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editors@scienceandscientist.orgFor comments and questions write to
editors@scienceandscientist.org[Science and Scientist](#)[Sadhu Sanga](#)**SOUL AND ITS POTENT QUALITIES**

by

SriLa Bhakti Sundar Govinda Dev-Goswami Maharaja



The burning power of the sun is also present in the sun's rays. There are also seven primary colours in the sunlight. Similarly, as spiritual rays of the Lord, we are endowed with powers of thinking, feeling and willing. As the Lord is *Purna-cetana* or the Supreme Original Conscious Entity, we, the individual souls, are *anucetana*, or atomic particles of consciousness. In the *Svetasvatopanisad* the soul is described as being so subtle that it is invisible to the eye:

*balagra-sata-bhagasya sata-dha kalpitasya ca
bhago jivah sa vijneyae sa canantyaaya kalpate*

The tip of a hair divided ten thousand times is a general estimation of the subtle form of the *jiva*. So he is invisible. But despite his minuteness, his power is great. He resides in the deepest recesses of the heart in such a subtle form, and to date he has never been seen. Nowadays some scientists say they can photograph some hazy shadow aspect of the soul, but still they could not ascertain the infinitesimal form of the soul. As this body is a covering, the soul also has a covering as mentioned in the *Gita*:

*indriyani parany ahur indriyebhyah param manah
manasas tu para buddhir buddher yah paratas tu sah*

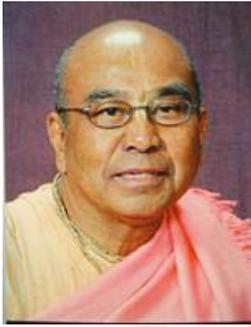
These are all more and more subtle coverings of the soul. More subtle than this bodily type of covering is the covering of the senses; more subtle than the senses is the covering made of the mind; more subtle than that is the intelligence; and more subtle still is the soul—*atma*. So the soul resides within so many layers of coverings, and its form is still unknown to us.

Still, even though the soul is infinitesimal in size, it is a particle of conscious life; and it eternally possesses the potent qualities of conscious life: thinking, feeling and willing. Anything having potency can act—whether with good or bad actions—and such potency of the soul is actually very great. A candle flame may be very tiny, but from such a tiny flame a gigantic fire can be ignited. From the tiny candle a larger candle can be ignited, and a larger one still; and the power of the large candle is of an equal nature to the small one. Their burning power is non-different. Similarly, the *Sat*, *Cit* and *Ananda*—the Potent Qualities of Eternal Existence, Consciousness and Ecstasy—found in the Original Form of the Supreme Lord are also found within the soul, who is a part (*amsa*) of the Lord.

INADEQUACY OF GENOMICS TO UNRAVEL LIFE'S MYSTERY

by

Srila Bhaktisvarupa Damodara Maharaja (T. D. Singh, Ph.D.)



Cloning and genetic engineering have raised many serious ethical questions and fierce debates among scientists, politicians and the general public. With profound implications for our health, the environment, the future of agriculture and the relationship between human societies and the rest of nature, today's genetic technologies have aroused worldwide attention.

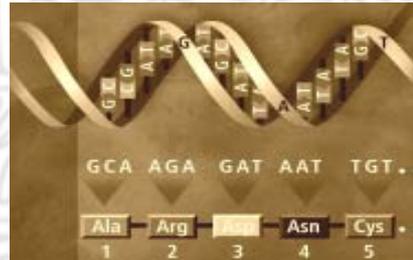
In recent years, scientists have observed that some genetic elements appear to jump around within a chromosome. There is sophisticated editing of genetic sequences, a wide range of hormonal effects, and numerous other phenomena that radically contradict simple, linear models of gene expression.¹ This is one reason why experiments in genetic engineering often yield wildly unpredictable results, such as the petunias whose color genes were doubled in the hope of producing brighter flowers, but instead yielded growing numbers of white flowers, or the pig engineered to produce a human growth hormone, which turned out so weak, arthritic and overweight that it could barely stand up.² Genetic engineers find it difficult to predict how a foreign strand of DNA from any organism will interact with the subtle genetic regulatory processes in a given cell.

A group of European scientists have even speculated that rapid spread of genetically engineered organisms in the environment may be one of the factors in the emergence of so many new, highly virulent disease pathogens in recent years, many of which are simultaneously resistant to several different antibiotics.³ Indeed, we have seen that genetically engineered crops harm beneficial insects such as ladybugs, lacewings and monarch butterflies, cross-pollinate at higher rates than their non-engineered counterparts, and are more susceptible to the effects of environmental stresses. The consumption of these foods has been associated with unusual allergies, irritations of the digestive tract, the uncontrolled spread of antibiotic resistance, and possible distortions in the growth and development of vital organs. The profound ethical implication of genetic engineering and other new biotechnologies have proved impossible to ignore.

