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EDITORIAL

The Soul of Science

by Jason Ross

Today, science stands at a crossroads. Technological improvements continue, to a certain degree, but something is missing at the core. Just as we see a complete lack of political direction, of a future towards which we are moving, in the United States, so too is there a certain something missing in science. The question confronting us isn't one typically considered to be scientific, in the sense of regarding the empirical world outside us. There simply is no distinction to be made between the mind and the world beyond that it understands and acts on. That is, it were an error to believe that the world outside obeys deterministic natural laws which themselves have no requirements for existing besides internal consistency, excluding the requirement of purposefulness (or intention) that we apply to human ideas. Mind itself is excluded from science! Such an approach to the physical world leads to the twin problems of a belief in the existence of an empty (or topologically flat) space, and of the self-evidence of particles with self-determined principles of interaction, upon which larger phenomena are understood. We explore:

Examine biological evolution: at each major stage in the development of life, the current biosphere acted very much as a system in itself, open to the incoming radiation from the sun, but a complete system of activity in itself. Yet, when approached not from the timeframe of individual organisms, but rather from evolutionary time, we see not a system approaching a point of equilibrium, but one which continually reaches to higher states of equilibrium. By such measures as energy-density, the rate of biogenic flow of atoms, cephalization, and the increasing independence from the surrounding environment, including the move to land and more extreme climatic conditions, life has been on a march upwards. Towards what end do these different stages strive?

If we compare these evolutionary stages with the platforms of Man's mental and spiritual development, a similar, inescapable observation emerges: our relationship to the rest of nature has not remained fixed, but shows a series of developments which, in a purely biological context, would be understood as developments of new forms of life. We grew from using the power of our muscles, to that of animals drafted into our service, to the use of wind and flowing water to power machinery. Fire, a basic phenomenon of nature, became a tool for our species alone, and continues to be re-invented in higher forms: The fire of wood was outmatched by that of charcoal, then that of coal and coke, as well as petroleum, and the "fire" of the sub-atomic—the power of fission, fusion, and even matter-antimatter reactions. The biosphere itself is increasingly controlled, with plants developed to greater usefulness and caloric-density, irrigation channels built to irrigate land further from rivers, and, more recently, massive dams that shift and control great volumes of water, as well as microbes which are increasingly used as specific tools.

These developments have dramatically re-shaped the life of the human species. But, more importantly, the unique ability that makes these uniquely human endeavors possible—insight into the mind—has itself seen a great development, as an increasingly powerful force of nature in its own right. Unlike the evolution of the biosphere, however, human beings, endowed with free will, are able to decide not to advance. In this brief historical overview, we will watch the activity both of those who advanced human thought, and those who held it back.

The search for a grand unified theory stretches back millennia, but it is a quest which can never be completed. Contrast the sense of completeness of Plato and Aristotle, as evident not only in their explicitly scientific works, but by their means of communication as well. Plato's God does have a single composition of creation, but it need not be one that is completely comprehensible by Man. In his dialogues, Plato's Socrates comes to many more questions than conclusions, and frequently makes the overturning of false conclusions itself the intention of his discussions – as seen in, notably, his *Gorgias* and *Alcibiades*. In contrast, the didactic style of Aristotle created a system in which he was seen as an authority not of thinking, but rather of conclusions. Such a kind of authority means the end of science as a developing system, and indeed, the pace of discoveries under the hegemony of Aristotelianism was rather slow until the Renaissance.

The flourishing of science in the Renaissance developed, in particular, out of the important work of one man: Cardinal Nicolaus of Cusa, whose great works, such as *De Docta Ignorantia*, overthrew Aristotle as an authority in more ways than one. While Cusa challenged Aristotle's conclusions on such scientific concepts as astronomy and physics, he also posed a higher basis for truth in his division of understanding from the sensual, to the rational, to the intelligible, to God. His concept of the coincidence of opposites states that opposites in a lower level of understanding may actually be reconciled by a higher concept, in much the same way that Plato's Socrates demonstrated the approach to truth by being teased into a higher concept through the use of paradox. Cusa's "intelligible" concepts exceeded rational empirical trends in the way that later thinkers would come to consider physics as surpassing mathematics. From the simple point of Cusa's that no motion could be so perfectly circular as not to be susceptible of being yet more circular, he adduces the conclusion that the motion of the stars and planets cannot be circular, with the startling conclusion that *circularity itself cannot be a cause of motion*. If geometry itself cannot measure (or cause) physical motions, what can? Thus begins modern science.

