



## ANIMATED GEOMETRY

[Versión en español en la pag. 2]

*Sloka* (6). THE ROOT OF LIFE WAS IN EVERY DROP OF THE OCEAN OF IMMORTALITY (*Amrita*) AND THE OCEAN WAS RADIANT LIGHT, WHICH WAS FIRE AND HEAT AND MOTION. DARKNESS VANISHED AND WAS NO MORE. IT DISAPPEARED IN ITS OWN ESSENCE, THE BODY OF FIRE AND WATER, OF FATHER AND MOTHER.

Q. What are the various meanings of the term “fire” on the different planes of Kosmos?

A. Fire is the most mystic of all the five elements, as also the most divine. Therefore to give an explanation of its various meanings on our plane alone, leaving all the other planes entirely out of the question, would be much too arduous, in addition to its being entirely incomprehensible for the vast majority. Fire is the father of light, light the parent of heat and air (vital air). If the absolute deity can be referred to as Darkness or the Dark Fire, the light, its first progeny, is truly the first self-conscious god. For what is light in its primordial root but the world-illuminating and life-giving deity? Light is that, which from an abstraction has become a reality. No one has ever seen real or primordial light; what we see is only its broken rays or reflections, which become denser and less luminous as they descend into form and matter. Fire, therefore, is a term which comprehends ALL. Fire is the invisible deity, “the Father,” and the manifesting light is God “the Son,” and also the Sun. Fire—in the occult sense—is aether, and aether is born of motion, and motion is the eternal dark, invisible Fire. Light sets in motion and controls all in nature, from the highest primordial aether down to the tiniest molecule in Space. MOTION is eternal *per se*, and in the manifested Kosmos it is the Alpha and Omega of that which is called electricity, galvanism, magnetism, sensation—moral and physical—thought, and even life, on this plane. Thus fire, on our plane, is simply the manifestation of motion, or Life.

All cosmic phenomena were referred to by the Rosicrucians as “animated geometry.”

Every polar function is only a repetition of primeval polarity, said the Fire-Philosophers. For motion begets heat, and aether in motion is heat. When it slackens its motion, then cold is generated, for “cold is aether, in a latent condition.” Thus the principal states of nature are three positive and three negative, synthesized by the primeval light. The three negative states are

- [1] Darkness;
- [2] Cold;
- [3] Vacuum or Voidness.

The three positive are

- [1] Light (on our plane);
- [2] Heat;
- [3] All nature.

Thus Fire may be called the unity of the Universe. Pure cosmic fire (without, so to speak. fuel) is Deity in its universality; for cosmic fire, or heat which it calls forth, is every atom of matter in manifested nature. There is not a thing or a particle in the Universe which does not contain in it latent fire. (*Transactions of the Blavatsky Lodge*, p. 114-16)

The evolution and correlation of the mysteries of Kosmos, of its growth and development—spiritual and physical, abstract and concrete—were first recorded in geometrical changes of shape. Every Cosmogony began with a circle, a point, a triangle, and a cube, up to number 9, when it was synthesized by the first line and a circle—the Pythagorean mystic *Decade*, the sum of all, involving and expressing the mysteries of the entire Kosmos... (*The Secret Doctrine*, Vol. I, p. 321)

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### *Geometría Animado*

*Sloka* (6). LA RAÍZ DE LA VIDA SE ENCONTRABA EN TODA GOTTA DEL OCÉANO DE LA INMORTALIDAD (*Amrita*) Y EL OCÉANO ERA LUZ RADIANTE, LA CUAL ERA FUEGO, CALOR Y MOVIMIENTO. LA OSCURIDAD DESAPARECIÓ Y NO FUE MÁS; DESAPARECIÓ, EN SU PROPIA ESENCIA, EL CUERPO DE FUEGO Y AGUA O PADRE Y MADRE.

*Pregunta.* ¿Cuáles son los varios sentidos del término “fuego” en los diferentes planos del Kosmos?

*Respuesta* El fuego es el más místico de los cinco elementos y, también, es el más divino. Por lo tanto: dar una explicación de sus varios significados sólo en nuestro plano, omitiendo por completo todos los otros, sería muy difícil, además de ser totalmente incomprensible para la mayoría. El fuego es el padre de la luz, la luz es la progenitora del calor y del aire (aire vital). Si a la deidad absoluta se le puede llamar Oscuridad o Fuego Oscuro, la luz, su primera progenie, es, en verdad, el primer dios autoconsciente; ya que: ¿qué es la luz en su raíz primordial, si no la deidad que ilumina el mundo y que da la vida? Luz es eso que, desde una abstracción, se ha convertido en una realidad. Nadie, jamás, ha visto la luz real o primordial; lo que vemos son sólo sus rayos diferenciados o reflejos que se vuelven más densos y menos luminosos al descender en la forma y la materia. Entonces, Fuego es un término que lo incluye TODO. El Fuego es la deidad invisible, “el Padre” y la luz que se manifiesta es Dios, “el Hijo” y también el Sol. En el sentido oculto, el Fuego es el éter, el cual nace del movimiento y el movimiento es el Fuego eterno, oscuro e invisible. La Luz pone en marcha y controla todo en la naturaleza, desde ese éter más elevado primordial hasta la molécula más diminuta en el Espacio. El MOVIMIENTO es inherentemente eterno y, en el Kosmos manifestado, es alpha y omega de lo que llamamos elec-

tricidad, galvanismo, magnetismo, sensación, moral y física, pensamiento y hasta la vida, en este plano. Por ende: el Fuego, en nuestro plano, es simplemente la manifestación del movimiento o vida.

Los Rosacruces solían llamar a todos los fenómenos cósmicos como: “geometría animada.” Los Filósofos del Fuego decían que toda función polar era sólo una repetición de la polaridad primordial porque el movimiento engendra calor y el éter en movimiento es calor. Cuando relaja su movimiento produce el frío; ya que: “el frío es el éter en una condición latente.” Entonces: los estados principales de la naturaleza son tres positivos y tres negativos, sintetizados por la luz primordial. Los tres estados negativos son:

1. Oscuridad
2. Frío
3. Vacío

Los tres positivos son:

1. Luz (en nuestro plano)
2. Calor
3. Toda la naturaleza.

Por eso al Fuego se le puede llamar la unidad del Universo. El fuego cósmico (sin, por así decirlo, el combustible) es la Deidad en su universalidad; ya que el fuego cósmico o el calor que produce, es todo átomo de materia en la naturaleza manifestada. No existe una cosa ni una partícula en el Universo que no contenga el fuego latente. (Transacciones de la casa de campo de Blavatsky, p. 114-116)

La evolución y la correlación de los misterios de Kosmos, de su crecimiento y desarrollo — espirituales y físicos, abstractos y concretos — primero fueron registradas en cambios de la forma geométrica. Cada cosmogonía comenzó con un círculo, un punto, un triángulo, y un cubo, hasta el número 9, cuando fue sintetizado por la primera línea y un círculo — la *Década*, místico pitagórico la suma del todo, implicando y expresando los misterios del Kosmos entero... (La Doctrina Secreta Tomo II pag. 321)

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## POINT OUT THE WAY

### XXXIII

#### Chapter VII

#### III.—Intuition, Intellect and “Lighting Up” the Child

**Question:** — Mr. Judge states on p. 55 that intuition does not depend on reason. Why is it that those flashes of intuition seem to come from very deep thought on any subject? It would seem that intuition is the result of deep thought.

**Answer:**—As a matter of fact, if we observed a little more carefully, we should find that we do not get intuitions in deep thought — we get them after having indulged in deep thought. Deep thought is like a camera; the intuition is like the taking of a picture. The intuition does not come from the camera, but from the direction toward which the camera is pointed.. So, taking ourselves as Manas — the being, not the principle, the being in this form — isn't it clear that we stand between two worlds, the world of human self-consciousness and the world of beings which are not self-conscious but whose guiding light is the four lower principles more or less completely aroused?

It follows, then, that if we direct the eye of the mind — that is, our attention — towards the physical body or the astral body or the life energy or Kama or any combination of them, the picture that we shall get in our mind will be from below and we shall identify ourselves with the picture. But if, as the question suggested, we turn in deep thought, not to those pictures perceived by means of our senses or our astral body, and so on, but to the causal source from which these effects flow, then this same eye of the mind is turned towards the divine world, and the result is that we shall get some kind of pictures, impressions, ideas, flashes from that world. This constitutes our higher mind—those impressions, or intuitions, or the perception of principles, or reason regarded as the pure mathematics of the Soul. What is that power? The ability to see the relation existing or subsisting between one thing and another.

**Question:** — The use of the word “intellect” at the bottom of the paragraph on p.54 brings up a statement which Mr. Judge made in another place, that intellect will lead a man straight to hell because it is so cold, hard, selfish.