Nobel Laureate biologist Marshall Nirenberg, who made a significant contribution in describing the genetic code, cautioned us well in advance: "Man may be able to program his own cells with synthetic information long before he'll be able to access adequately the long-term consequences of such alterations, long before he'll be able to formulate goals and long before he can resolve the ethical and moral problems which will be raised. When man becomes capable of instructing his own cells, he must refrain from doing so until he has sufficient wisdom to use this knowledge for the benefit of mankind. I state this problem well in advance of the need to resolve it because decisions concerning the application of this knowledge must ultimately be made by society and only an informed society can make such decisions wisely."⁴

Nevertheless, research continued. After the study of individual genes, researchers proceeded to the next step: the study of com-

plete genomes, soon referred to as genomics. Their aim was to determine the complete sequence of base pairs in all the DNA molecules of a particular organism. This sequence is the organism's genome ('ome' in Greek means 'all', 'every' or 'complete', thus genome means 'all genes' or *complete* genetic makeup of an organism).⁵ The smallest known genome for a free-living organism (a bacterium) contains about 600,000 DNA base pairs, while the human and mouse genomes have about 3 billion DNA base pairs.



Human Genome Project

In 1990, the Human Genome Project formally began as an international effort to sequence the entire genome of humans.⁶ In 1995, the genome of bacterium *Haemophilus influenzae* was produced and in 1998, the genome of first multicellular organism – 97 million base pairs of DNA sequence of the roundworm *Caenorhabditis elegans* – was published.⁷ In Feb 2001, Celera Genomics, the commercial sequencer led by J. Craig Venter, and the Human Genome Project consortium, the publicly funded group led by Francis S. Collins, announced their 'first drafts' of the human genome. The human genome project was completed in 2003.⁸ Can we now answer, what life is?

But researchers are in their next task -annotating the genes, determining each gene's role and how it interacts with other genes. The most serious impact of genomics may well be on how we view ourselves and each other. It requires our constant vigilance, lest we may lose sight of who we are, why we are here, what we wish to become and what the purpose of our life is.

Determining the structures of all of the gene products in a cell doesn't explain the lively workings of the cell. In the last 50 years, we have filled in huge details about living systems and can even manipulate their bodily structures in many astonishing ways. But we still do not know what life is. Even with the human code in hand, life's mystery seems far, faraway.

The Human Genome Project, though extremely useful, is related to only the physical aspect of a human person. It is inadequate to describe the complete human person since a person is far more than a mere collection of molecules or genes, however sophisticatedly organized. A person is much more than his genome.

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1. John Rennie, "DNA's New Twists," *Scientific American*, March 1993, pp.88-96.
2. Andrew Kimbrell, *The Human Body Shop: The Engineering and Marketing of Life*, San Francisco: Harper Collins, 1993, pp. 175-76.
3. Mae-Wan Ho, et. al., "Gene Technology and Gene Ecology of Infectious Diseases," *Microbial Ecology in Health and Disease*, Vol. 10, 1998, pp. 33-59.

4. Marshall Nirenberg, "Will Society be Prepared?" (editorial), *Science* 157 (1967): 633.
5. Human genome is contained in 23 pairs of chromosomes, which lie in the nucleus of every cell in the body. Each chromosome consists of a DNA double helix that is wrapped around spool-like proteins called histones. The DNA-histone complexes are then coiled and double-coiled to yield chromosomes. The ultimate aim of the Human Genome Project is to understand the proteins that are encoded by the DNA. When a gene is 'on,' the cell uses a process called transcription to copy the gene's DNA into a single-stranded molecule called messenger RNA (mRNA), which leaves the nucleus to associate with a series of large protein structures called ribosomes. The ribosomes then translate the mRNA into the chain of amino acids that make up the encoded protein. The new protein – here a receptor destined for the cell membrane – goes through several folding steps in a sequence that researchers are trying to understand.
6. Refer *Understanding the Genome*, compiled by George Olshevsky, New York, 2002; "The Human Genome", *Science*, 291:5507, Feb 16, 2001; *Science -Pathways of Discovery*, edited by Ivan Amato, New York, 2002, pp. 57-72; and www.ornl.gov/sci/techresources/Human_Genome/home.shtml
7. R. D. Fleischmann et al., "Whole-Genome Random Sequencing and Assembly of *Haemophilus influenzae* Rd," *Science* 1995, 269, 496-512; and "Genome Sequence of the Nematode *C. elegans*: A Platform for Investigating Biology," The *C. elegans* Sequencing Consortium, *Science* 282: 2012-2018 (1998).
8. Genomes data are publicly available and can be viewed at www.ncbi.nlm.nih.gov

THE CONCEPT — Part 3 (of 3)

by

Sripad Bhakti Madhava Puri Maharaja, Ph.D.

