

VARIOUS SHORTS

Energy may be defined as the underlying existence showing through in time and space. The changeless shows through in time as inertia. The infinite and the undivided show through in space as electricity and gravity, energies of position in space.

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 which the infinite *appears* as small, Therefore bursts whatever bursts. Therefore shines whatever shines. And time is not that in which we see the changing, but that in which the changeless *seems* to change. Therefore rests whatever rests. Therefore coasts whatever coasts.

What we see, in what we call mater, as gravity, electricity, and inertia, we see in ourselves as our yearning for love, freedom, and peace. It's the underlying existence showing through in space and time.

When I was in India in 1983 some one pointed out to me that, in the Sanskrit account of the five elements, it's not that water and earth (electricity and magnetism) are said to be twins, but that *each of them* is said to be twins. Now I see that that is even more interesting because both electricity *and* magnetism arise in the duality that keeps the gravitational plurality from collapse. The electromagnetic duality and the gravitational plurality keep each other from collapse.

If the proton weren't gravitationally heavier than the electron, the electrical duality would disappear. We wouldn't have atoms at all. And if Fermi particles didn't obey Pauli's Verbot, we wouldn't have neutron stars or the atomic table.

If the Galaxy weren't spinning, the Solar system wouldn't be spinning and the Earth wouldn't be spinning. And the Galaxy wouldn't be spinning if it hadn't passed another galaxy long ago. Surely solar systems will be found only in the dusty discs of spinning galaxies. It takes a lot of angular momentum to keep the planets from falling into the stars.

Oh I seek that one being whom all beings seek,
Whom so few beings find,
Who is lord of my life and the bliss of my mind,
And who dwells in the cave of the heart.

I have sought him for ages, not finding the way,
The mind going out, finding nothing but clay.
Oh come in, Oh my mind!
He dwells in the cave of the heart.

-About 1945, 2963 Webster Street

Oh I seek that one Mother whom all children seek,
Whom so few children find.
She is lord of our lives and the bliss of our minds,
And She dwells in the hearts of all.

I have sought Her for ages, not finding the way,
Oh come in, Oh my mind!
She is all that exists,
And the sentiency even in clay.

-About 2000, 1946 Vedanta Place

If the Universe is real, faith will be of no avail; but if the Universe is a mistake, faith will get you out of it.

All spiritual aspirants see the World as apparitional; otherwise faith would have no place in spiritual practice.

When you say *all this*, all this includes not only your local situation, but also all other such situations on Earth. It includes the Solar System and the nearly empty space beyond, which contains Our Galaxy. And it include the much more nearly empty space beyond, containing galaxies in all directions, farther than the telescopes can see.

That is what is meant when you say *all this* is Brahman, beyond time, beyond space, beyond change.

A lady school teacher in India once said to Swami Vivekananda, "Swamiji, I don't know much about religion, but these little ones I worship, and they will take me to whatever truth there is."

In 1802 Thomas Young did the double slit experiment and invented wave theory to explain it.

In 1831 Michael Faraday discovered electromagnetic induction and invented field theory to explain it.

In 1905 Albert Einstein discovered the geometry of the real world but failed to notice that it does away with both wave and field theory.

In Einstein's 1905 four dimensional geometry the space-time separation between the emission and absorption events for a 'photon' or a 'graviton' is zero.

All we measure in radiation is the emission and absorption events, and the space-time separation between them is zero. There are no photons. And as Niels Bohr pointed out long ago, the electron doesn't have a trajectory. The wave aspect is in the space component of the assumed trajectory.

All of quantum mechanics is a restatement of Einstein's 1905 geometry in which space and time appear as a pair of opposites.

For a single 'photon' the emission and absorption events are adjacent in space-time. But this adjacency has two components, a space component and a time component. And what we do in Feynman's 'sum over histories' method is to sum over the space component of the assumed trajectory.

For electromagnetic messages the space component cares what's in the way. For gravitational messages the space component doesn't seem to care.

In Einstein's 1905 geometry space and time come in as a pair of opposites. How?

The space separation between two events comes into his Pythagorean equation squared with a plus sign, but the time separation between those two events comes in squared with a minus sign; so that if the space and time separations are equal, the total space-time separation between those two events stands at zero. They are adjacent in space-time. In that geometry the separation between the emission and absorption events for 'photons' and 'gravitons' stands at zero. The emission and absorption events are adjacent in space-time.

We see a Universe spread out before us with zero separation between us and what can affect us by gravity, and with zero separation between us and what we see.

Memoir1

In the monastery, in San Francisco, we had an oil burning furnace in the basement. When I was up in Swami's kitchen, on the third floor, he asked me if Jerry Seeler had put that powder in the furnace 'to prevent the formation of soot.' I told him that the powder was not 'to prevent the formation of soot' but to cause the soot to burn out of the fire box. "Are you sure?" "Yes, Swami." "Are you sure?" "Yes, Swami", I replied.

When this had been repeated several times, since one can't be that sure of anything, I [finally] said, "No, Swami." Whereupon he stamped his foot on the floor and made the whole building sound like a drum and, in very disrespectful language, called me a liar and several worse things, and that's how the conversation ended at a very high pitch.

A day or two later, when I was up in his kitchen, I mentioned, in the course of the conversation, that there was a roof between his floor and ours. (Swami Trigunaita had built the third floor as an afterthought, on top of the two story building, in the hope that Swami Brahmananda would come to America.) Well, Swami didn't know that there was a roof in there, and challenged me on it. So I said, "Come, Swami, I'll show you." So I got a flashlight, opened the door to the crawl-space on the stair between his floor and ours, which he passes several times a day, and showed him the old roof.

It's hard to describe what happened next. He lit up with one of the most beautiful smiles I've ever seen, turned to me and said, "You are right, *as usual*."

He's found out from Jerry what the powder is for.

Memoir2

Once, at the monastery in Ganges, Michigan, I found myself seated next to Marie Louise Burke. We were just sitting there waiting, and she turned to me and said, "I owe all my life in Vedanta to you." "What are you saying!" I said. (I had always thought that I was on her list of people to be avoided.) Well, she told me that when she came to the Temple that night, long ago, she rang the bell at the office door, and no one answered. She rang again, and no one answered. She told me that she had said, "It's all dark, and they're not going to let me in. I'm going to jump off the Bridge." Then she said, "You came and invited me to go to the lecture at the other end of the building."

I was the usher at the far end of the auditorium, but I had heard the bell, and I was not going to let someone ring the bell and not get in. So I left my post and went around to the office entrance on Webster Street and found this lady standing at the door with the tears streaming down her face. I asked her if she would like to attend the lecture, and I took her around to the Filbert Street entrance.

Seated there on the bench in Michigan, I told her that I had always thought that she had eye trouble. I had thought so all these years.

Now all that is over, and later, in San Francisco, I gave her the information on Swamiji and Tesla. And I told her that she was the custodian of information on Swamiji.

This body is the energy of 75,000 atomic bombs, not so much because of its separation from all the rest of the matter in the observational Universe, as from the undividedness of the underlying existence showing through in that separation.

Quantum mechanics is the observational evidence that the geometry of what is known in the trade as the real world is four dimensional, and that time

separations come into that geometry squared with a minus sign. Quantum mechanics is the evidence that space and time come into that geometry as a pair of opposites, so that the space-time separations between the emission and absorption events for both 'photons' and 'gravitons' stand at zero.

Gravity, electricity and inertia are the observational evidence that the underlying existence is changeless, infinite and undivided, and that seeing it in space and time is due to a mistake, and that through that mistake the changeless shows as inertia; the infinite shows as the electrical energy of the minuscule electrical particles; and the undivided shows as gravity and the attraction between opposites.

