize a town.

It is easy to see now that, falling to the event horizon of a small black hole, one third of the energy would be released, and that all of it would be released if the black hole contained all the rest of the matter in the observable Universe. It is easy to see now that as Einstein said in 1917, "There can be no inertia relative to 'space', but only an inertia of masses relative to one another." And it is easy to see now that that inertia is related to

their separation in the gravitational field, and not to their proximity to each other, as Einstein seems to have thought. (13)

It is easy to see now that the Universe is wound up against gravity because the undivided shows through in the separation. And it is easy to see now that the Universe is wound up against the electrical charges of the minuscule particles because the infinite shows through in the smallness. (14) And we owe a great deal of these considerations to Einstein. But there is another revolution that has taken place in our physics which is considered even more basic than Einstein's change in our geometry. That is quantum mechanics.

Quantum Mechanics

Matter does not behave according to our genetic expectations. Our genetic expectations are Newtonian. They assume Euclidian geometry, and they assume Newtonian physics. They take for granted that space separations are real, and that causation is transformational. That is why so many people have so much trouble "understanding" relativity and quantum mechanics. Our genetic expectations are offended. We cannot easily accept the fact that it is impossible to know everything about a physical system, just as it is impossible to identify the snake for which a rope has been mistaken. But there is this deep uncertainty lying at the bottom of our physics.

In the late 1920's, Werner Heisenberg pointed out that the product of our necessary uncertainty in where a particle is and our necessary uncertainty in its momentum can never be smaller than Planck's constant over two pi. Also that the product of our necessary uncertainty in when something happens and our necessary uncertainty in the energy of the happening can never be less than that same amount. This is Heisenberg's uncertainty principle, which I take to be another of the equations of maya. What it says is that if we see what we see through the screen of time and space, we cannot quite tell what it is that we see.

Richard Feynman has said that every statement in quantum mechanics is a restatement of Heisenberg's uncertainty principle. This quantum behavior is what keeps the electron from sitting down on the proton in a hydrogen atom, in spite of the enormous electrical attraction between them. If we knew that much about its position, our necessary uncertainty in its momentum would be so large that the momentum associated with that uncertainty would be enough to drive it off. That is why we don't fall through the floor. If the electrons are pushed too close to the nuclei, they simply buzz harder and keep us up.

That's why the planets don't collapse. It's the uncertainty necessitated by the fact that the first cause of our physics is apparitional.

Summary

These three equations, as I see it, are some of the equations of maya. Einstein's separation equation sets the separation between the perceiver and the perceived at zero. The dream is in the dreamer. We see the bright star Sirius eight and a half light years away from us by the trick of seeing it eight and a half years ago. And the distance away comes in squared with a plus sign but the time ago comes in squared with a minus sign, so that if the two are equal, the total separation goes to zero.

Einstein's more famous equation, $E = mc^2$, in which "energy is set equal to mass," is the equation which Swami Vivekananda had hoped to get from Tesla, because, as he said, "There cannot be two existences, only one." And Heisenberg's uncertainty principle includes the notion that the observer is always mixed up in what he sees. There is no longer any talk of a Universe independent of the observer any more than there is talk of an apparitional snake independent of the person who is seeing the apparition.

Whence and Whither?

For a long time I have felt that the physicists were just on the verge of noticing that the first cause of our physics is apparitional, that our physics is the physics of an apparitional Universe. I mentioned it to Johnny Carson when I was on his show a couple of years ago. I said that when you mistake a rope for a snake, what you do is to look at it very carefully, and you notice that it has these diagonal markings on its back. And you think, "It looks like a rope. Have we had ropes long enough for the snakes to imitate them?" And you call it a rope-snake. Then you look carefully at the end where the rattles should have been and you see hemp fibers. "Aha! Rope-snake hempii." There was so much laughter that I couldn't finish. We were cut off by the music. But what I wanted to say was that when you find that the head end is also hemp fibers, you realize that it really is a rope. I wanted to say that only this last step has not yet been taken by the physicists. Relativity and quantum mechanics are not about an actual Universe. We already have the physics of an apparition.