THE FALLACY OF THE "GIVEN"

The empiricist assumes or presumes that the object is already a "given" thing — in other words, that the "whatness" or properties of the thing are inherent in the thing before consciousness comes on the scene, so it is assumed that the subject makes no real contribution to the thing. As we have shown, the actual situation denies the validity of this presumption of the "given", and furthermore that it is a presumption or positing by the subject (or consciousness). In other words, **the "given" is posited by consciousness as not posited**, i.e. as "given." The empiricist is unconscious of this truth of the "given." We call this the "fallacy of the given."



Let us, therefore, look more closely at the situation of how the empirical "given" comes about. By articulating this process we are able to bring what is unconsciously assumed to consciousness, i.e. to actual knowing and truth.

First we have the apprehension of an indeterminate object, or the mere being of an object. Next we have the determination of the object as having particular qualities or properties. This determination is made by the subject. Simultaneously, the determinations are posited by consciousness as existing in the object, the correspondence of the subjective and objective determinations being called truth or the actuality of the thing. Thus thinking (determination) is essentially related to the actuality of the thing.

By positing the determinations of the subject or consciousness as being in the object, and by forgetting that consciousness has done this, we come to conceive that the object's determinations as a thing come from the thing itself. This "forgetting" is the negation of the positing activity of consciousness, or, what is the same thing, consciousness posits the positing as not posited, in other words, as "given."

Here we thus uncover the root of the empirical "fallacy of the given." But more than this, we also reveal the objective and subjective aspects that constitute the actuality of things, leading us to inquire into the relationship of these two opposed aspects.

The object appears to be a passive element in our considerations thus far. This passive element may be identified with the "matter"

or that which is simply there to be formed by an active agent. Thus we have the object as passive matter (with the potential to be formed) and the subject as the active agent that gives form to matter. Matter and Form never really exist independently of one another, although Aristotle seems to conceive the highest Form as the *noesis noesios* (thinking of thinking) as being a state devoid of matter, i.e. as pure actuality. However, Hegel shows that the "matter" in the thinking of thinking, viz. the object of thinking, is itself thinking — i.e. the "content" of thinking is thinking. But before we can understand how Hegel reaches this conclusion we have to further inquire into the nature of the object. Further consideration will also lead us to understand that referring to the object as mere being is not meant to identify being and object. Being and object are two different categories, but this can be clarified only in a detailed study of Hegel's "Science of Logic." It is important to know this, but this distinction will not be significant for our present purposes.

RELATION OF ENERGY (*ENERGIA*) TO WORK

The object, or matter, cannot be static, however, but must be changeable — since it goes from a formless to a formed condition, or from one form to another. The subject acts and the object changes, thus both change, the only difference is that the subject changes freely and spontaneously by its own will, while the object changes only by the influence of the subject upon it. The formative activity of the subject upon the object changes the object. This formative activity (which we also encountered in the Master-Servant section of the Phenomenology) is the "work" that the subject does on the object to change or negate its presented form.



Aristotle

By denoting the activity of the subject upon the object by the term "work" we can easily understand why Aristotle calls subjectivity "*energia*." Even modern science defines energy as a measure of "the ability to do work." Thus there is a connection between energy or *energia* and work, so that we now see why this comes directly into the conception of the subject-object relationship, or the form-matter relationship that Aristotle developed.

ENTELECHY AND THE ESSENTIAL TELEOLOGICAL PROCESS

The relationship that is involved here is not between two separable independently opposed elements - a "form" and a "matter," or a "subject" and an "object." These never exist as isolated from each other except in an abstract sense, i.e. each as a mere identity with itself. Thus the activity that relates one to the other is an essential part of their actual unity. Aristotle called this relational activity "entelechy," and the result of this activity was the 'actuality' (*energia*) of the object.

In order to understand the details of the entelechy, we have to remember that it is the subject that **causes** the object to change. The object (potentiality) thus changes in such a way as to conform to the formative activity or work of the subject. It is in this way that potentiality achieves its actuality or truth. The "cause" (*energia* or actuality) affecting the object to produce its actuality is therefore prior to the object. Actuality-as-cause and actuality-as-end are therefore two distinct phases that are yet both unified as true actuality giving us what is called a teleological process. We may note that this is an internal teleological process, one not directed toward some end external to the object itself.