**Answer:**—Do we not see that intellect is used for the perception of the relation be-

tween cause and effect, the principle of relativity? Now, we can mathematically apply that power, our perception of cause and effect (the factors which produce any given result), just as well in figuring out how to destroy somebody's life as we can use it in figuring out how to save somebody's life.

Here is a man drowning. By the use of this principle in us, in its mundane aspect, we can say, "If such—and—such steps are taken, we can save that drowning man. We may perhaps even be able to resuscitate him after all signs of life have disappeared." Or we can take that same reason, here called "intellect," and say, "If we just put out a pole and hold it on top of that man's head and keep him under water for 10 minutes, he will drown." The same power—by one exercised wisely, creatively and preservatively; by the other, used destructively.

Mr. Judge knew, and we all know, that this power, unless used from a moral basis—that is, a humanitarian basis, an unselfish basis—is bound to be used from a selfish basis, a personal basis. Everything in nature comes down to one of two directions. So, then, whatever principle it is that we employ, if we do not employ it unselfishly we are bound to employ it selfishly. Does it not stand to reason, therefore, that the man who regards intellect, or the reasoning from cause to effect, as the very highest power of mind, knowing nothing of Self, knowing nothing of the principle of unity, knowing nothing of the real source and real purpose of all existence—is bound to use it for his own sake, for his own benefit? That is what is the matter with humanity all the time.

**Question:** — When the mindless man becomes a man, becomes aware of his own real nature, even in the smallest or most inaccurate way, does he then say, "Never was time when I was not?"

**Answer:**—Well, we say it, but when we were in the cradle we did not know that never was there a time when we were not. The knowledge was in us, but we weren't aware that it was in us. Perhaps many of these questions, including the famous one, "Were we ever animals?" can never be cleared up for any one of us. Actually, that stands to reason. If any other being whatsoever could do our work for us in the mental and moral and spiritual sense, it stands to reason that the Masters of Wisdom would have done it for all of us long ago. As a matter of fact, they can't. The Third Fundamental says that progress for man is absolutely by self-induced and self-devised efforts.

What is called "inorganic matter," by us is Life in a state of profound lethargy externally. When examined, it will be found that internally it is violently alive, that its particles are in a state of tremendous tension and oscillation within themselves. The analogy for this is in the mind of a man who may be sitting perfectly still; outwardly, he is in a state of profound lethargy but, internally, his mind is whirling at a tremendous speed, is in a state of high tension.

Then we have the beginnings of organic life. What is the essential difference, let us not say between a vegetable and a mineral, but between what we know as the vegetable kingdom and the mineral kingdom? In order to see what is the difference, we have first to see what there is in common. One is just as much Life as the other. To distinguish the primary form of life which has passed through the three elemental kingdoms and through the mineral kingdom, and is now in the vegetable kingdom, we have to invent a term. That term in Sanskrit is Jiva meaning a life. To put it in English, we can borrow the religious term and say, a soul or we can borrow a Theosophical term and call it a Monad. It simply means a primary, and therefore a simple and enduring, form of life.

Now this life is in the vegetable form. What does that mean? It means that two of its principles, which were there all the time potentially (all seven principles are there, but asleep), are now partially awake. Follow that same soul or Monad or primary form of life through into the animal kingdom, and what does that mean? That this same Monad now has three of its principles active and awake, and is only beginning dimly to be sensitive.

Next, we come into a kingdom no longer known to us, a kingdom here called that of the “mindless men,” who in The Secret Doctrine are called the “Lunar Pitris.” Here we have a form of life which is today no longer existing; it is human in form, but has no self-consciousness. If we called it simply an animal—that to—us—unknown being—we should think of it as a four—legged creature, perhaps with horns and a tail. But when the phrase “mindless man” or “human animal..” is used, it ought to arouse in us the conception that this form of life does not exist on this plane

What is the “mindless man”? There is the same primary consciousness with all four of the lower principles not only fully aroused and active, but combined into one principle. If we were using present—day Theosophical terms for it, we could call it the personality, the human being with out self—consciousness. We can see a very close counterpart of it in a little child—except that the race of the mindless had grown—up forms. In the case of the child, there is a human form, but actually the being is a “human animal”: it is a mindless human being, because there is no self-consciousness in the baby body.

What is that consciousness that has passed “through every elemental form of that Manvantara. . .first by natural impulse”? We need to think what that means. The Monad has risen to that point where its fifth principle can be waked up by those beings in whom the fifth, sixth and seventh principles are all awake. How is that ac-

complished? Well, H.P.B. once used the word metempsychosis which is the true word, but we are mostly materialists. So the people took the word reincarnation and she took it because they took it.

But if you turn to p. 128 in the Ocean Mr. Judge gives us the answer right there as to how this mindless man had his Fifth Principle waked up by his brother beings, the incarnating egos, so—called, in whom the fifth and sixth and seventh principles were awake in unison. The initial awakening is continued by the sure method, as Mr. Judge says, of mixture, amalgamation and precipitation—just exactly what goes on in a chemical laboratory every day with the chemical elements. The ingredients are put together, they are mixed, they are amalgamated, they are fused, until a new temporary element exists. Then, when that is precipitated, we—humanity, that is—have something we can use.

[TO BE CONTINUED]

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### **Traducción en español;de la pregunta y de la respuesta iniciales de *Señala el Camino***

**Pregunta:** -- El señor Judge nos informa en la pagina 55 que la intuición no depende de la razón. ¿Por-que es que esas destellos de intuición parecen venir de un pensamiento muy profundo en cualquier tema? Parecería que la intuición es el resultado de un pensamiento profundo.

**Respuesta:** — En realidad, si observamos cuidadosamente, encontraríamos que la intuición no viene de unpensamiento profundo — nos viene después de haber estado en una meditación profunda. La profundidad de un pensamiento es como una cámara; la intuición es como tomar el retrato. La intuición no viene de la cámara, sino de la dirección a la cuál la cámara está enfocada ¿Así que, tomandonos como Manas — el, ser, no el principio, el ser en esta forma — no es claro que estamos entre dos mundos, el mundo de la auto-consiencia

humana, y el mundo de seres sin autoconciencia, que son guiados por los cuatro principios inferiores casi completamente despiertos?

Nos indica, entonces, quasi dirigimos el ojo de la mente — o se nuestra atención — hacia el cuerpo físico o el cuerpo astral o la energía viva o Kama o cualquier combinación de estas, el retrato que obtendríamos en nuestra mente sería desde el fondo y nos identificaríamos con el retrato. Pero si, como la pregunta sugiere, nos concentramos en un profundo pensamiento, no en los retratos percividos por nuestros sentidos o nuestro cuerpo astral, y así sucesivamente, sino de la fuente casual de donde estos efectos fluyen, entonces este mismo ojo de la mente se vuelve hacia el mundo divino, y el resultado es que obtendríamos cierto tipo de retratos, impresiones, ideas, chispas de ese mundo. Esto constituye nuestra mente superior — esas impresiones, o intuiciones, o la percepción de principios, o razones consideradas como las matemáticas puras del alma. ¿Que es ese poder? La habilidad de ver la relación existente o subsistente entre una cosa y otra.



## THE COFFEE KLATCH

**Coffee Maker:** My, my, what a day, *Grapes of Wrath* must have been written in the summer with no shade trees in sight.

**Gray-flanneled Man:** Yes, bring me some ice, I'll be your first cooler customer. .

**New-Baked Theosophist:** (Whispering to the Coffee Maker) He said that last month! You have another "One Sentence Harry" on your hands! Well, cheer-up Coffee Maker, I will lighten your day with a story: .

### The Water Bearer

To All My Crackpot Friends

A water bearer in India had two large pots, each hung on the ends of a pole which he carried across his neck.

One of the pots had a crack in it, while the other pot as perfect and always delivered a full portion of water.

At the end of the long walk from the stream to the house, the cracked pot arrived only half full.

For a full two years this went on daily, with the bearer delivering only one and a half pots full of water to his house.

Of course, the perfect pot was proud of its accomplishments, perfect for which it was made.

But, the poor cracked pot was ashamed of its own imperfection, and miserable that it was able to accomplish only half of what it had been made to do.

After 2 years of what it perceived to be a bitter failure, it spoke to the water bearer one day by the stream.

"I am ashamed of myself, and I want to apologize to you. I have been able to deliver only half my load because this crack in my side causes water to leak out all the way back to your house. Because of my flaws, you have to do all of this work, and you don't get full value from your efforts."

The bearer said to the pot, "Did you notice that there were flowers only on your side of the path, but not on the other pot's side?"

That's because I have always known about your flaw, and I planted flower seeds on your side of the path. Every day as we walk back, you've watered them.