There are some interesting differences between the physicists and the mystics. The mystics take existence for granted, and want to get from here to there. They want to see beyond the apparition. And the physicists are likely to take non-existence for granted, and want to get from there to here. The Big Bang cosmologists want to get the Universe out of

nothing. It's like asking us to believe that nothing made everything out of nothing. But that's not what shows in our physics. If behind what we see there were only a zero, then where would gravity come from, and electricity, and inertia? I have to side with the mystics. On observational grounds I have to take existence for granted.

Another interesting difference is that the physicists are Parinamavadins. They believe that causation is transformational and that the Universe is actual, whereas the mystics are Vivartavadins. Regardless of what they write in their books or what they say from the pulpit, all the mystics and religious aspirants agree that faith is at the root of spiritual experience. And that would not be possible unless the Universe were apparitional. If the milk has been made into buttermilk, faith that it's milk will be of no avail; whereas, if you have mistaken your friend for a ghost, faith that it's your friend ends the problem.

Here let me remind you that physics and philosophy are our maps. They can be judged as true or false according to whether they correspond or do not correspond to fact. But mysticism (or religion) is a journey, and about a journey one does not ask whether it is true or false, but only where it goes. Will it take me to the goal?

Our problem is to reach the goal. To see beyond the screen. You remember that Swami Vivekananda said that the Universe is the Absolute seen through the screen of time, space, and causation. It's no use asking how the Absolute became the Universe. The Absolute has not become the Universe any more than the rope has become a snake. Our problem is to see it straight. And you remember that Sri Ramakrishna said that maya is nothing but the egotism of the embodied soul. And that is genetic. The prime directives of the genetic programming are to direct a stream of negative entropy upon ourselves and to pass on the genetic line.

That is why we feel ourselves to be the doers of action and the enjoyers of its fruits. It is just a genetic mirage. The genes have us persuaded that by following their dictates we'll reach the peace of the changeless, the freedom of the infinite, and the bliss of the undivided. They don't have it to give. We don't get the undivided; we get a family. You must have noticed.

Our problem is to reach the goal, and not be hoodwinked by the genes. But this is not a journey from one place to another in an actual world. It is a journey from one point of view to another. That is why it is often referred to as an "inner journey." It is a journey from an erroneous point of view, dictated by the genes, to a point of view from which we can see through the genetic mirage.

Counter-cheating the Genes

It is important to remember that our problem is genetic. As James Burke says, "If you don't know how you got somewhere, you don't know where you are." And as I say, "If you don't know where you are, how will you know where to go?" In order to "counter-cheat" the genes, we need to know how they have cheated us.

In an apparitional Universe, seen in time and space, there are only three drives to catch hold of -- the drive for the changeless which we see in matter as inertia, and in ourselves as our yearning for peace and security; the drive for the infinite which we see in matter as electricity, and in ourselves as our yearning for freedom; and the drive for the undivided which we see in matter as gravity, and in ourselves as our yearning for love and bliss.

There are no other drives for the genes to catch hold of; so they have caught hold of these three and persuade us to run after them in ways that get their genetic necessities fulfilled, in ways that fulfill their prime directives. But the fulfillment of a genetic necessity does not confer on the organism the fulfillment of the yearning that drives it. The yearnings have been borrowed by the genes. But the genes have left some loopholes which we built in at the beach long ago.

All our spirituality began at that beach -- our breath control, our speech, our music and our hymns, our worship, our mantras and our prayers. And there at the beach we built in parenting and childhood and the ability to pass on what we know. And now we are smart enough to counter-cheat the genes, to use the genes themselves to help us see behind the screen. Every human emotion can be redirected from the fulfillment of a genetic necessity to the fulfillment of our spiritual quest. And remember, our childhood batch is unique; children don't go along with the prime directives of the genetic programming. "The ego of a child is nothing like the ego of a grown-up man."

And let me remind you that space is not that which separates the many, but that which seems to separate the one. And in that space that oneness shines, therefore falls whatever falls. And space is not that in which we see the small, but that in which the infinite appears as small. And in that space that vastness shines, therefore bursts whatever bursts, therefore shines whatever shines. And finally, time is not that in which we see the changing, but that in which the changeless seems to change. And in that time that changeless shines, therefore rests whatever rests, therefore coasts whatever coasts.

Swami Vivekananda said that science and religion would meet and shake hands. I think that time has come.