It may also help to understand this as unmanifest actuality-as-cause, manifesting itself or appearing in the form of being. This may be compared to an architect's concept or blueprint before the actual construction work manifests the thought determinations or ideas of the architect. The thoughts or original ideas must be there first before they can become concretely manifest or actual through the work of construction. It is important to keep in mind that there are three distinct yet inseparable stages here: (1) the conceptual actuality or original idea, (2) the concrete or material actuality, which comes about as a result of (3) the formative work of construction.



Hegel

The object (potentiality, *dunamis*) becomes what it is in actuality (*energia*) due to (or, caused by) the unmanifest actuality (*energia*) working on the object (matter) to bring forth its manifest actuality. This whole process, as activity, is called the entelechy. In the word "entelechy" we have the root "telos" on which its connection with teleology is founded. We also have

to understand that **activity** or entelechy is different from the **actuality** or *energia* that produces that activity, although they are logically related through their common root, "act."

This is the same relation we have, for example, between the activity of seeing and the thing that is seen as a result of that activity, so that "seeing" and "seen" are different even though one is produced by the other. Generally we do not think of the thing seen as being produced by the activity of seeing, because, due to empirical thinking, we consider the "seen" as a given — a first. "Seeing" then comes as a secondary factor. This confusion arises on account of the "fallacy of the given" as described above.

Let us summarize the movement or activity of thought that is involved here.

1. Subjectivity (*energia*, form) works on or moulds the object (*dunamis*, matter).
2. The object responds to this influence caused by the *energia* and changes.
3. This activity of both *energia* and *dunamis* (or of the subject and object) is called entelechy.
4. Thus potentiality (*dunamis*) becomes actuality (*energia*)

through this activity (entelechy).

For example, we know that a child will become a man, because there is a natural tendency in children to develop or mature into what we call men. To say that the impulse or tendency to become a man is due to the archetypal form "Man" working within the child may not be wrong if we can logically and scientifically show how that occurs. Hegel takes up this task by demonstrating how the Concept and its objective content are dialectically related and ultimately identified through 'Spekulative' philosophy — also known as conceptual thinking.

NEGATIVE BEING

Let us now look at the Concept, an entity or subject-object unity or identity that we have before us as the new foundation of reality. If we begin our study with the immediate juxtaposition of subject and object, we note that subject and object are different types of being. Generally, two objects confronting each other have similar types of being, but when subject and object confront each other we have a very different situation. The subject has being as much as the object, but the being of the subject is negative compared to the positive being of the object. In fact, the subject is pure negativity, since it cannot be seen, touched, etc. — basically it cannot be detected by the senses, and therefore it cannot be measured or directly detected by any sensuous instrument. Thus we call it 'negative being' or 'pure negativity' as compared to positive being. Another way to understand negative being is as pure restlessness, unceasing movement or pure mediation. Positive being, in that case, is momentary being, i.e. merely an immediate moment of being when conceived as pure restlessness.

The subject can detect or experience its own existence, as well as its own activity (thinking). Its subjectivity as consciousness when directed toward itself is self-consciousness or "I." But these are all non-sensuous aspects of its being; they cannot be detected by the senses, although they can certainly be experienced by the subject in its own thinking. In addition, subjects can experience sensuous objects.

THE CONCEPT AS THE FOUNDATION OF SCIENCE

The primary misconception of modern science, and ordinary thought, is that the universe consists of material objects or things that have no relation to consciousness — things are presumed to be there even before human consciousness or Man appears on the scene. In fact, Man is assumed to evolve from such material things. What is lacking is a proper recognition of the fact that the things or objects of the universe already contain the thought determinations of Man before we may even refer to them. This error of positing the elements of the universe as not posited by thought is the fallacy of the given we mentioned previously. Science can no longer base itself upon this error if it is to make advancement in understanding the true nature of Man and the universe.

Hegel founds Science upon the Concept - the unity of an objective content, an abstract subjective concept, and the dialectical movement of which they consist and are related. This allows for a philosophy that explicitly accounts for more than just the objective aspect of experience. It does not do away with any of the advancements of modern science, but it does situate them in a broader perspective. By re-integrating Mind and Matter in a rational reality, thinking is freed from the bonds imposed upon it by materialism and empiricism, as well as the irrational philosophical assumptions they embody. This greater freedom allows Man to study the depths of his own spiritual nature with the complete backing of scientific justification it deserves.