For two years I have been able to pick these beautiful flowers to decorate the table. Without you being just the way you are, there would not be this beauty to grace the house".

Each of us has our own unique flaws.  
We're all cracked pots.

But it's the cracks and flaws we each  
have that make our lives together so inter-  
esting and rewarding.

You've just got to take each person  
for what they are, and look for the good in  
them.

**Collected lady in the center booth:**  
New-Baked how could you come up  
with something so elegant! Yes, in  
someone's land we'll always fit in no  
matter how weird we appear down  
here. Even HPB said that the hullaba-  
loo crowd stared at her like she "was a  
monkey in red britches!"

## CORRESPONDENCE

Dear Jerome,

Thank you very much for your reply!

I quite agree with you, "this is not even  
veiled!"

It is not strange that Plato describes in 360 BC how  
to travel from Europe to America:

ἐκ δὲ τῶν νῆσων ἐπὶ τῆν κῆντικρὺ  
πῶς ἡπειρὸν τὴν περί τὸν ἀληθινὸν  
ἐκεῖνον πόντον

and from these (islands) you might pass to the  
whole of the opposite continent which surrounded  
the true ocean.

As you point out, it was known in those days that  
the earth was round, that it rotated, and was but a  
planet like any other of these celestial bodies.

Furthermore there are indications of trips to  
America from ancient times. Possible travelers are  
Odysseus and the Argonauts. There are also many  
findings today in the USA supporting the  
hypothesis that the ancient Greeks and other  
Europeans had traveled to the New World long  
before Columbus. The finds include coins, artifacts,  
tombs etc.

<http://oroblanco.freeyellow.com/coinridl.htm>

What is surprising is that none of Plato's analysts  
and researchers has ever spotted this. I haven't read  
any comments on this. It seems that they all  
concentrate on the Atlantis and they miss out this  
little bit of information.

It remains to be seen if this small finding will have  
any significance in the future research.

With best greetings from Athens,

Costas

Athens, GREECE

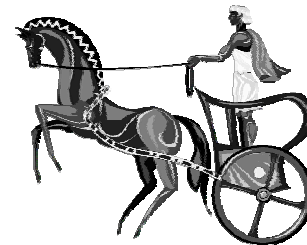
PS. Thank you for the interesting material that you sent  
me.

"The "old Romans" were Hellenes in a new ethnological  
disguise; and the still older Greeks the real blood ances-  
tors of the future Romans."

That's my opinion as well.

Did you know that between the 4<sup>th</sup> to 7<sup>th</sup> century the  
name Greek or Hellene was considered as an insult, the  
equivalent of idol worshiper?

Also in the 17<sup>th</sup> & 18<sup>th</sup> century Greeks were commonly  
called Romii.



## DNYANESHVARI

[The *Dnyaneshvari* is mentioned many times by Madame  
Blavatsky, always in glowing terms. The following  
rendition is extracted from Manu Subedar's translation.  
The great Sage, Dnaneshwara Maharaj sang this work to  
his people when he was quite young. He did it in their  
native language, Marathi, about 700 years ago. It is his  
commentary on the *Bhagavad Gita*.]

XXXII

CHAPTER TEN

**Shri Krishna says to Arjuna:** I will now  
mention to you the characteristics of a  
devotee (Bhakta), who has reached the  
realization of oneness.

I am the Creator of the universe and  
its sustenance is also through Me. Waves  
originate in water, they depend on water

and their life is through water. The only support from all points of view for the waves is nothing but water. In this way for the whole universe, there is no other support except My form. Realizing thus, that I am omnipresent, people worship Me with devotion and affection in all places. I am the same in all countries and at all times.

The wind moves in the sky and assumes the form of the sky. So the devotee, constantly thinking of Me, who am omnipresent, moves in this universe cheerfully. Remember, that he alone, knows the true knowledge of Self. He regards everything as My form and he secures union with Me through this devotion (Bhakti Yoga). Those, who are absorbed in Me with all their hearts, are conscious of life and death moving through the ocean of wisdom (Dnyana). Like adjacent lakes, joining one another, when they are full of water, so that the different waves of each other support each other, in the union of men of wisdom, waves of supreme joy meet one another. True knowledge of Self becomes an ornament of the true knowledge of Self, and their meeting is like the sun embracing the moon or two streams of equal magnitude joining one -another. In the overflow at their meeting place, where the unity of Brahman resides, the eight authorities (Bhavas), themselves are carried away.

The men with wisdom thus become the lords of the highways of discourse. They experience the supreme joy of Brahman and with the satisfaction of having attained. They shout with delight and troop out of the village in the form of the human body. The incantation (Mantra) consisting of one letter, that is ordinarily spoken of in private between the teacher and the disciple, is then declared by them as loudly as thunder in the clouds. Just as the bud of the lotus cannot conceal its scent after it has bloomed, but passes in on equally to the high and the low, so these devotees sing My praises and after deep devotion, they ultimately become unconscious of body and mind. They lose sight

of the day and night in the excess of their affection for Me and through the knowledge of Self, they experience supreme happiness. They are on their way to Me to receive the final fruits of their efforts. Before this path of the devotee, the choice of heaven and salvation itself fades. They already possess, whatever they are going to receive on account of their devotion. The only obligation, which then remains for Me towards them, is that I should increase their affection in the form of their devotion to Me and should take away from them the fear of death.

A fond mother runs after her child when it is playing, and prepares everything that the child requires as if it were a most important obligation. Similarly I have to support My devotees in their devotional activities. I encourage them cheerfully in the practices that they favor and by which they seek Me and come to join Me. The very affectionate devotees are so rare, that I begin to love their whole-hearted attention to Me. Those whose devotion is superficial, are rewarded in their path by two conditions – one of which is called Swarga (heaven) and the other is Moksha (salvation). Even for Shesha, the great serpent, and for Lakshmi, the goddess of wealth, I have given My physical body only. But the supreme joy of Self, which is superior to everything and free from any material connection has been reserved only for the exclusive devotees of mine. So close are they to Me, O Arjuna, that this is a topic, which I do not like to discuss. It is a matter only for experience and not for words.

[TO BE CONTINUED]

*Guest Editorial***THE EVOLUTION OF SPIRIT-MATTER**

“...man is a free agent during his stay on earth. He cannot escape his ruling Destiny...which from birth to death every man is weaving thread by thread around himself; and this destiny is guided either by the heavenly voice of the invisible prototype outside of us, or by the evil genius of our more intimate astral, or inner man.”

SD I 639

“It is on the right comprehension of the primeval Evolution of Spirit-Matter and its real essence that the student has to depend for the further elucidation in his mind of the Occult Cosmogony, and for the only sure clue which can guide his subsequent studies.” — Secret Doctrine I, 277

“It is the Spiritual evolution of the inner, immortal man that forms the fundamental tenet in the Occult Sciences...the student has to believe:

- a) in the ONE Universal Life, independent of matter...and,
- b) in the individual intelligences that animate the various manifest-ations of this Principle.”

— SD I 634

**CONSCIOUSNESS** is the PERCEPTIVE power which is used by the Real Man, in its experiences on the 7 planes of Nature — using the 6 “principles” of its nature as a basis for making this contact, and it stores the memory of those experiences. This power gives each man-mind its independence.

But that **MEMORY** is not always available to the Mind (Lower-Manas) when embodied in our personalities and also, the visible physical bodies we now live in as waking consciousness. This makes the progress we seek (in the here and now) to become a process of purifying the nature of the psychic impressions we have imposed on living matter (skandhas) that we have drawn together to make up these bodies of ours.

The MONAD (in itself) is unaffected. But it draws SKANDHAS (or Monads of lesser experience around it and to it) They “hook up to it.” They choose it to be the center of their progress<sup>1</sup>. They form the highest and best vehicle for it to begin to manifest CONSCIOUSLY on the lower planes of MANIFESTATION -- of which there are the 7 we know (both in Nature and in Man). “The Monads are the Souls of the Atoms, both are the fabric in which the Chohans (Dhyanis, gods) clothe themselves when a form is needed.” — SD I 619.

To be brief we call the MONAD when it is the mineral stage the “MINERAL-MONAD.” When it is in the animal stage of its evolution, we call it the “ANIMAL-MONAD.” And when it finally reaches the Human stage, we call it the “HUMAN-MONAD.”<sup>2</sup>

[Extracts from material contributed by DTB]

<sup>1</sup> Hence the sacramental phrase: “To the earnest Disciple his Teacher takes the place of Father and Mother.” Or this from the *Voice*: “So the collective mind of Lanoo Shravakas, they have to be attuned to the Upadhyaya’s Mind, one with the oversoul, or break away.” It is the Upadhyaya’s *attunement* that makes him a crucial bridge or pathway to birth on a higher plane for the disciple.