With the new thoughts and discoveries of the Renaissance, as exemplified by such as Leonardo da Vinci, it became impossible to maintain Aristotle as an authority, since his conclusions about the natural world were seen to be so very wrong. The imperial enemies of human thought, seeking to continue to maintain a general control over people, and, naturally, needing a means of controlling their method of thinking, introduced a new concept, that of Sarpian empiricism. Under this outlook, the specific conclusions of Aristotle could be rejected, but a new sort of prison of the mind would be introduced. Under this form of empiricism, any experimental observation was fair game to be incorporated into new theories, but the basis of any such theories would be the modeling of observations: the direct conversion of data into trends, and thus "laws" of nature. The mind and intellect—necessity and cause (purpose) in the human sense—have no place here. Such curve-fitting was in keeping with the method of Claudius Ptolemy, who "saved appearances" with his geocentric planetary model, while not troubling himself with any cause of motion.

The first major, groundbreaking work of what can truly be called modern science was Johannes Kepler's great *Astronomia Nova*, which should have ended the curve-fitting approach of Sarpi once and for all. In this work, of unexaggerably great importance for the development of human thought, Kepler, in the Socratic approach of Cusa, demonstrated, unassailably, that the then-general approach of science, of fitting hypotheses to data inductively, was doomed to fail. This he showed in the motion of Mars, whose orbit defied explanation by the methods of his predecessors: looked at from one standpoint, one set of model parameters matched the orbit, but, from another viewpoint, a different set of parameters best fit. Kepler brought these opposing viewpoints into coincidence, by stepping on the head of mathematics to climb to the realm of physics, of true causes. His development of the elliptical orbits based on a universal physical cause, and his discovery, in his *Harmonice Mundi* of the unified intention behind the various eccentrities and orbital radii of the planets, put the human mind in the center of science; to qualify as a physical cause, a concept needed an inner *necessity*. In Kepler's words, a concept would have to answer the question: "Why is it so, rather than otherwise?" And such a concept would have to be a successful *discovery*—a resolution of an impossibility—a new thought!

We will not enter here into the domain of music, which, along with poetry, is of great importance to the practice of science, by affirming to the mind the existence of creativity *per se*, the development of new concepts.

Science as a Series

Looking back over science as a series of revolutions in thought, we can make conclusions about the practice of science itself. So far as any series of discoveries goes, it may be correct, but is always *incomplete*. That is, there are indeterminables: statements, which cannot be said to be certainly true or certainly false under the theory. In ancient times, such unknown forces may simply have been ascribed to "the gods" or to chance. This domain of the unknown took a new shape in the 20th Century, with the championing of probabilisitc quantum theory as a complete description of nature in the very small. Here, statistical indeterminateness itself is enshrined as a scientific truth, overstepping its bounds. Truly, indeterminateness is an indication that either there is more to know, or the domain of study is unduly restricted, excluding an "outside" factor of causative importance, as we shall see:

As the work of Simon Schnoll has shown, the supposed randomness of quantum phenomena is not actually entirely random. The periodicities he has observed show us that as we peer deeper, we find that there must necessarily exist principles of which we are yet unaware, that govern the behavior of particles on the quantum scale. But, returning to the mind, such higher principles would be necessary, even were it not for the work of such as Schnoll, Ephraim Fishback, and Jere Jenkins.[1] We see why:

Compare the human mind to the brain, by first comparing life to assemblages of physical-chemical components. Without doubt, it is true that living organisms are composed of the same elements as non-living matter, the same matter which spectroscopy shows to make up the stars. Yet, perhaps it is better said that living organisms can be *decomposed into such pieces*.[2] Yet, the ability to break living processes into recognizable abiotic pieces, does not mean that all of the characteristics of life can be understood by combining the characteristics of such abiotic components, *as such components are understood in isolation*. Anomalous characteristics of photosynthesis and the polarizing capabilities of DNA suggest that the *space* of life, the sorts of interactions possible in a living context, differ from abiotic space. Are the nuclear and chemical characteristics observable in non-living contexts the *only* characteristics of energy and matter? And, are those identifiable characteristics identical in the context of life? The answer must necessarily be: no.

The presence of these higher principles is the subject of this issue of *21st Century*.

In This Issue

The unique, higher phase-space of living processes, as demonstrated by the work of Vladimir Vernadsky, necessitates a higher dynamic "dimension," more degrees of freedom, than non-living processes. How do these higher dimensions, these existences between the cracks, express themselves? The translations, by Bill Jones and Meghan Rouillard, of two works by Vernadsky in this issue address the manner in which living processes distinguish themselves from the non-living, as well as the development of the "noösphere" out of the biosphere—the development of Man's reason as itself a physical force in nature.

Dr. Ernest Shapiro's article focuses on nuclear processes, and takes up the question of whether nuclear processes in biology are *unique*. Investigating the work of C. Louis Kervran, his follower Vladimir Vysotski, and others on elemental transmutation in life, Shapiro argues that there are aspects of the nature of the nucleus and nuclear processes that are unique to the biological context. In this case, the apparent body-temperature transmutation of elements in various organisms indicates that there is more to nuclear processes than we currently understand, and, indeed, possibly more than *could* be understood if our experiments are limited to the non-living apparatus typically assigned to such studies in the department of physics.

One may additionally ask: Are there unique aspects to biological processes in the human nervous system? Or, perhaps the seemingly random phenomena of the quantum world find reason in the human brain, in which there is necessarily neither pure randomness nor pure determinism, but rather a freedom, constrained by universal law, but not bound to any past sense of universality. Human creative reason requires a relatively non-determined substrate. Such studies of processes of physics or biology that are unique to the human nervous system, would be a fascinating follow-up to the work treated by Shapiro.

Also in this issue, Shawna Halevy takes us on a journey into the creatively functioning mind. Halevy leads us through Albert Einstein's thinking process, focusing in particular on the necessity of Classical music in his breakthroughs, and on the inability of a closed, deterministic, literal system to express true breakthroughs not in *what* we think, but truly addressing *how* we think. Such discoveries in science mirror the compositional challenges faced by an honest composer, poet, or playwright.

Shifting our attention from different phase spaces, to the topic of scale, we ask ourselves: what differences do we find between the biology of individual organisms, and that of the biosphere as a whole– and what differences do we find in biology considered in the timescale of individual organisms, and that seen in the multi-generational process of evolution? On such time scales are observed both a secular increase in measures such as metabolism rate, independence from environment, and cephalization, as well as a cyclical variation in biodiversity which appears to be tantalizingly correlated to other large-scale terrestrial and even galactic cycles. Jason Ross offers a short examination of both the failures of neo-Darwinism to account for the evolutionary history of life, and several possible means by which extra-terrestrial processes (such as cosmic radiation) can play a role in changing the phenotypic expressions of life here on earth.

Future issues will bring more on both Man's place in the cosmos (specifically, the scientific challenge of detecting and defending against asteroids and comets) and the breakthroughs of Vladimir Vernadsky (whose 150th birthday we celebrate in 2013) respecting the biosphere and the noösphere. It is certainly an exciting time to be alive!

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1. See reference in *Planetary Defense*, box 8. larouchepac.com/planetarydefense

2. The identification of the words that make up a poem, or the notes that make up music, does not mean that the poem or the musical piece is composed of these pieces, in the human sense of composition. A new concept requiring expression exists, whose transmission to other people is effected by the aid of a language of communication, including the non-literal use of metaphor.