UNIVERSAL SPIRITUALITY

At the present time, as I see it, we're facing a rather complicated problem, the problem of reconciling our various views on how the Universe is put together. The scientists have some views, and the religionists (the mystics) have some views, and they don't see eye to eye. But, since there's only one Universe, it follows that if the scientists are right, and if the mystics are also right, we need only a translator.

But before we can solve that problem we need to reconcile the various views of the scientists and the various views of the religionists. The scientists need a translator between quantum mechanics and relativity theory, and they're working on that, and the religionist need a translator between the Christians, the Muslims, the Buddhists, and the rest, and Swami Vivekananda worked on that.

His problem was to separate the essence of religion, which is spirituality, from the vast overlay of superstition and local custom. That was his job. And Swami Brahmavidyananda's problem was to separate from the vast collection of Swami Vivekananda's writings and lectures those which bear on that particular problem. That was his job, and we owe him for that.

OBSERVATIONAL EVIDENCE

Quantum mechanics is the observational evidence that the geometry of what is known in the trade as the real world is four dimensional, and that space and time come into that geometry as a pair of opposites, so that the space-time separations between the emission and absorption events for what are known in the trade as 'photons' and 'gravitons' are zero. That allows us to see, by mistake, a Universe spread out before us with zero separation between us and what we see, and with zero separation between us and what affects us by gravity. It's like a dream, but the separation is *objectively* zero.

The existence of gravity, electricity, and inertia is the observational evidence that we are seeing, in space and time, an underlying existence which is *not* in space and time and is therefore undivided, infinite and changeless. The changeless shows through in the misperception as inertia; the infinite shows through as the electrical energy of the minuscule particles; and the undivided shows through as gravity and the attraction between opposites. That allows us to see a Universe of hydrogen, falling together by gravity to galaxies and stars, planets and people. It's like a dream, and the notion that we're made out of meat is part of the dream.

Sri Ramakrishna is the observational evidence that this underlying existence may be addressed as Mother, and that it's possible to reach Her. That allows us to understand that it's even possible to see *through* this misperception.

All this is Mother. Had there been anything else, I'd have written it down.

John L. Dobson, February 26, 2003

Dear Doctor Halton Arp,

February 25, 2003

Fortunately for me, someone recently gave me a copy of *Seeing Red*. I had no idea you had so much *observational* evidence for intrinsic redshifts. As I'm sure you'll agree, our cosmological imagination must be constrained by the physics, and our physical imagination must be constrained by the observations. Bravo for you! We used to match the model to the physics; now they match the physics to the model.

If one has a cosmological view, or a view on physics, you're expected to support it with arguments; but if you have a religious view, you're not expected to support it with arguments, and it's protected by law. In this country the Big Bang is protected by law. I hope they're not so pig headed over there. The English tell me that they're as bad as we are.

I wish I had access to Narlikar on the creation of matter in the vicinity of other matter.

Is there any reason to think that the ejection of radio sources is physically different from the ejection of quasars?

For more than a decade I have thought that matter must recycle from the border of the observable Universe through Heisenberg's uncertainty principle. And, for similar reasons, I have thought it must also recycle from black holes, especially from big ones. But, after reading your book, I wonder whether the recycling might not be *somehow* constrained to galaxy sized blobs. The intrinsic mass, both gravitational and electrical, would be seriously reduced in the gravitational well of a black hole. And that would allow the particles to be both larger and lighter and more easily blown away by the galactic winds. And I would expect the blobs to be constrained to come out in pairs so as not to change the center of gravity of the parent galaxy.

If you or Narlikar can come up with a physical mechanism to constrain the recycling to blobs, we may be home free.

Is it possible that something could happen to an over crowded black hole that would render it incapable of holding all those particles in different energy states? After all they're neutrons, Fermi particles, with a half unit of spin, and no two can occupy the same energy state. Could some gravitational disturbance to the black hole allow Pauli's Verbot to throw matter outside?

Yours in the allergy to the Big Bang,

John L. Dobson

VERY OLD PHYSICS

Einstein's E=m was built into Sanskrit long ago...

There were some very sharp physicists in India a long time ago. I don't know how long ago, but it must have been at least several thousand years ago because the ideas of those physicists are built into the Sanskrit language which is itself very old. Now when a language is codified the ideas that are current among the people at that time get built into that language and some very fundamental modern physics is built into Sanskrit. This should have been obvious to any European or American physicist who knew that old language.

Those old physicists saw that the Universe which we see is changing in time. Their word for the Universe is **Jagat**, "the changing." But they also saw, since change can be perceived only with respect to something changeless, that there must be a Changeless reality, not in time, underlying what we see. Their word for the "real" is **Sat**, "the changeless." (When we say 60 miles per hour we mean 60 miles per hour *with respect to* the road.) Then too, if that "underlying reality" is not changing in time it must also be not limited or divided in space. And their word for that Reality is **Brahman**, "the vast, the infinite."

Now since the "underlying reality" cannot be changed it follows that if we see a changing Universe it can only be by a mistake in perception. So they studied perception and they studied mistakes. They pointed out that if, in the dusk, a rope is mistaken for a snake there are actually 3 aspects to that mistake. They sometimes referred to them as "red", "white", and "black". The "black" is the darkness of dusk by which *you fail to see the rope rightly*. That aspect they called the "veiling power", **Avarana Shakti**, of **Tamas**. The "red" is the color of your imagination when *you jump to the conclusion that it is a snake*. That aspect they called the "projecting power", **Vikshepa Shakti**, of **Rajas**. And finally the "white" refers to the fact that through sentiency, which they called **Chaitanya**, *you saw the rope in the first place* (or you would have never mistaken it for a snake). That final aspect they called the "revealing power", **Prakasha Shakti**, of **Sattva**. It is the length and diameter of the rope that you mistake for the length and diameter of a snake.

So those old physicists saw that it was the nature of the "underlying reality" showing through the revealing power of the mistake that drives the changes in this changing Universe. They even had words for that. That nature they called **Asti-Bhati-Priya**. **Asti** is the Changeless showing in the changing. **Bhati** is the Infinite showing in the finite. And **Priya** is the Undivided showing in the appearance of division. That is what drives the changes in this changing Universe. That is what we see as energy.

To put it in modern terms: Inertia and the Conservation of Energy is the Changeless showing through. The electrical charge on the miniscule particles is the Infinite showing through and the Undivided shows through as gravity and the attraction between opposites like plus and minus electrical charges. The electrical energy of an electrical particle would go to zero if, and only if, the size of that particle went to infinity. And the gravitational energy of the Universe would go to zero if, and only if, the dividedness of the Universe went to zero. They are in our physics as numbers.

Those old physicists saw that if the “underlying reality” is seen in space and time, it will show as energy. The whole Universe is made out of energy. *It is not made out of anything else.* And way back then they had a word for that energy, **Shakti**. If the whole Universe is seen as energy, their word for that energy is **Shakti**. But if the usual discrimination is made between what we see as matter and what we see as energy, then their word for energy is **Prana**. Their words for what we call matter and energy are **Akasha** and **Prana**, as Tesla used them. It is only when we see the whole thing as energy that their word for energy is **Shakti**.

Now those old physicists took the trouble to catalogue 5 different kinds of energy and the senses by which we perceive them: **Akasha** (matter or gravity) with the ear (the saccule); **Vayu** (wind or kinetic energy) with the skin (temperature is a measure of the mean kinetic energy of the molecules); **Tejas** (radiation – that which shines) with the eye; and **Ap** and **Prithivi** (water and earth) with the tongue and the nose. But I take **Ap** and **Prithivi** to refer to electricity and magnetism for the simple reason that this is really a list of *energies*, not *substances*.