<sup>2</sup> Sometimes called the “three lettered Monad” because Atma-Buddhi-Manas are the human higher Triad. “It is those who have deserted the Superior Spheres, the Gods of **Will**, who complete the Manu of illusion. For the ‘Double Dragon’ has no hold upon the mere form. It is like the breeze where there is no tree or branch to receive and harbour it. It cannot affect the form where there is no agent of transmission (Manas, “Mind”) and the form knows it not.”

“In the highest worlds, the three are one, ¶ on Earth (at first) the one becomes two. They are like the two (side) lines of a triangle that has lost its bottom line—which is the third fire.” (Catechism Book III., sec. 9.) (vide SDII, 57)

*Buckminster Fuller On:*  
Life, Synergetics, and Geometry

**The Wellspring of Reality**

We are in an age that assumes the narrowing trends of specialization to be logical, natural, and desirable. Consequently, society expects all earnestly responsible communication to be crisply brief. Advancing science has now discovered that all the known cases of biological extinction have been caused by overspecialization, whose concentration of only selected genes sacrifices general adaptability. Thus the specialist's brief for pinpointing brevity is dubious. In the meantime, humanity has been deprived of comprehensive understanding. Specialization has bred feelings of isolation, futility, and confusion in individuals. It has also resulted in the individual's leaving responsibility for thinking and social action to others. Specialization breeds biases that ultimately aggregate as international and ideological discord, which, in turn, leads to war.

R. Buckminster Fuller, *Synergetics*

**CHILD AS EXPLORER**

**Awareness of the Child:** The simplest descriptions are those expressed by only one word. The one word alone that describes the experience "life" is "awareness." Awareness requires an otherness of which the observer can be aware. The communication of awareness is both subjective and objective, from passive to active, from otherness to self, from self to otherness.

Awareness = self + otherness

Awareness = observer + observed

Awareness is the otherness saying to the observer, "See Me." Awareness is the observer saying to self, "I see the otherness." Otherness induces awareness of self. Awareness is always otherness

inductive. The total complex of otherness is the environment.

Universe to each must be  
All that is, including me.  
Environment in turn must be  
All that is, excepting me.

R. Buckminster Fuller, *Synergetics*

Discoveries are uniquely regenerative to the explorer and are most powerful on those rare occasions when a generalized principle is discovered. When mind discovers a generalized principle permeating whole fields of special-case experiences, the discovered relationship is awesomely and elatingly beautiful to the discoverer personally, not only because to the best of his knowledge it has been heretofore unknown, but also because of the intuitively sensed potential of its effect upon knowledge and the consequently improved advantages accruing to humanity's survival and growth struggle in Universe. The stimulation is not that of the discoverer of a diamond, which is a physical entity that may be monopolized or exploited only to the owner's advantage. It is the realization that the newly discovered principle will provide spontaneous, common-sense logic engendering universal cooperation where, in many areas, only confusion and controversy had hitherto prevailed.

R. Buckminster Fuller, *Synergetics*

**ON GEOMETRY**

**Synergetics:** A metaphoric language for communicating experiences using geometric concepts.

Thinking is the tuning in/out of systems. Systems are spherical networks of interrelated points of interest. The density of points is a measure of a system's "frequency" — super high frequency systems approach sphericity.

The minimal system with the fewest possible points is a tetrahedron — four

points make a primitive volume with an inside and an outside. The canonical tetrahedron has a volume of one.

The tetrahedron may be sliced into 24 irregular tetrahedra (12 left handed, 12 right handed) called "A modules." The octahedron is comprised of 48 A and 48 B modules of equal volume = 4 x the volume of the tetrahedron. A and B modules may be used to assemble the cube (3 tetravolumes), rhombic dodecahedron (6 tetravolumes), and the Coupler (1 tetravolume). The Coupler, with the same volume as the tetrahedron (1), is an irregular octahedron that packs together to fill space without gaps.

Radiation is explosive outwardly while Gravitation is an implosive squeezing at 90 degrees to Radiation, i.e. is circumferential. Metaphysically, Gravity networks points of interest into systems of interrelated thoughts while Radiation drains away the sense of our systems and turns them into meaningless noise. Radiation is compression, Gravity is tension. Radiation is Entropy. Gravity is Love. Clearly this is not Physics but a more metaphorical language for communicating experiences using geometric concepts. This is Synergetics.

[Ed: I think Fuller's synergetics describes real physics. Though it is true as Kirby points out that Bucky's presentation is more "descriptive" than "hard" physics. I contend that because Fuller is "right on" in his description, it is up to us to find the "hard" physics interpretation behind his "metaphors."]

Synergetics originates in the assumption that dimension must be physical; that conceptuality is metaphysical and independent of size; and that a triangle is a triangle independent of size.

Since physical Universe is entirely energetic, all dimension must be energetic. Synergetics is **energetic geometry** since it

identifies energy with number. Energetic geometry employs 60-degree coordination because that is nature's way to closest-pack spheres.

### What is a tetrahedron (tetra), octahedron (octa), and an icosahedron (icosa)?

These are the three omni-triangulated, omni-symmetrical, stable, space structures in Universe. The tetra has 4 vertices (crossings), 6 edges (vectors) and 4 faces (openings). The octa has 6 crossings, 12 vectors, and 8 openings. The icosa has 12 crossings, 30 vectors, and 20 openings. The Greeks called these three figures "platonian solids." They are very important in synergetics.

For those interested in group theory, from a group theoretical perspective, we can view the symmetry groups of the tetrahedron and the octahedron as subgroups of the symmetry group of the icosahedron (with reflections included) - so that, in a sense, the tetrahedron and octahedron are "**children**" of the icosahedron.

### What is "synergy"?

"Synergy means behavior of whole systems unpredicted by the behavior of their parts taken separately.

"Synergy means behavior of integral, aggregate, whole systems unpredicted by behaviors of any of their components or subassemblies of their components taken separately from the whole." [From Blaine A. D'Amico.]

Fuller's clearest example of "behavior of whole systems unpredicted by the behavior of the parts" is mass attraction. The Earth and the Moon maintain their relationship through an interattraction of their respective masses. This mass attraction (gravity being a special case of mass attraction) is a

function of the mass of the two bodies AND THEIR DISTANCE FROM ONE ANOTHER. The scientific law governing this attraction states that if you halve the distance between the two bodies you quadruple the attraction and vice-versa (*i.e.*, double the distance and the attraction is 1/4 the original). This generalized principle (the law of mass attraction) is a synergy because if either body is considered separately there is no attractive force to examine. The law of mass attraction is mathematically exact and exists only as a function of the whole system. It is therefore a Synergy.

The following quote comes from Hugh Kenner's book *Bucky: A Guided tour of Buckminster Fuller*, c.1973

"...What are we to make, for instance, of Alexander Graham Bell's infatuation about the tetrahedron?"

"About two years after little Bucky's adventure with the toothpicks and the peas, the veteran inventor of telephony perceived in the tetrahedron a figure of singular virtue. It is the three-dimensional equivalent of the triangle, holding its form with invincible tenacity. It is the minimum space enclosure, with four identical sides nothing simpler can be envisaged. Having of all space enclosures the maximum structure in proportion to its content, it has therefore the maximum attainable strength. Bell's mind moved to performance per pound and to aeronautics, and in the very summer before the Wrights flew he wrote in his son-in-law's National Geographic of the virtues of a tetrahedral configuration in kites. Such a kite will not easily lose lift, and Bell's idea that the future of aeronautics lay in a design which wouldn't tend to kill the pilot in case of a stall led him to hundreds of experiments with kites composed of many tetrahedral cells, as many as 1300.

"In 1905, such a kite powered by a feeble breeze, lifted a man some thirty feet into the air ....

"...He did erect, on his Nova Scotia island, a tetrahedral tower, its seventy-two foot legs meeting tripod fashion five stories above the ground. Each leg was subdivided into four-foot tetrahedral cells of half-inch pipe, and each cell could support two tons without signs of distress. Bell had effected about 1907 one of the periodical rediscoveries of the oc-tet configuration Bucky stumbled onto in kindergarten, and moreover has used it in a practical structure. He seems not to have applied for a patent and the tetrahedral tower was dismantled after a decade. Bucky had very possibly never heard of it when he came upon the principle yet again during his geometrical work of the 1940's and wrote to his patent lawyer."

### What is the "vector equilibrium" (VE)?

"The geometrical model of energy configurations in synergetics is developed from a symmetrical cluster of spheres, in which each sphere is a model of a field of energy all of whose forces tend to coordinate themselves, shuntingly or pulsatively, and only momentarily in positive or negative asymmetrical patterns relative to, but never congruent with, the eternality of the vector equilibrium. The vectors connecting the centers of the adjacent spheres are identical in length and angular relationship. The forces of the field of energy represented by each sphere interoscillate through the symmetry of equilibrium to various asymmetries, never pausing at equilibrium. The vector equilibrium itself is only a referential pattern of conceptual relationships at which nature never pauses."