Since the water molecule is an electrical dipole their word is actually better than ours. Our word, electricity, is derived from the Greek word for Amber. Also it is electrically charged ions that we actually taste as salty and hydrated protons that we taste as sour. And finally, since our sense of smell reads molecular structures which are held together by electron pair bonds which are magnetic, I take **Ap** and **Prithivi** to refer to electrical and magnetic energies.

Those old physicists missed what we now call nuclear energy. They also missed the fact that electrical energy, like gravitational energy, arises directly from the mistake of seeing what we see as in time and space. Nuclear energy also arises by that same mistake. If we see what we see as in time and space it will be wound up to “500 atom bombs per pound” against gravity because we see it spaced out. It will be wound up to “500 atom bombs per pound” against electricity because we see it spaced in. It will be wound up against Heisenberg’s Uncertainty Principle because we can know where it is in time and space.

If the modern European and American physicists had studied Sanskrit all this would have been immediately apparent to them. But the concept of energy

did not arrive in European physics until the 1800's. And it wasn't until 1905 that the first modern physicist (Albert Einstein) noticed that what we call matter is just potential energy.

Einstein's $E=mc^2$ was built into Sanskrit

long ago
11/6/99

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Now since the underlying reality cannot be changed, it follows that if we see a changing Universe it can only be by a mistake in perception. So they studied perception and they studied mistakes. And they pointed out that if, in the dusk, a rope is mistaken for a snake, there are three aspects to that mistake. They sometimes referred to them as red, white and black. The black is the darkness of dusk by which you fail to see the rope rightly. That they called the veiling power, Avarana Shakti, of Tamas. The red is the color of your imagination when you jump to the conclusion that it's a snake. That they called the projecting power, Vikshepa Shakti, of Rajas. And finally the white refers to the fact that through sentience, which they called Chaitanya, you saw the rope in the first place or you never would have mistaken it for a snake. That they called the revealing power, Prakasha Shakti of Sattva. It is the length and diameter of the rope that you mistake for the length and diameter of the snake.

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(To put it in modern terms: Inertia and the conservation of energy are the changeless showing through. The electrical charge on the minuscule particles is the infinite showing through, and the undivided shows through as gravity and the attraction between opposites like plus and minus electrical charges. The electrical energy of an electrical particle would go to zero if, and only if, the size of that particle went to infinity. And the gravitational energy of the Universe would go to zero if, and only if, the dividedness of the Universe went to zero. They're in our physics as numbers.)

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If the modern, European and American physicists had studied Sanskrit, all this would have been immediately apparent to them. But it wasn't till 1905 that any of us noticed that what we call matter is just potential energy.

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VIVEKANANDA AND THE EINSTEINS

When reading *The Complete Works of Swami Vivekananda* it is important to remember that embedded in his language are the scientific views of his day, some of which are no longer current.

For example, when Swamiji uses the terms “force” and “matter” for “*Prana*” and “*Akasha*”, he is really referring to what we would call energy and mass. The physicists no longer use the term “force” as equivalent to energy. The Sanskrit word *Prana* means what we now call energy, not force.

Also it is important to remember that what we call an atom, as we conceive it now, was not even invented until 1911 (by Neils Bohr), some nine years after Swamiji had passed away. It is no use thinking that when Swamiji used the term “atom” that he meant what we mean by it today.

In Swamiji’s day the mix of the chemical elements in the Universe was thought to have been given at the time of “creation”, if there was a “creation”; or to have been around “forever”, if there was a “forever”. It is on the basis of that view that Swamiji suggested in a lecture that if you just keep shuffling the mix long enough it will come out in the present configuration once again. (He had suggested that he had even given that lecture before with that same tumbler of water on the table.) No one thinks like that now. The chemical mix is changing, and the entropy is going up. The scrambledness of the energy is going up. We no longer agree with Sir James Jeans that a band of monkeys, turned loose on a bank of typewriters might eventually type out a Shakespeare sonnet.

It is important to remember also that what we now refer to as “modern science” was not the science of Swamiji’s day. Modern science came out of Relativity Theory and Quantum Mechanics, which imply that the first cause under our physics is uncertainty (*Vivarta*). What Swamiji referred to as “modern science” was the older physics – Newtonian physics, which is based entirely on “transformational causation” (*Parinama*).

Having failed to square his *Advaita Vedanta* (which holds to *Vivarta*) with Newtonian physics (which holds to *Parinama*), Swamiji then tried to square it with *Sankhya* (which also holds to *Parinama*), because he knew how to get from *Sankhya* to *Vedanta*.

In *Vedanta* the three *Gunas* are taken as three aspects of a misperception, like mistaking a rope for a snake. First there is the veiling power of *Tamas* (in the twilight you must fail to see the rope rightly); then there is the projecting power of *Rajas* (you must jump to the wrong conclusion about what you are seeing); and finally there is the revealing power of *Sattva* (you had to see the “real” rope or else you would not have mistaken it for a snake).

The *Sankhyans* did not hold to this misinterpretation business, however, and they used the *Gunās* in an entirely different way – as “things”. There are “particles” of *Tamas* (inactivity); “particles” of *Rajas* (activity); and “particles” of *Sattva* (balance). They have the Universe arising from an “imbalance” of *Gunās*. Well I just don’t think it goes that way. In Sanskrit the word *Rajas* is mostly used to designate an impurity (something else), never an activity. According to the *Sanskrit-English Dictionary* of Sir Monier Monier-Williams, activity, or energy is not associated with the word *Rajas* in the Sanskrit language.

Usually Swamiji’s use of the *Gunās* follows *Sankhya*; I don’t know why. Probably they were so used in his educational background. Most of India runs with *Sankhya*, not *Vedanta*. They have the Universe arising from the veiling and projecting powers and made out of ignorance. They don’t see that it arises out of the revealing power and is made out of sentiency, *Brahman*. Sri Ramakrishna saw it as *Chinmaya* (made out of sentiency) not *Mrinmaya* (made out of earth).

The European physicists and philosophers seem to have taken matter to be inert and insentient. But how could anyone who lives in an earthquake zone take matter to be inert? We don’t push those mountains around, they push each other around. The *Sankhyans* take matter (*Prakriti*) to be active but insentient. They put sentiency in the *Purushas*, which are many. They say *Prakriti* dances for the *Purushas*.

But how could anyone see matter as insentient? If the stone did not “know” where the Earth is it certainly would not fall toward it. And if the electron did not “know” where the proton was we would not have a Universe of hydrogen.

Vedanta sees matter as both sentient and “ert” (active), and it is sentiency, through the revealing power of *Sattva* that drives the whole Universe.

Most of the *Vedantic* writings, like *Vedantasara*, follow *Sankhya*. They leave out the revealing power, which is native to sentiency itself, and mention only the veiling and projecting powers, which are native to the genetic programming. They, like the *Sankhyans*, have the Universe arising out of ignorance. For the *Sankhyans* the goal is isolation from *Prakriti* (*Kaivalya*).

But Sri Ramakrishna, Holy Mother, and Swamiji saw it as it is said in the Upanishad, “All this is verily *Brahman*.” All beings are That. The worship of all beings is the worship of That. As Buddha said, “*Bahujana hitiaya, bahujana sukaya*” (For the good of the many, for the happiness of the many). Sri Ramakrishna’s remarks imply that *Maya* is nothing but the genetic programming. He said that *Maya* is nothing but the egoism of the embodied soul. That is genetic. He also said that *Maya* is nothing but woman (or man) and gold. But these are simply the prime directives of our genetic programming. Regardless, through the revealing power the Reality shows through. That is what drives the

Universe. The electrical and gravitational energies of the Universe are the infinitude and undividedness of *Brahman* showing through. *You cannot leave the revealing power out.*

In the 1890's Swamiji had a problem. He was face to face with the European and American physicists who [at that time] saw a Universe of matter and energy in the framework of space and time. They saw the Universe as consisting of "real" particles with "real" mass and "real" energy moving through "real" space in "real" time. But Swamiji knew from his own experience that there was only one Reality, one Existence, not two, behind what we see. He was presumably upset by the fact that the physicists had matter (mass) as well as energy.