Although the discovery of the geometrical basis for all of nature's designs

was published by Fuller over 30 years ago, "modern" science & society still does not seem to be aware of this monumental achievement!

All of the physical universe is made out of ENERGY either radiant or tied up in knots called atoms.

Energy can not stand still; energy is always in motion; therefore, energy is always moving in some DIRECTION

[Dedication of Buckminster Fuller's two-volume work: *Synergy*]

THIS WORK IS DEDICATED TO  
H. S. M. COXETER  
PROFESSOR OF MATHEMATICS  
UNIVERSITY OF TORONTO

To me no experience of childhood so reinforced self-confidence in one's own exploratory faculties as did geometry. Its inspiring effectiveness in winnowing out and evaluating a plurality of previously unknowns from a few given knowns, and its elegance of proof lead to the further discovery and comprehension of a grand strategy for all problem solving. By virtue of his extraordinary life's work in mathematics, Dr. Coxeter is the geometer of our bestirring twentieth century, the spontaneously acclaimed terrestrial curator of the historical inventory of the science of pattern analysis. I dedicate this work with particular esteem for him and in thanks to all the geometers of all time whose importance to humanity he epitomizes.

[There are numerous sites working with the Buckminster Fuller material. Most of the above material comes from:

<http://www.rwgrayprojects.com/synergetics/toc/toc.html>

*Roger Penrose on*

## Consciousness

["In his book *Shadows of the Mind*, Roger Penrose suggests that deep problems in artificial intelligence, physics, and the philosophy of mind are closely connected. He presents a detailed argument, using Gödel's theorem, for the conclusion that human thought cannot be simulated by any computation. This leads him to the conclusion that physics is non-computable, and he presents suggestions about how noncomputability may enter into a theory of quantum gravity. Finally, he argues that this may take effect at the level of the mind through quantum collapse processes in microtubules — protein structures found in the skeleton of a neuron.

In this symposium, nine researchers in computer science, philosophy, psychology, mathematics, and molecular biology address Penrose's positions at some length, concentrating on his Gödelian arguments against artificial intelligence and on his proposal that quantum processes in microtubules are essential to the functioning of the mind. The commentaries are followed by a [reply by Penrose](#)." {David Chalmers, editor of *PSYCHE, an interdisciplinary Journal of Research on Consciousness*}

We have used fragments of the reply by Penrose; the entire set of papers may be viewed at: <http://psyche.cs.monash.edu.au/psyche-index-v2.html> ]

### How Could Physics Actually Help?

Several commentators (Baars, Chalmers, Feferman, Maudlin) question the competence of *any* physical theory ever having anything of importance to say about mind, consciousness, qualia, etc. and Klein asks for clarification on this issue. According to Feferman, for example, my attempts to push the consciousness discussion in the direction of physics would merely be to replace one "nothing but" theory with another, *i.e.* to replace "the conscious mind is nothing but a computer" with "the conscious mind is nothing but sub-atomic physics". Other commentators, in effect, express similar worries. In fact, to describe things in the aforementioned way is rather to **miss the point** of what I am trying to say. I certainly do not expect to find any answers in sub-atomic physics, for example. What I am arguing for is a

*radical upheaval* in the very basis of physical theory.

In most respects, this upheaval would have to have no observable effects, however. This might seem odd, but we have an important precedent. Einstein's general relativity, as regards most (indeed, almost all) of its observational consequences, is identical with Newton's theory of gravity. Yet, it indeed provided a radical upheaval in the very basis of physical theory. The concept of gravitational force is gone. The concept of a flat background Euclidean space is gone. The very fabric of space-time is warped, and the density of energy and momentum, in whatever form, directly influences the measure of this warping. The precise way in which the warping occurs describes gravity and tells us how matter is to move under its influence. Self-propagating ripples in this space-time fabric can occur, and carry away energy in a **mysterious non-local way**. Although for many years observational support for Einstein's theory was rather marginal, it can now be said that, in a clear-cut sense, Einstein's theory is confirmed to a precision of one part in one hundred million million — better than any other physical theory (see *Shadows*, Section 4.5).

What I am asking for is a revolution of (at least) similar proportions. It should represent as much of a change in our present-day ways of looking at quantum theory as general relativity represents a change from Newtonian theory. Some will argue, however, that even the profound changes that I have described above, which overturn the very basis of Newtonian physics, will do nothing to help us come to terms with the puzzle of mentality within such a physically determined universe. I do not deny the significance of that argument. But we do not yet know the very form that this new theory must take. It might have a character so different from that which we have become accustomed to in physical theory that mentality itself may not seem

so remote from its form and structure. Moreover, quite apart from any considerations of mentality, there are, in my opinion, very powerful reasons coming from within physics itself for believing that such a revolution is necessary.

Einstein's theory was to do with the issue of how to describe the phenomenon of gravity — in its action in guiding the planets and the stars and the galaxies, and in the shaping of the large-scale structure of the universe. These phenomena do not directly relate to the processes which control the behaviour of our brains and which presumably actually underlie our mentality. What I am now asking for is a revolution that would operate at the very scales relevant to mental processes. Yet I am also arguing that the physical revolution we seek should actually be dependent upon the particular revolutionary changes that Einstein's theory already represented from the older Newtonian ideas about the nature of reality.

I know that this puzzles many people; in fact, it puzzles many *physicists* that I should seriously attempt to claim such a thing. For the scales at which gravitational interactions reign seem totally different from those which operate in the brain. A few words of explanation may well be helpful at this juncture. I am certainly not asking that gravitational interactions (or "forces") should have any significance for the physical processes that are going on in the brain. The point is **quite a different one**. I am referring, instead, to the influences that Einstein's viewpoint with regard to gravity will have upon the very structure of quantum theory. Instead of quantum **superpositions** persisting for all time — as standard quantum theory would have us believe — such superpositions constitute a state which is **unstable** (see Penrose 1996). Moreover, this decay time can be computed, at least in certain very clear-cut situations. Yet, many physicists might well take the view that the time-scales, distance-scales, mass-scales, and energy-

scales that would arise in any framework that purports to embody the union of Einstein's general relativity with quantum theory must be hopelessly wrong. Indeed the relevant time-scale ( $\sim 10^{-43}$  seconds) is some twenty orders of magnitude shorter than the briefest processes that are considered to take place in particle physics; the relevant space-scale ( $\sim 10^{-13}$  cm) is some twenty orders of magnitude smaller than the diameter of a proton; the relevant mass-scale ( $\sim 10^{-5}$  grams) is about the mass of a flea, which seems much too big; and the relevant energy scale ( $\sim 10^{18}$  ergs) is about what would be released in the explosion of a can of petrol. However, when one comes to examine the details, these figures conspire together (some being individually too small but others correspondingly too big) to produce an effect that is indeed of an eminently appropriate magnitude.

Again, many would argue that we shall still have come no closer to an understanding of mentality in physical terms. Perhaps, indeed, we will not have come a great deal closer. But I believe that some progress will have been made in an appropriate direction. The picture of quantum state reduction that this viewpoint is concerned with ("OR": objective state-reduction) involves the bifurcation and then selection of one out of several choices for the very shape of space-time. Moreover, there are fundamental issues arising here as to the nature of time and the apparent flow of time. I am not arguing that these issues will, in themselves, resolve the puzzles of human mentality. But I do claim that they could well point us in new directions of relevance to them, and this could change the very nature of the questions that the problems of mentality raise.

I think that people in AI<sup>1</sup>, and perhaps a good many philosophers also, have a tendency to underestimate the importance of the *specific* nature of the physical

laws that actually govern the behaviour of our universe. What reason do we really have to assume that mentality does not need these particular laws? Could consciousness arise in a world controlled by some arbitrarily chosen set of rules? Could it arise within the scope of John Conway's "game of life" (Gardner 1970, Poundstone 1985), for example, as Moravec (1988) has suggested? Although the Conway rules for a "toy universe" are ingenious, they do not have the subtle sophistication of Newtonian mechanics — whose sophistication people often take for granted. Yet despite the extraordinary fruitfulness of Newtonian ideas, even they cannot explain something so basic as the nature and stability of atoms. We need quantum theory for that. And even quantum theory does not fully account for the behaviour of atoms, because its explanations require that curious hybrid of procedures of unitary (Schroedinger) evolution and quantum state-vector reduction (denoted in *Shadows* by U and R, respectively) — procedures which are not really consistent with one another, I claim. Eventually, in order to explain even the stability and the specific nature of atoms, we shall need a better theory of physics than we have today, at the *fundamental* level.