It must have been with this problem in mind that he approached Nikola Tesla at Sarah Bernhardt's party in New York on February 13, 1886. He asked Tesla if he could show that what we call matter could be reduced to potential energy. Vivekananda said later, in a letter, that he was to go next week "to get this new mathematical demonstration." But alas, Tesla apparently failed in his attempt to show it and so the problem languished.

Enter Mileva Einstein, Einstein's first wife, who was a physicist and a close friend of Tesla. She must have been aware of Swamiji's problem, and she would surely have noticed, when she wrote the papers for her husband in 1905, that he had the problem solved.

In the world's first important paper on Quantum Mechanics, his paper on the Photoelectric Effect, Einstein had pointed out that if something is receding from us, the energy of its radiation is seen red-shifted to lower energy. And that if it is approaching, the energy of its radiation is seen blue-shifted to higher energy. In Einstein's other paper, on Special Relativity, he had pointed out that if something is receding from us its mass can be seen to be reduced, and that if it is approaching its mass is seen to be increased.

It would have been a simple matter for Mileva to notice that, since the apparent loss of energy on recession is paralleled by the apparent loss of mass, mass and energy might be the same thing. $E=mc^2$, Einstein's famous equation which connects his two papers, appears in the appendix to his Special Relativity paper, not in the paper itself.

It may not be a presumption that Swamiji saw that what we call energy is the underlying existence showing as Changeless through changes in time. After all, that is the standard nomenclature of Indian *Vedanta*. *Brahman* is the "underlying existence" which, seen through space and time, is called **Shakti** (energy).

Swamiji tried to change the physics. If Tesla, at Swamiji's suggestion, had been able to show that what we call matter is just potential energy, Swamiji might have squared his *Advaita Vedanta* with science. But the identity of mass and energy was not shown by the Einsteins for another nine years and by then Swamiji was gone.

Toward the end of his life here, Swamiji tried to square *Sankhya* (which is dualistic) with science. But even there he apparently failed because the *Prakriti-Purusha* dualism of *Sankhya* is a very different thing from the matter-energy dualism of Newtonian physics.

It may be that Swamiji's use of *Tamas* as inactivity (inertia or matter) and *Rajas* as activity (energy) is evidence of his effort to square *Sankhya* with science, because *Vedanta* could not be squared with the science of his day. The science wasn't ready. Had Swamiji dallied on Earth for another ten years or so the identity of his *Advaita Vedanta* and the changed science, (what is now called modern science) would have been immediately transparent to him, although neither the Vedantins nor the scientists appear to have noticed.

John L. Dobson
Hollywood, California
February 1998

September 23, 1998

Dear Swami Sarvadevananda,

As probably you know, I have two problems; to get the physicists back to the equations of their physics, and to get the Vedantins back to Vedanta.

We are Advaitins, and the view is that we see all this through Maya which is made of three gunas: the veiling power of Tamas, the projecting power of Rajas, and the revealing power of Sattva. All of our physics follows from that. We have mistaken the changeless for the changing by seeing the changeless, and it shows in our physics as the conservation of energy and its inertia. We have mistaken the infinite for the finite by seeing the infinite, and it shows in our physics as the electrical energy of the miniscule particles. And we have mistaken the undivided for the divided by seeing the undivided, and it shows in our physics as gravitational energy and the attraction between opposites. All of our physics follows from that notion, and nothing follows from the notion of the gunas as used in Sankhya.

Even if you use Tamas as mass and Rajas as energy, nothing follows from that. In 1905 the Einsteins showed what Swamiji had hoped Tesla could show, that the Universe is made out of energy, it is not made out of anything else. What we saw as mass is just energy, Shakti. There is nothing else here.

I know, you are all trained at the Training Center, and you're all trained on Vedantasara, but there is almost as much Sankhya in Vedantasara as there is Vedanta, especially in Swami Nikhilananda's translation and notes.

If you mistake a rope for a snake there are three things you have to do. You have to fail to see it rightly; that's the veiling power of Tamas. You have to jump to the conclusion that it's a snake; that's the projecting power of Rajas. And you have to have seen it in the first place or you never would have mistaken it for a snake; that's the revealing power of Sattva.

All our physics follows from this notion, and I beg you to look at it seriously.

Yours in That to which the tear drop goes,

John L. Dobson

P.S. The veiling and projecting powers are native to the genetic programming. The revealing power is native to sentiency itself. -J.

Early November 1998

Dear Swami Sarvadevananda,

As you very well know, there cannot be two worlds – one for the mystics and one for the physicists. There is only one of it. And, for the same reason, there cannot be a line between Vedanta and physics.

The other day at three o'clock in the morning, as I was coming out of a dream, it suddenly occurred to me why ancient India had so readily accepted Vedanta and plunged headlong into Sadhana. It is because, like Swami Vivekananda, the ancient rishis were physicists, and because they connected their Vedanta with the physics.

And it occurred to me then that if we could re-connect Vedanta to physics perhaps the Americans too could accept it and rush headlong into Sadhana.

But let me go back. Let me explain.

The concept of energy did not exist in the *European* physics of Newton's day. It was the rishis who invented that concept. It was they who first noticed that the Universe is made out of energy. They even catalogued the different forms of energy: gravitational (Akasha), kinetic (Vayu), radiation (Tejas), electrical (Ap), and magnetic (Prithivi). This is perfectly straight physics. Only nuclear energy was left out.

But the European physicists rarely notice what happened in Asia. And it was not until 1905 of the present century that the Einsteins, *following Swami Vivekananda's suggestion to Tesla*, showed that the Universe is made out of energy (Shakti), and that it is not made out of anything else. But the ancient rishis (physicists three thousand years before their time) had shown, long ago, that the underlying existence, the changeless, the infinite, the undivided, seen in space and time, through apparition or Maya, shows as energy.

Through the revealing power of Sattva the changeless shows as the conservation of energy and its inertia. And likewise, through the revealing power of Sattva, the infinite shows as electricity, and the undivided shows as gravity and the attraction between opposites. And I'm very much afraid that if we don't use the Gunas as the veiling, projecting, and revealing powers of an apparition, we will have thrown the physicists to the wind.

Yours in That. Keep up the good work!

John L. Dobson

Still Early November 1998

Dear Swami Sarvadevananda,

Since you were probably not trained primarily in physics I owe you an apology in the form of an explanation.

If one makes the usual discrimination between matter and energy then the Sanskrit words are Akasha and Prana. Swami Vivekananda used the words that way and so did Nikola Tesla. But the Swami had asked Tesla if he could show that what we see as matter (Akasha) is just potential energy. That was shown by the Einsteins in 1905, after Swamiji had gone. Now when both matter and energy (Akasha and Prana) **are seen as energy**, then the Sanskrit word for energy is **Shakti**, not Prana.

“All this is Brahman” (the changeless, the infinite, the undivided), but seen in space and time is shown as energy (Shakti). All this that we see as matter is just gravitational, electrical, and nuclear potential energy, and it arises by Vivarta, not by Parinama. Gravity makes things fall. Then we have kinetic energy (Vayu) and radiation (Tejas). Electricity makes things move, and then we have magnetic energy (Prithivi). The changeless shows through as inertia (mass or matter), the infinite shows through as electricity, and the undivided shows through as gravity.

Akasha, as the first of the Panchamahabhutas, can only mean gravity, not sound. Vayu (kinetic energy) arises from Akasha, as it is said in the Taitirya Upanishad. And kinetic energy arises from gravity, **not from sound**.