There is no doubt that physics — and often the very detailed nature of the specific underlying physical laws — is essential to most of the sophisticated behaviour of the world we know. So why should the most sophisticated behaviour that we know of in the world, namely that of conscious living human beings, not also depend on the very detailed nature of those laws? As I have indicated above, we do not yet know the full nature of these laws, even in some of their most basic respects. A new theory is needed quite independently of any necessity for new laws to describe a universe that can support consciousness. However, physicists themselves often get carried away into thinking that they know everything that is needed — in principle, at

<sup>1</sup> i.e., those studying Artificial Intelligence.

least — for the behaviour of all things of relevance. There is a curious irony, here, in McDermott's quoting from *Shadows* p.373 "It is only the arrogance of the present age that leads so many to believe that we now know all the basic principles that can underlie all the subtleties of biological action." For he takes that remark to be aimed primarily at the AI community. In fact, the people I had primarily in mind were the (theoretical) *physicists*. I do not blame the biologists, or even AI researchers, when they take from the physicists a picture of the world commonly claimed to be almost final — bar some technical details that are irrelevant for the behaviour of macroscopic objects. But perhaps McDermott is right; some AI researchers seem to be nearly as arrogant as high-energy physicists (and with far less reason) — especially those AI researchers who claim that the deepest mystery of the physical world can be answered without any reference to the actual laws that govern that world!

I should make it clear, however, that I am certainly making no claim that the mystery of mentality can be resolved *merely* by finding the correct physical theory. I am sure that there are vital insights to be gained from psychology as well as from neuro-physiology and other aspects of biology. Baars seems to think that I am denying the existence of the *unconscious*, because there is no significant mention of it in *Shadows* (though there was some small reference to the unconscious mind in *The Emperor's New Mind*). I should like to reassure Baars that I fully accept both the existence of the unconscious and its importance to human behaviour. The only reason that the unconscious was not discussed in *Shadows* was that I had no contribution to make on the subject. I was concerned with the issue of *consciousness* directly, in particular in relation to the quality of understanding. However, I certainly agree that a complete picture cannot be obtained without the proper role of un-

conscious mentality being appreciated also.

It appears that some people, on reading the section entitled "Contact with Plato's World" in Chapter 10 of *The Emperor's New Mind*, have picked up the curious view that I believe that mathematicians obtain their mathematical knowledge by use of some direct mystical quality not possessed by ordinary mortals (see Grush and Churchland 1995, for example), and even that I may be claiming for myself a particularly unique such quality! This is a complete misreading of what I had intended in that section; for I was simply trying to find some explanation of the fact that different mathematicians can communicate a mathematical truth from one to another even though their modes of thinking may be totally dissimilar. I was arguing merely that the mathematical truth that each mathematician may be groping for are "external" to each of them — these truths being "inhabitants of Plato's timeless world." I was certainly not arguing for a fundamentally *particular* quality of "direct Platonic contact" to be possessed only by certain individuals. I was referring simply to the general qualities of "understanding" (or "insight") which are in principle available to all thinking individuals (though they may perhaps come somewhat more *easily* to some individuals than to others). These qualities are not mystical — but as Godel's theorem shows, there is indeed something rather mysterious about them.

Roger Penrose  
 "Beyond the Doubting of a Shadow"  
*Psyche*, Jan. 23, 1996



## BRANE THEORY ALTERS PHYSICS BIG PICTURE

Is the world we see trapped on a thin membrane separating us from vast other realms? Some scientists say that would explain a lot.

Plato considered it first.

What if everything we hold dear is but a thin slice of some larger, unreachable reality, like a flickering shadow cast on the craggy wall of a cave? What if the moon and stars, you home, your thoughts, your cat, are but projections on this wall—mere suggestions of unfathomable realms beyond.

In the last few years, a mathematically rigorous version of Plato's 2,000 year-old thought experiment has been re-fashioning the way physicists think about everything from sub-atomic particles to the Big Bang. The universe we see according to this scenario, is stuck on a thin membrane of space-time embedded in a much larger cosmos. And our membrane may be only one of many, all of which may warp, wiggle, connect and collide with one another in as many as 10 dimensions. Physicists call this new frontier the "brane world."

The idea could help solve a long list of outstanding mysteries. Among them: What is the "dark matter" that seems to make up 90% of the universe? And Why is gravity trillions of times weaker than electromagnetism?

The revolution was set off in the mid-1990s when UC Santa Barbara physicist Joe Polchinski determined through mathematics that branes were a surface to which things attach, like hair to skin—except the "things" in this case were the minuscule "strings" that may well be the fundamental ingredients of the universe.

"I was just fiddling around with mathematics. Within a week or two [other

physicists] had done things with it I hadn't envisioned. It was like taking the stopper out of the dam. Things poured through.

Alan Guth of the Massachusetts Institute of Technology, creator of the currently accepted version of the Big Bang said recently he felt a little like Rip Van Winkle—picking up his head from a long sleep only to notice that the landscape of physics he thought he knew had suddenly, drastically, changed.

Stephen Hawking of the University of Cambridge, among others, envisions brane worlds bubbling up out of the void, giving rise to whole new universes. He ends his latest book, *The universe in a Nutshell*, with a call to explore this "brane new world."

One might well wonder why such a seemingly bizarre concept has attracted so many well-established physicists. The short answer is: desperation.

The laws of nature that describe the large-scale universe to an astonishing degree of precision (Einstein's general relativity) are incompatible with the laws that describe the small scale universe with the same astonishing exactness (quantum theory). This means either that one of these well-tested theories is wrong (all but inconceivable) or that there is some larger, more encompassing theory that somehow accommodates both.

To date, the only theory that comes close to marrying the two is "string theory"—a mathematically elegant set of ideas that has swept the world of physicists over the last few decades. According to string theory, the basic ingredients of the universe are not point-like particles but tiny strings vibrating in 10-dimensional space. Although still untested, string theory has scored a spectacular series of theoretical successes, earning it an ever-widening circle of admirers.

And yet string theory remains a realm apart from day-to-day physics — lovely to behold but innately aloof.

For one thing, the strings are so small that it would take a [huge particle accelerator larger than any accessible to most physicists to test.]

Brane models change all that. Unlike in string theory, the extra dimensions in brane worlds can be big, infinitely big. “It led to a whole new bunch of possibilities that could be experimentally tested,” said physicist Jim Cline of McGill University in Montreal.

What’s more, branes don’t require the full range of mathematical tools required for string theory, opening the door to new groups of scientists. “You can use methods that are part and parcel of more traditional physics.” Said Columbia University physicist Brian Greene. “So a person who’s not a string theorist can jump into the field and make contributions.”

This sense of promise was palpable last summer at the Aspen Center for Physics, where string theorists and cosmologists — the scientists who study the origin and structure of the universe — gathered for a workshop to explore links between the smallest scales in the universe and the largest. Brane scenarios popped up everywhere, enveloped in the thick fog of uncertainty that clouds the birth of new worlds.

The setting was strangely church-like. The faithful sat in rows under spires of white-barked aspens, their round leaves fluttering in the wind.

In front a maestro in sneakers tapped out symbols on a blackboard, chalk flying like fairy dust, black jeans covered in white handprints. There was lots of talk about the infinite; lots of recitation and response. Everyone strained to channel some larger reality through equations.

“Your bulk could contain many 3-branes,” one physicist said.

“The 9-branes could still annihilate.”

This was not your grandmother’s physics. There were no objects in the usual sense. No matter, no particles. Not even numbers. Only “instantons,” “alpha vacua” and multimulti-dimensional membranes wrapping around one another, traveling down throats of black holes and bouncing back, transformed.

Even to physicists, much of this seems unbearably strange. But in physics, strangeness comes with the territory. “When I first learned about quantum physics as an undergraduate, it just about destroyed my mind,” said Stanford post-doctoral fellow Stephen Alexander. “And now, 12 years later, it’s just tool.”

There’s actually nothing particularly new about the idea that space may extend into unseen dimensions, or even that the world we know is somehow trapped on a membrane.

Extra dimensions were such a hot topic in the 19<sup>th</sup> century that Victorian schoolmaster Edwin Abbott wrote a famous science fiction novel, *Flatland*, based on the notion that our limited perceptions prevented us from seeing worlds existing right in front of our three-dimensional noses. Albert Einstein made extra dimensions an integral part of physics when he used a fourth dimension, time, in his theory of relativity in 1905. Ten years later he showed that this interwoven fabric of space-time could warp under the influence of massive objects — “causing” the force we know as gravity.

Extra-dimensional membranes were kicking around in string theory since at least the mid-1980s but no one took them very seriously. One of the first suggestions that the world we know might be stuck to such a membrane appeared in a 1985 paper that was a parody of string theory titled

“The Super G-String” by V. Gates, et al., from the University of Cauliflower (actually, physicist Warren Siegel of State University of New York, Stony Brook). “It was based on a serious paper that was totally overlooked because it was before its time,” Polchinski said.

The branes playing such a large role in physics today are richer and more mathematically rigorous than early versions.

Essentially, a brane is a discontinuity in space-time, a boundary where things meet, like the surface of a pond where the water meets the sky.

“It’s a defect in the quantum fabric,” said Ruth Gregory of the University of Durham in Britain. One one side of the defect would be the vacuum of empty space. A vacuum with somewhat different properties might exist on the other side.

Imagine our brane as pond scum — a thin film that divides the air above from a deep (perhaps infinitely deep) body of water below. Most of what we experience is trapped in the scum. But beyond is a whole other world of currents swirling beneath the surface. Their motion might tug on our scum. We’d feel it as nothing but a gentle disturbance, never dreaming of what lurks below.

A brane doesn’t always divide one thing from another. It may just be a condensation of stuff, “a localized lump of energy and curvature that likes to hang together,” Stanford University physicist Steve Shenker said.

Either way, it’s a place where things get stuck — like the scum on the pond. “that was the revolution,” said Harvard University physicist Lisa Randall. “To realize that branes were honest-to-goodness objects.”

Randall played a pivotal roles in the revolution when she and Johns Hopkins University physicist Raman Sundrum real-

ized that branes could be infinitely large and yet remain invisible.

The reason: We can’t see anything outside our brane, because light can’t escape or enter it. We can’t hear anything outside, because sound travels through matter, and matter is stuck to our brane. We can’t use radioactivity to sense what’s beyond, or even break through with nuclear bombs, because nuclear forces are also firmly nailed to our brane. There could be a big blue elephant setting not a millimeter away in another dimension, but we wouldn’t know it’s there because everything we use to “see” is stuck to our brane.

Only gravity can’t be glued to a particular brane. Gravity, as Einstein revealed, is the curving of space-time itself, so it wanders willy nilly where it will, leaking off our brane into what physicists call “the bulk” — the rest of space-time.

Brane scenarios offer an elegant explanation for why gravity is such a weakling. Maybe it’s not any weaker than the other forces. Maybe it’s just concentrated somewhere else in the bulk, or on another brane.

Explaining the wimpiness of gravity is but a taste of what this Brane New World might do. Consider another embarrassing problem that has stumped astronomers for decades. At least 90% of the matter in the universe is AWOL. Or more precisely, it is known to exist because of its gravitational pull (without it, galaxies wouldn’t hold together) but can’t be detected by any other means. The standard approach has been to populate the universe with exotic new forms of matter, too elusive to be readily seen.

If our brane is but a small slice of a much larger cosmos, however, the “dark matter” might be nothing but ordinary matter trapped on another brane.

Such a shadow world, Hawking speculates, might contain “shadow human beings wondering about the mass that seems to be missing from their world.”

Or take the mystery of why elementary particles always appear in triplets, each set, heavier than the next.

One possibility is that each triplet is the same particle repeating itself on three layers of branes. They would have different masses on our brane for the same reason as shadows on a wall can be different sizes depending on the distance of the object that casts them.

“One of the neat things about the whole extra-dimensional idea,” Polchinski said, “is that all the physics that we see — all the kinds of particles and their detailed properties — are reflections of some inner geometry.

As in real estate, value depends on location, location, location.

The physicists most entranced with brane worlds are cosmologists. Over the last decade, a new array of telescopes and satellites has provided them with sophisticated tools for taking the measure of the universe. What was once little more than navel gazing is fast becoming a data-drenched science.

But cosmologists need string theory to understand the origin of the universe, because laws of physics break down at the tiny distances and immense gravity at play in the Big Bang. According to current theory, the universe sprang from an infinitely small speck of space-time known as a “singularity” — a paradox in the accepted laws of physics, which hold that nothing can be infinitely small.

“A singularity is a euphemism for ‘Things have gone haw-wire ... Things make no sense,’” said Greene, one of the coordinators of the Aspen workshop. “The Big Bang singularity is an ‘It doesn’t make

sense’ on the most important problem — namely, how did it all begin.”

Branes can enclose the Big Bang singularity like a sheet of cellophane — avoiding the problem of the infinitely small by giving the singularity some dimension.

Not surprisingly, the string cosmology connection that brane worlds brought about is also producing something of a culture clash. Until recently, string theorists have remained skeptical of the grand theories of cosmologists. String theory is mathematically rigorous. Cosmologists are a wilder bunch, willing to try out almost any model of the universe and see where it leads.

“We know how branes work,” said string theorist Nathan Seiberg of the Institute for Advanced Study in Princeton, N.J. “We know what are properties of branes, and what are not properties of branes. [Cosmologists] violate all the rules. Is this good or bad? I’m not sure. Because if they come up with something which violates the rules of string theory but does all sorts of other wonderful things, then maybe we in string theory will have a motivation to look into it.”

Branes already have brought a whole new zoo of exotic species into the world of physics. There are skinny branes and fat branes; empty branes and full; active and still.

“A brane which is wiggling a lot would translate to a brane that has excitations on it, particles on it,” said McGill’s Cline. That would be a brane with atoms, forces, [etc.]. ... branes could exist in every possible dimension. A string is a “1-brane” for one-dimensional object. Brane worlds (like the one we might live in) must by necessity be “3 plus 1” branes — three dimensions of space plus one of time. But you can just as easily have a pair of 10-dimensional branes bounding an 11-dimensional universe.

For now, no one knows whether the building blocks of the ultimate theory will be strings or branes. "You can't really say," Polchinski said, "It's kind of Zen-like, but in a very precise way."

Ultimately, brane worlds will stand or fall, like all science, on the twin tests of consistency and experiment. Whatever bizarre brane worlds may exist in some larger dimensional landscape, they can't change what we perceive. The stars can't slip off into hyperspace. The cat can't be disturbed be disturbed from the couch. Physics has to answer to nature as we know it.

Experimental evidence could come in the next decade from two very different realms. A new particle collider under construction in Europe could reach high enough energies to produce, say, a five dimensional "particle" of gravity — a tell-tale sign of brane worlds beyond. This particle might be detected as energy missing from a collision because it "leaks" into an extra dimension.

At the same time, cosmologists are figuring out ways to read the signature of extra dimensions in the microwaves that pervade space as the afterglow of the Big Bang: the effects would be subtle but detectable, with a new generation of satellites.

"We just have to keep hoping that nature will be kind," Cline said.

In the end, there's always the chance that all these ideas will turn out to be too, well, off the wall. "Who knows?" said University of Chicago physicist Sean Carroll. But even if brane worlds aren't real, Carroll said, "they will have taught us a useful lesson that we should have known all along, which is that we don't have a clue to what's going on."

Polchinski, for one, believes that branes are probably real, even though he isn't sure where the idea will lead. "It's

possible that nature doesn't work that way," he said. "But it's so rich with possibilities, if it's not good for this, it's probably good for something else."

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## REDUCTIONALISM: A SCIENTIFIC DOGMA

In the course of linear and empirical thinking the scientific community bases all of its beliefs and conclusive facts upon empirical logic, conjunctive speculation or reduction theories. The problem with this is that these so-called scientific facts are purely conceived on the premise that only physical, tangible and controllable evidence can be accepted and used as a valid hypothesis for anything. Such nescience (ignorance) and an irresponsible fundamentally erroneous technique of learning deny and attempt to negate all metaphysical or esoteric knowledge. From a metaphysical and theosophical perspective many scientific theorems - theories and principles appear contradictory to universal law and principal. Unfortunately, this gives evidence that some if not most of the great scientific minds of the world (past and present) are caught up in and deluded by the rhetoric of secular, empirical and strictly linear thinking.

An epidemic of this type of reasoning is found to be more prevalent in the studies of 'astro-physics', but flawed reasoning is characteristic of any science dealing with the origin, history and development of life, *e.g.*, anthropology, paleontology or ecology.

In the last hundred years phenomenal discoveries and understandings have evolved yet at the same time humanity is still in the stone-age as far as any real

causal knowledge and esoteric – metaphysical understanding is concerned. Mankind is still searching for and attempting to support a linear concept of time and space with a fixed, finite or definite point of origin. There is no better or more ludicrous example of this than the “Big Bang Theory” which postulates that a single, one time only stellar explosion is solely responsible for the origin of the entire Milky Way Cosmos.