I was raised by a zoologist and I learned from early on that the ear has three perceptions: gravity, dizziness, and sound. The oldest organ in the ear is the saccule which reads our orientation in the gravitational field. Our perception of sound is a late comer. Akasha, Ap, and nuclear energy arise from Brahman by Vivarta. The other Mahabhutas arise by Parinama.

I am sorry that you Indian Swamis are not trained in physics. The whole thing is transparent to a physicist. Well, it **should** be.

I wish you Hindus would quit using the English translation of the Greek translation of the five elements. Our word “electricity” is from the Greek word for amber which is *not* electrical. Water (Ap) is an electrical molecule. That is why salt dissolves in water. And earth, solids (Prithivi) are held together with magnetic bonds. They had the **right words** in Sanskrit.

Yours in That,

John

VIVEKANANDA AND THE EINSTEINS

When reading the *Complete Works of Swami Vivekananda*, it is important to remember that embedded in his language are the scientific views of his day, some of which are no longer current.

As, for instance, when Swamiji uses the terms "force" and "matter" for "*Prana*" and "*Akasha*," he is referring to what we would call energy and mass. The physicists no longer use the term force as equivalent to energy. The Sanskrit word *Prana* means what we now call energy, not force.

Also, it is important to remember that what we call an atom, as we conceive it now, was not even invented by Neils Bohr till 1911, some nine years after Swamiji had passed away. It is no use thinking that when Swamiji uses the term atom that he means what we mean today.

In Swamiji's day the mix of the chemical elements in the Universe was thought to have been given at the time of "creation," if there was a "creation," or to have been around "forever," if there was a "forever." It is on the basis of that view that Swamiji suggested in a lecture that if you just keep shuffling the mix long enough, it will come out in the present configuration again. (He suggested that he had given that lecture before with that tumbler of water on the table.) No one thinks like that now. The chemical mix is changing, and the entropy is going up. The scrambledness of the energy is going up. We no longer agree with Sir James Jeans that a band of monkeys, turned loose on a bank of typewriters, might type out a Shakespeare sonnet.

It is important to remember also that what we now refer to as modern science was not the science of Swamiji's day. Modern science came out of relativity and quantum mechanics, which imply that the first cause under our physics is uncertainty (*Vivarta*). What Swamiji referred to as modern science was the older physics, Newtonian physics, which is based entirely on transformational causation (*Parinama*).

Having failed to square his Advaita Vedanta (which holds to *Vivarta*) with Newtonian physics (which holds to *Parinama*), Swamiji then tried to square it with Sankhya (which holds to *Parinama*), because he knew how to get from Sankhya to Vedanta.

In Vedanta, the three *Gunas* are taken as three aspects of a misinterpretation, like mistaking a rope for a snake. There is the veiling power of *Tamas* (in the twilight you must fail to see the rope rightly); there is the projecting power of *Rajas* (you must jump to the wrong conclusion); and there is the revealing power of *Sattva* (if you hadn't seen the rope at all, you wouldn't have mistaken it for a snake). The Sankhyans didn't hold to this misinterpretation business and used the *Gunas* in an entirely different way – as things. There are "particles" of *Tamas* (inactivity), "particles" of *Rajas* (activity), and "particles" of *Sattva* (balance). They have the Universe arising from an imbalance of the *Gunas*. Well, I just don't think it goes that way. And in Sanskrit, the word *Rajas* is mostly used to designate an impurity (something else), never an activity. According to the *Sanskrit-English Dictionary* of Sir Monier Monier-Williams, activity, or energy, is not associated with the word *Rajas* in the Sanskrit language.

Usually, Swamiji's use of the *Gunas* follows Sankhya; I don't know why. Probably they were so used in his educational background. Most of India runs with Sankhya, not Vedanta. They have the Universe arising from the veiling and projecting powers and made out of ignorance. They don't see that it arises out of the revealing power and is made out of sentiency, Brahman. Sri Ramakrishna saw it as *Chinmaya* (made out of sentiency) not *Mrinmaya* (made out of earth).

The European physicists and philosophers seem to have taken matter to be inert and insentient. But how could anyone who lives in an earthquake zone take matter to be inert? We don't push those mountains around; they push each other around. The Sankhyans take matter (*Prakriti*) to be active but insentient. They put sentiency in the *Purushas*, which are many. They say *Prakriti* dances for the *Purushas*.

But how could anyone see matter as insentient? If the stone didn't *know* where the Earth is, it would certainly not fall *toward* it. And if the electron didn't *know* where the proton is, we would not have a Universe of hydrogen.

Vedanta sees matter as both sentient and "ert" (active), and it is sentiency, through the revealing power of *Sattva*, that drives the whole Universe.

Most of the Vedantic writings, like *Vedantasara*, follow Sankhya. They leave out the revealing power, which is native to sentiency, itself, and mention only the veiling and projecting powers, which are native to the genetic programming. They, like the Sankhyans, have the Universe arising out of ignorance. For the Sankhyans the goal is isolation from *Prakriti* (*Kaivalya*).

But Sri Ramakrishna, Holy Mother and Swamiji saw it as it is said in the Upanishad, "All this is verily Brahman." All beings are that. The worship of all beings is the worship of that. As Buddha said, "Bahujana hitaya, bahujana sukhaya" (For the good of the many, for the happiness of the many). Sri Ramakrishna's remarks imply that *Maya* is nothing but the genetic programming. He said that *Maya* is nothing but the egotism of the embodied soul. That is genetic. He also said that *Maya* is nothing but woman (or man) and gold, and these are simply prime directives of the genetic programming. But through the revealing power, the reality shows through. That is what drives the Universe. (The electrical and gravitational energies of the Universe are the infinitude and undividedness of Brahman showing through.) *You cannot leave the revealing power out.*

In the 1890's, Swamiji had a problem. He was face to face with the European and American physicists who saw a Universe of matter and energy in the framework of space and time. They saw the Universe as consisting of real particles with real mass and real energy moving through real space in real time. But Swamiji knew, from his own experience, that there was only one reality, one existence, not two, behind what we see. And he was presumably upset by the fact that the physicists had matter (mass) as well as energy.

It must have been with this problem in mind that he approached Nikola Tesla, at Sarah Bernhardt's party in New York on February 13th, 1896, and asked him if he could show that what we call matter could be reduced to potential energy. He said, in a letter, that he

is to go next week “to get this new mathematical demonstration.” But, alas, Tesla apparently failed in his attempt to show it, so the problem languished.

Enter Mileva Einstein, Einstein’s first wife, who was a physicist and a close friend of Tesla. She must have been aware of Swamiji’s problem, and she would surely have noticed, when she wrote the papers for her husband in 1905, that he had the problem solved.

In the world’s first important paper on quantum mechanics, his paper on the photoelectric effect, Einstein had pointed out that if something is receding from us, the energy of its radiation is seen red shifted to lower energy. And that if it is approaching, the energy of its radiation is seen blue shifted to higher energy. In Einstein’s other paper, on relativity, he had pointed out that if something is receding from us, its mass is seen to be reduced, and that if it is approaching, its mass is seen to be increased.

It would have been a simple matter for Mileva to notice that, since the apparent loss of energy on recession is paralleled by the apparent loss of mass, mass and energy might be the same thing. $E = mc^2$, Einstein’s famous equation which connects his two papers, appears in the appendix to his relativity paper, not in the paper itself.

It may not be a presumption that Swamiji saw that what we call energy is the underlying existence showing as changeless through the changes in time. After all, that is the standard nomenclature of Indian Vedanta. Brahman is the underlying existence which, seen through space and time, is called *Shakti* (energy).

Swamiji tried to change the physics. And if Tesla, at Swamiji’s suggestion, had been able to show that what we call matter is just potential energy, Swamiji might have squared his Advaita Vedanta with science. But the identity of mass and energy was not shown by the Einsteins for another nine years and, by then, Swamiji was gone.