The scientific community uses the terms universe, cosmos, and galaxy interchangeably without always adequately or clearly differentiating between the large scale omniprevalent Universe – macrocosm and the small scale cosmic universe – microcosm. The former use of the term follows its first definition of being the totality of all existing things as a whole. The latter use of the term universe adopts its second and third definition as being the world; a world (cosmos) or sphere in which something exists or prevails. Without an understanding of the literal and the figurative use of the term universe, astrophysics can seem confusing or at least misleading.

Man establishes and sets certain physical laws and at his whimsical convenience contradicts and/or denies those laws in an effort to substantiate erroneously based new found or preferred beliefs and theories. Point in fact being exemplified by the 1<sup>st</sup> law of thermodynamics which states that: “matter or energy can not be created nor destroyed but is merely transformed” now this is either true or it is not true, it cannot be both. In discussing the so-called origin of the cosmos or universe it can not be a truth applicable to the alleged inertia of matter and not be applicable to alleged active matter and vice-versa. On the atomic and sub-atomic level of matter, motion (as energetic or electromagnetic activity) is an inherent quality and character of all matter otherwise Albert Einstein’s proven and still valid “theory of relativity” ( $E=mc^2$ ) would be untrue.

Thus, through a pragmatic and scientific observation and from a philosophical and logical conclusion there can ultimately be no true material inertia. Inertia is defined as: “a state of matter having no inherent power of action, motion or resistance; the property of matter by which it retains its state of rest or its velocity along a straight line so long as it is not acted upon by an external force” - Webster’s Unabridged Dictionary. First, action-less-ness and motion-less-ness would constitute a static state of existence and modern and occult science refutes the old belief of there being the reality of a static Universe, matter or space. Second, modern science also realizes that in nature (matter) there are no truly straight lines. Thirdly, if scientifically and metaphysically speaking energy (force) is an omnipresent and omniprevalent reality, then ultimately and primordially how is there or what is a possible external force. It is understood that science often uses terms in a purely relative (empirical) and linear sense which may be opposed to the universal, metaphysical or cyclic context of the term and may also be out of sync with the literal semantic, lay or common use of a term. However, if or when the scientific community asserts a theory or hypothesizes by certain terms declaring a postulated fact to be an absolute and irrefutable truth, then by definition of those same terms that theory, hypothesis, postulation or truth should be able to withstand an honest challenge to its correctness.

The reputed early 20<sup>th</sup> century astrophysicist Fred Hoyle was the most noted and authoritative opponent and rebuttal of the “big bang theory”. Hoyle said that: “big bang fits an irrational process that can not be described in scientific terms” (alluding to it being a cyclic metaphysical phenomenon). In fact in his dismissal of a one time single (singularity) beginning of the cosmos he mockingly referred to it as the “big bang” which is a phrase that stuck and was later generally adopted as the term to describe what most astro-physicist hy-

pothesize to be the origin of the cosmos. Sadly enough the astute Stephen Hawking, a self proclaimed reductionist presently the worlds leading astro-physicist, and the strongest proponent of the 'big bang theory', appears to now have become a victim to the empirical and very linear school of reductionism joining the nescient ranks of most other (popular and accepted) physicist. 'Reductionism' is defined as: "the theory that every complex phenomenon can be explained by analyzing the simplest, most basic physical mechanisms that are in operation during the phenomenon; the practice of simplifying a complex idea, issue or condition to the point of minimizing, obscuring, or even distorting it" – Webster's Unabridged Dictionary. Reductionism is a common fallacy of empirical and linear thinking and is the seed of nescience and dogmatism.

According to Hawking's assumptions Einstein's 'theory of relativity' implies that the universe/cosmos must have begun with a 'big bang'. Hawking says that "the universe/cosmos could not have collapsed, bounced and then have expanded again." Einstein's 'relativity' implication Hawking refers to rests on the fact that matter does "equal energy" ( $E=mc^2$ ) and vise-versa and correctly attributes that there must be a point of initial or incipient activity, *i.e.*, a 'bang'. However, the fundamental correctness of this hypothesis does not make it a true singularity in the sense of being a unique *One Time Only* (never before or since) activity. In the cyclic everyday change phenomenon of nature, all things figuratively and literally collapse, bounce, and expand again. A 'singularity' is defined as: "the state, fact, or quality of being singular; a singular, unusual, or unique quality; peculiarity" – Websters Unabridged Dictionary.

The basic premise that the "big bang theory" is founded upon is a hypothesis by a mathematician named Roger Penrose. According to Penrose, when a large or massive enough star collapses it collapses

into what is called a 'black hole'. At the core of a black hole all the star's matter is crushed into a point of infinite density, called a singularity. Hawking adapted Penrose's process of this (alleged) singularity hypothesis and applied it in reverse to the whole universe, *i.e.*, the cosmos or small "universe" — microcosm, as astro-physicists customarily refer to the cosmos. In Hawking's adaptation the collapsing star was compared to the expanding universe/cosmos and metaphorically likened the universe/cosmos to similarly collapsing through reversing our sense of linear time. In this reversal of time a collapsing universe/cosmos must reach a point of singularity (a single and sole point of activity) then going back to an ordinary sense of time the 'big bang' origin of the universe/cosmos would have to be singular. The logic of this reversal scenario to its own contradiction merely affirms the cyclic nature of time, matter and energy. Again, a singularity is not the opposed factor here, but rather the rebuttal is to the theory that a so-called singularity is or ever was a One Time Only Creation phenomena. Relatively every cell, molecule or atom in the Universe is a single entity (a singularity) but in its ultimate and true nature it is but part of a dynamically infinite body of ceaseless and cyclically transforming matter and energy.

In 1948 the "*steady state*" theory a contradiction to the 'big bang' theory accepted that the universe/cosmos as expanding but correctly stated that as the galaxies were moving away from each other new galaxies were being formed contrary to an expanding universe's need to begin with a 'big bang'; but rather endlessly spreading generating more and more additional matter to fill the (alleged) voids. As you go back in time there is no increase in density and therefore no 'big bang'. There is merely a universe/cosmos that is expanding but which stays the same with its overall properties for all time; thereby being a universe not ever changing in its large scale (macrocosmic) structure.

Hubble had declared (partially correct) that: “the universe/cosmos contracts establishing an infinitely dense and infinitely extended moment and in that infinite density, unable to go beyond it, a moment marking the beginning of the cosmos – Creation, or ‘big bang’ takes place as the origin of all”. In truth the universe/cosmos expands and contracts (it figuratively breathes) but the contradictive problem with Hubble’s declaration is that true infinite density and an infinitely extended moment, being ‘*infinite*,’ denotes an unperceivable, incognizable and non placement point of beginning or ending; so, any incipient point of ‘Creation’, ‘big bang’ or other such singularity becomes mute, false, and void of meaning.

After fifteen hundred years of the ecclesiastical society following Ptolemy’s hypothesis that the Earth was the center of the universe/cosmos, and the correction of that by Copernicus, though still insisting on a literal ‘Creation theory’; it is convenient and suspicious that the ecclesiastical dogma and doctrine of a single, finite, One-Time “Creation” story (which historically set the stage for accepted science) again coincides with modern science. It would appear that once again the scientific community has been coerced and persuaded (doped) by the very powerful tentacles of the church. In this interest the Vatican openly established its own (hitherto covert) department of scientific research (*Pontifical Academy of Theology*) and through its diligent priest like George le Maitre successfully interpolated the scientific community and persuaded Einstein and Edward Hubble, along with many other of the worlds’ greatest scientific minds toward its views; conveniently marginalizing the illusionary yet professed and alleged division between church and the secular state. Einstein’s succession to the contraction expansion theories of le Maitre and the galactic observations of Hubble was an advance over his previously held staunch belief in a ‘static fixed universe’, but unfortunately that was not enough to

allow either of them to grasp or accept the truer expansion hypothesis of Hoyle. The coalescing of these three scientists, *i.e.*, le Maitre, Einstein and Hubble, established the basis for modern cosmology.

Conclusively, in a relative sense certainly there was and continues to be countless so-called ‘big bang’ origins. That which formed the Milky Way was just one in the course of myriads of single and simultaneous explosive galactic formations. Galaxies are constantly being formed as part of the ongoing cosmological process of an expanding universe/cosmos. To attribute any one particular galaxy with being separately conceived, unique, cosmologically unusual or having a special quality would amount to the same ludicrous medieval claim that a God only chose Earth as a Divine Creation or that the Earth is the center of the Universe. Thus, as it is with most things it all boils down to interpretative semantics and a *relative* versus *absolute* perspective. The principles of truth are multiple and relative and have no absolutes, but there is the Principle of an unknowable, omniprevalent and omnipresent *Absolute* into which all else dissolves; and that is the only real Singularity.

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The visible world is the invisible organization of energy.”

— Physicist Heinz Pagels