Toward the end of his life here, Swamiji tried to square *Sankhya* (which is dualistic) with science. But, even there, he apparently failed because the Prakriti-Purusha dualism of Sankhya is very a different thing from the matter-energy dualism of Newtonian physics.

It may be that Swamiji’s use of *Tamas* as inactivity (inertia or matter) and *Rajas* as activity (energy) is evidence of his effort to square Sankhya with science, because Vedanta could not be squared with the science of his day. The science wasn’t ready. Had Swamiji dallied on Earth for another ten years or so, the identity of his Advaita Vedanta and the *changed* science, (what is now called modern science) would have been immediately transparent to him, although neither the Vedantins nor the scientists appear to have noticed.

Hollywood, California
February, 1998

John L. Dobson

September 23rd 1998

Dear Swami Sarvadevananda,

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We are advaitins, and the view is that we see all this through Maya which is made of three gunas, the veiling power of Tamas, the projecting power of Rajas, and the revealing power of Sattva. All of our physics follows from that. We have mistaken the changeless for the changing by seeing the changeless, and it shows in our physics as the conservation of energy and its inertia. We have mistaken the infinite for the finite by seeing the infinite, and it shows in our physics as the electrical energy of the minuscule particles. And we have mistaken the undivided for the divided by seeing the undivided, and it shows in our physics as gravitational energy and the attraction between opposites. All of our physics follows from that notion, and nothing follows from the notion of the gunas as used in Sankhya.

Even if you use Tamas as mass and Rajas as energy, nothing follows from that. In 1905 the Einsteins showed what Swamiji had hoped Tesla could show, that the Universe is made out of energy, it is not made out of anything else. What we saw as mass is just energy, Shakti. There is nothing else here.

I know, you're all trained at the Training Center, and you're all trained on Vedantasara, but there is almost as much Sankhya in Vedantasara as there is Vedanta, especially in Swami Nikhilananda's translation and notes.

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All our physics follows from this notion, and I beg you to look at it seriously.

yours in that to which the tear drop goes,

John A. Dawson

P.S. The veiling and projecting powers are native to the genetic programming. The revealing power is native to sentience itself.

J.

Early November 1998

Dear Swami Sarvadevananda,

As you very well know, there cannot be two worlds, one for the mystics and one for the physicists. There is only one of it. And, for the same reason, there cannot be a line between Vedanta and physics.

The other day, at three o'clock in the morning, as I was coming out of dream, it suddenly occurred to me why ancient India had so readily accepted Vedanta and plunged headlong into Sadhana. It is because, like Swami Vivekananda, the ancient rishis were physicists, and because they connected their Vedanta with the physics.

And it occurred to me then that if we could re-connect Vedanta to physics, perhaps the Americans too could accept it and rush headlong into Sadhana.

But let me go back. Let me explain.

The concept of energy did not exist in the *European* physics of Newton's day. It was the rishis who invented that concept. It was they who first noticed that the Universe is made out of energy. They even catalogued the different form of energy, gravitational (Akasha), kinetic (Vayu), radiation (Tejas), electrical (Ap), and magnetic (Prithivi). This is perfectly straight physics. Only nuclear energy was left out.

But the European physicists rarely notice what happened in Asia. And it was not until 1905 of the present century that the Einsteins, following Swami Vivekananda's suggestion to Tesla, showed that the Universe is made out of energy (Shakti), and that it is not made out of anything else. But the ancient rishis (physicists three thousand years before their time) had shown, long ago, that the underlying existence, the changeless, the infinite, the undivided, seen in space and time, through apparition or Maya, shows as energy.

Through the revealing power of Sattva the changeless shows as the conservation of energy and its inertia. And likewise, through the revealing power of Sattva, the infinite shows as electricity, and the undivided shows as gravity and the attraction between opposites. And I'm very much afraid that if we don't use the Gunas as the veiling, projecting and revealing powers of an apparition, we will have thrown the physics to the wind.

work! yours in that. Keep up the good

John A. Dabron

Still early November 1978

Dear Swami Sarvadevananda,

Since you were probably not trained primarily in physics, I owe you an apology in the form of an explanation.

If one makes the usual discrimination between matter and energy, then the Sanskrit words are Akasha and Prana. Swami Vivekananda used the words that way and so did Nitada Tena. But the swami had asked Tena if he could show that what we see as matter (Akasha) is just potential energy. That was shown by the Einsteins in 1905, after Swamiji had gone. Now when both matter and energy (Akasha and Prana) are seen as energy, then the Sanskrit word for energy is Shakti not Prana.

"All this is Brahman" (the changeless, the infinite, the undivided), but seen in space and time it shows as energy (Shakti). All this that we see as matter is just gravitational, electrical and nuclear potential energy, and it arises by Vivarta, not by Parinama. Gravity makes things fall. Then we have kinetic energy (Vayu) and radiation (Tejas). Electricity makes things move, and then we have magnetic energy (Prithivi). The changeless shows through as inertia (mass as matter), the infinite shows through as electricity and the undivided shows through as gravity.

Akasha, as the first of the Panchamahabhutas, can only mean gravity, not sound. Vayu (kinetic energy) arises from Akasha, as it is said in the Taittiriya Upanishad. And kinetic energy arises from gravity, not from sound.

I was raised by a zoologist and I knew from early on that the ear has three perceptions, gravity, dizziness and sound. The oldest organ in the ear is the sacculus which reads our orientation in the gravitational field. Our perception of sound is a late comer. Akasha, Ap and nuclear energy arise from Brahman by Vivarta. The other Mahabhutas arise by Parinama.

I am sorry that your Indian Swamis are not trained in physics. The whole thing is transparent to a physicist. Well, it should be.

I wish your Hindus would quit using the English translation of the Greek translation of the five elements. Our word electricity is from the Greek word for amber which is not electrical. Water (Ap) is an electrical molecule. That's why salt dissolves in water. And earth, solids (Prithivi) are held together with magnetic bonds. They had the right words in Sanskrit.

Yours in that,
John

WATCHERS OF THE SKY

One of the problems of human knowledge is that the world which we see from the surface of this planet on a sunny day bears almost no resemblance to the Universe at large. Our Earth is made of iron and rock, but the Universe as a whole is mostly made of hydrogen. The actions which we see on the surface of this Earth run mostly on sunlight, but the Universe runs on gravity. What we see here are continents, oceans, rivers and lakes, mountain ranges, forests, tundra, and prairies. But the Universe at large is mostly gas, partly condensed by gravity into galaxies and stars, and lightly sprinkled, here and there, with interstellar dust.

The interstellar dust is made from hydrogen in the bellies of stars, and is scattered through the galaxies by the explosions and stellar winds of stars much bigger and much hotter than our Sun. But the dust is scarce, and, like our bodies, the rock on which we live is made up of these dusts. It is a collector's item. The heavier elements, such as iron, have sunk to the center, overlaid with rocks of the mantle and the crust and a thin veneer of water and gas. Since the age of this museum piece is pushing five billion years, by now the water-soluble compounds of the surface rocks have leached into the water layer, making the oceans salty.

The saltiness of our blood is the saltiness of the ancient sea, some four hundred million years ago. That is when our scaly ancestors, on stumpy fins, crawled out across the land in search of other water and the sight of other fish. Descended as we are from them, we can think of our bodies, even now, as little bags of sea water, hung out on clotheslines of bone, gulping oxygen directly from the gas layer above us, and shambling out across the rocks to gaze with starry eyes, through the blackness of night, at the vast expanse of the Universe beyond.

Even the oxygen that we breathe is freed by sunlight through the instrumentality of our photosynthetic relatives. First, by the blue-green algae in the sea, and now by the green leaves of the rain forest. Even the rain is driven by sunlight. But the Universe at large has a reducing atmosphere, and it is without rain and sunlight. It is very cold, very dark, and very lonely – trying desperately to fall together by the seemingly inexplicable attraction of the particles in it for each other. Even the radiation of the Sun is driven by this attraction which has pushed the central temperature of the Sun up to some fifteen million degrees Celsius. It is only because its gravitational collapse has been slowed down by the nuclear fusion at its core that the Sun has bathed our Earth with its warming rays for nearly five billion years. Only this delay has made possible our long genetic development – until we were able to climb out of the water and gaze in wonder at the starry sky of night.

Although we, as living organisms, owe both our existence and our long genetic development to the Sun, its dazzling brightness prevents us from seeing the Universe by day. The blueness of the daytime sky is not the color of the air, but simply the shorter wavelengths of light scattered from the sunlight by the gas layer above us. That gas layer by night, unlit by the Sun, is sufficiently transparent so that through it we may gaze into the far reaches of the Universe.

But seeing alone is not enough. It is only the beginning. We must also understand what we see, and that has a history. Understanding rests on a foundation of concepts and information coming down to us from the past, albeit not the very distant past. It is not from the first few hundred million years after we came ashore in the swamps to look around. This is because in those distant days and nights the concepts which we framed, and the information which we gained, could not be transmitted from generation to generation. We lacked a mechanism to transmit it. It is not transmitted genetically and back then there were no words. Written words, by which concepts and information are largely transmitted in what we proudly think of as the "Age of Science", are only a few thousand years old. Vocal speech itself is fairly new. It was probably forced on us by the failure of our body language in the surf, when we, as brachiating primates, were marooned on an island in northeast Africa. We were driven by drought from the jungles to the beach, not more than ten or fifteen million years ago. Even the body language common to the great apes, and easily understood by the oranges, the gorillas, the chimps, and ourselves, is less than fifty million years old. Our great gain in those earlier times was in our genetically transmitted capabilities. By the early demise of those with poorer eyes we gained our visual acuity, and by the early demise of those with smaller brains we improved our capacity to understand.

It is that capacity which sets us apart amongst the watchers of the skies.

John Dobson

September 9, 2004

WAVES AND FIELDS

In 1802 Thomas Young did the double-slit experiment, and invented the *wave theory of light* to explain his observations. In 1831 Michael Faraday discovered electromagnetic induction, and invented *field theory* to explain those observations. In 1873 James Clerk Maxwell brought into both theories, and suggested that light was an electromagnetic wave whose speed could be measured with respect to what was then called the "luminiferous aether". Then, in 1887, Michelson and Morley showed that the speed of light could *not* be measured with respect to the aether. Finally, in 1905, Albert Einstein, through his rare insight, dropped the luminiferous aether idea but kept Young's wave theory and Faraday's field theory in his 1915 General Relativity theory, even though his 1905 geometry denies them both.

In Einstein's 1905 geometry, space and time come in as a pair of opposites - so that if the space and time separations between two events are equal, their total space-time separation is zero. If a light beam can get from one event to the other *in vacuo*, then their space and time separations are equal and their space-time separation is zero. The "speed of light" is therefore not a speed at all. It is simply the ratio of space to time. One light-year is equal to one year. And, since that puts the total space-time separation between the emission and absorption events at zero for both gravitational and electromagnetic radiation *in vacuo*, we should, perhaps, dispense with both the wave and field theories in the explanation of *our* observations.

Einstein took his famous equation, $E = mc^2$ ("in which energy is set equal to mass") as he wrote it. However, it is *usually* taken to mean that mass can be *converted* to energy, and that energy can be *converted* to mass, much, as in a swinging pendulum, gravitational energy is converted to kinetic energy on the down-swing and kinetic energy is converted to gravitational energy on the up-swing. But that equation would have been $E + m = K$ (The *sum* of mass and energy is constant.). That's not what he meant, and it's not what he wrote. His equation simply states that what we call mass is just potential energy as Swami Vivekananda had suggested to Nikola Tesla in 1896. If one fails to notice that Einstein's geometry rules out the existence of photons and gravitons, because the total space-time separations between their emission and absorption events is zero, then there *appears* to be energy in the radiation state without mass, and then, of course, Einstein's famous equation would not hold.

No one sees electromagnetic waves, and no one sees photons. All we know about electromagnetic radiation is the emission and absorption events. Let's stick to the observations!

As Thomas Huxley remarked when he ran into Darwin's theory of evolution, "How extremely stupid not to have thought of that."

-John L. Dobson, June 19, 2002

WHENCE THIS HYDROGEN?

It will be remembered that none of our modern cosmological models have even a reasonable answer to this question. The Big Bang model gets the hydrogen from the Fireball but with no source for the Fireball. The old Steady State model gets its hydrogen from the C Field but with no source for the C Field. Can we come up with a more reasonable answer?

On a plane on my way to the Summer Scientific Meeting of the Astronomical Society of the Pacific at Pomona in southern California I was thinking about the Big Bang model. I was thinking of its suggestion that in the absence of the Universe, and in the absence of space and time, there would be nothing. And I thought, "Isn't that unwarranted?" For in the absence of time we would have the absence of change, but not necessarily nothing. I intended to ask this question to William Kaufman on the second day of the meeting. But Allan Sandage gave such a *lovely* talk the first day on the Hubble Constant that I asked my question of him instead.

I asked: "Since we are now willing to talk about a "creation event" (as I wiggled my fingers for quotes) why must we assume that in the absence of the Universe and in the absence of space and time there would be nothing? Isn't that unwarranted? In the absence of time we would have the absence of change, but not necessarily nothing. And in the absence of space we would have the absence of dividedness and the absence of smallness, but not necessarily nothing. That leaves the possibility that behind what we see there might be the Changeless, the Infinite, the Undivided – which seems a long way from nothing."

That remark brought the discussion to an end.

But several years later, at the University of California in Berkeley I asked Stephen Hawking whether he saw any observational evidence as to whether what underlies the Universe which we see might be a zero or whether it might be the Changeless, the Infinite, and the Undivided. He took the trouble to have his machine answer me, "I'm not sure that is a meaningful question." But to me it *is* a meaningful question, and to me the observational evidence is obvious.

As I see it the *gravitational energy* of the Universe is the observational evidence that what underlies the Universe is undivided. That is why gravity falls the hydrogen together to galaxies and stars. *Inertia* is the evidence that what underlies the Universe is changeless. That is why matter fights every change in its state of motion. And the *electrical energy* of the Universe is the evidence that the underlying existence is infinite. That is why the electrical charge is self-

repulsive and why the electrical energy of an electrical particle (an electron) would go to zero if, and only if, the size of that particle went to infinity.

It will be remembered that we currently have no other explanation for gravity, electricity, or inertia.

Richard Feynman once said, "It is important to realize that in physics today we have no knowledge of what energy *is*." But I think that energy is simply the "underlying existence" showing through in space and time.

Now there were some physicists long ago, several thousand years ago, who noticed that if what underlies the Universe is Changeless and we see it as changing it can only be by mistake, because you can not change the Changeless. And, since you can't have a "mis-take" without a "take" first (you can't mistake your friend for a ghost without seeing your friend), then the Changeless, the Infinite, and the Undivided *must* show through in our physics.

Even accepting this point of view we still have a problem. If we see a *duality* why doesn't the undividedness show through and just close it all down? And if we see a *plurality* why doesn't the undividedness show through and close *that* down?

Enter Heisenberg and Pauli. The plurality can keep the duality up, and the duality can keep the plurality up. Heisenberg's Uncertainty Principle prevents the collapse of the electrical duality of the electron and the proton in the hydrogen atom because although the electron, as Feynman has pointed out, is *purely* electrical, the proton is *not*. [A positron is purely electrical too – but of opposite charge to the electron. And if they meet they collapse and annihilate each other.] The proton's rest mass is related to the plurality, to its separation in the gravitational field from all the rest of the matter in the observable Universe. Pauli's Exclusion Principle prevents the collapse of the plurality because you can't put two Fermi particles in the same energy state.

It may be that if we see what we see as in space and time it will automatically take the form of hydrogen falling together into galaxies and stars. And it may be that Heisenberg's Uncertainty Principle recycles the hydrogen from the border of the expanding Universe with all of its negative entropy fully restored.

John L. Dobson
December 23, 2005

WHENCE THIS HYDROGEN?

It will be remembered that none of our modern cosmological models have even a reasonable answer to this question. The Big Bang model gets the hydrogen from the Fireball with no source for the Fireball, and the old Steady State model gets the hydrogen from the C Field with no source for the C Field. Can we come up with a more reasonable answer?

On a plane, on my way to the Summer Scientific Meeting of the Astronomical Society of the Pacific at Pomona in Southern California, I was thinking about the Big Bang model's suggestion that in the absence of the Universe, and in the absence of space and time, there would be nothing. And I thought, 'Isn't that unwarranted?' In the absence of time we would have the absence of change, but not necessarily nothing. And I intended to ask my question to William Kaufman on the second day of the meeting. But Allan Sandage gave such a *lovely* talk the first day, on the Hubble Constant, that I asked my question of him.

I asked: Since we're now willing to talk 'creation event' (and I wiggled my fingers for quotes), why must we assume that in the absence of the Universe and in the absence of space and time there would be nothing? Isn't it unwarranted? In the absence of time we would have the absence of change, but not necessarily nothing, and in the absence of space we would have the absence of dividedness and the absence of smallness, but not necessarily nothing. So I said, that leaves the possibility that behind what we see there might be the changeless, the infinite, the undivided, which to me seems a long way from nothing. That remark brought that discussion to an end.

But several years later, at the University of California in Berkeley, I asked Stephen Hawking whether he saw any observational evidence as to whether what underlies the Universe which we see might be a zero or whether it might be the changeless, the infinite, the undivided. He took the trouble to have his machine answer me, "I'm not sure it's a meaningful question." But to me it *is* a meaningful question, and to me the observational evidence is obvious.

As I see it the *gravitational energy* of the Universe is the observational evidence that what underlies the Universe is undivided. That's why gravity falls the hydrogen together to galaxies and stars. *Inertia* is the evidence that what underlies the Universe is changeless. That's why matter fights every change in its state of motion. And the *electrical energy* of the Universe is the evidence that the underlying existence is infinite. That's why the electrical charge is self repulsive and why the electrical energy of an electrical particle would go to zero if, and only if, the size of that particle went to infinity.

It will be remembered that we have no other explanation for gravity, electricity or inertia.

Richard Feynman has said, "It is important to realize that in physics today we have no knowledge of what energy *is*." But I think that energy is simply the underlying existence showing through in space and time.

Now there were some physicists long ago, several thousand years ago, who noticed that if what underlies the Universe is changeless and we see it as changing, it can only be by mistake, because you can't change the changeless. And, since you can't have a mistake without a take (You can't mistake your friend for a ghost without seeing your friend.), the changeless, the infinite, the undivided *must* show through in our physics.

But even accepting this point of view, we still have a problem. If we see a duality, why doesn't the undividedness show through and close it down? And if we see a *plurality*, why doesn't the undividedness show through and close *that* down?

Enter Heisenberg and Pauli. The plurality can keep the duality up, and the duality can keep the plurality up. Heisenberg's uncertainty principle prevents the collapse of the electrical duality of the electron and the proton in the hydrogen atom because, although the electron, as Feynman has pointed out, is purely electrical, the proton is not. The proton's rest mass is related to the plurality, to its separation in the gravitational field from all the rest of the matter in the observable Universe. And Pauli's exclusion principle prevents the collapse of the plurality because you can't put two Fermi particles in the same energy state.

It may be that if we see what we see as in space and time it will automatically take the form of hydrogen falling together to galaxies and stars. And it may be that Heisenberg's uncertainty principle recycles the hydrogen from the border of the expanding Universe with all its negative entropy restored.

John L. Dobson
December 23, 2005

WHY HYDROGEN?

Why do we see hydrogen and not something else?

In order to see, *in time and space*, that which is *not in time and space* (and cannot, therefore, be changing, finite, or divided), there is a problem. The problem arises because the nature of that “underlying existence”, its changelessness, its infinitude, and its undividedness, must show through in the apparition. Just as, when a rope is mistaken for a snake, the length of the rope, through what is called the revealing power of the apparition, must show through in the snake for which it is mistaken.

Therefore, *if the underlying existence were to be seen as only a duality*, there would be nothing to prevent the undividedness from showing through the revealing power of the apparition and bringing the two together. Similarly, if the underlying existence were to be seen as *only a plurality*, there would be nothing to prevent the undividedness from showing through and bringing the many together. But if the underlying existence were to be seen as a *duality within a plurality*, then the duality could prevent the collapse of the plurality, and the plurality could prevent the collapse of the duality, because the one cannot be seen without the other.

What we see in this Universe is an electrical duality *within* a gravitational plurality, and the undividedness of the underlying existence shows through in the duality as the electrical attraction between the electrons and the protons, and it shows through in the plurality as gravity. But the demise of the duality is prevented by the gravitational dissimilarity between the electrons and the protons. That's Heisenberg's Uncertainty Principle. And the demise of the plurality is prevented by the spin duality of the protons and the neutrons. That's Pauli's Verbot.

Heisenberg's Uncertainty Principle does *not* prevent the demise of the duality of the electron and the *positron* (a positive electron) because gravity is not involved in the rest energy of the positron. But it *does* prevent the collapse of the duality of the electron and the proton, in spite of the enormous electrical attraction between them, because the proton's mass is gravitationally determined whereas the electron's mass is not. As Richard Feynman has pointed out, “The electron is purely electrical, the proton is not.”

Energy is that underlying existence showing in space and time through the revealing power of the apparition. It shows through in space as the gravitational and electrical energies – energies of position in space. And it shows through in time as inertia. But, as Swami Vivekananda pointed out to Nikola Tesla in 1896, these are all the same thing. That's why $E = m$, and why the gravitational field is so much weaker than the electrical field. The total electrical energy must equal

the total gravitational energy, the total nuclear energy and the total mass. Ernst Mach didn't see it quite this way. He didn't notice that *the mass is the energy*.

But there is still a question: Why should the proton spin? Although the underlying existence which we mistake for what we see in time and space is changeless, infinite, and undivided, we see it as changing, finite, and divided, or it wouldn't be a mistake. We see a Universe of hydrogen divided into atoms, but the atoms are spaced out, and the undivided shows through as gravity. We see the hydrogen as made of minuscule particles, but the infinitude shows through as their electrical charge. And we see the protons and electrons as changing (spinning) and the changelessness shows through as their inertia. In order to be seen in time, they *have to be changing*. Nothing we see in time and space is changeless, infinite, or undivided.

In this Universe we see pairs of opposites, spin-up against spin-down, momentum to the right against momentum to the left, and plus against minus, but the total spin goes to zero, the total momentum goes to zero, the total force goes to zero, and the total electrical charge goes to zero. The Universe is not made of these things; it's made out of energy, and the total energy does not go to zero. If the total energy went to zero, the Universe would be made out of nothing; there wouldn't be an underlying existence, and we wouldn't have the physics which we have.

Is all this just a guess?

If seeing, *in time and space*, that which is *not* in time and space is a mistake, it's consoling to know that it will take the form of hydrogen falling together by gravity to galaxies and stars.

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