

LETTERS TO THE MEMBERS



RUDOLF STEINER ON THE SCIENCES

"...one sees the embryonic life of a new human spirituality beneath the outer veils of scientific ways of thinking. This is and must be my opinion, based on objective study. Rightly understood, the path of science which humanity has taken in modern times is not a path of error but a true path. Rightly regarded, moreover, it bears within it the seed of a new spiritual knowledge and a new spiritual will."⁽¹⁾

"This is the impulse of Michael. Now that the Intelligence administered by him has come down to men, it is his impulse to lead men again to the point where they will read once more in the Book of Nature. The great Book of Nature will be opened again... The blundering, inadequate, and frequently repulsive attempts of modern science must be transmuted by a spiritual world-conception, till there arise from them a true reading of the Book of Nature."⁽²⁾

"Until our physics, our mechanics, the whole of external science, come to be permeated by the Christ impulse, science will not have reached its goal. Not only history should speak of the Mystery of Golgotha; men should also realize that since the Mystery of Golgotha natural phenomena have to be observed in such a way that Christ is known to be on the earth, whereas He was not on the earth before. A truly Christian science will not seek for atoms, not for atoms and their laws, nor for the conservation of matter and of energy; it will seek for the

revelation of Christ in all the phenomena of nature and these will thereby reveal to men their sacramental character."⁽³⁾

Now what will those beings [the progressive angels] teach who attained their goal in the old Egypto-Chaldean sphere of civilization, and who then learned to know the Christ? They will be able to instill into man other thoughts than those that assert that there are only material atoms; they will be able to teach that, even to the minutest particle of the world, the substance is permeated with the spirit of Christ. And, strange as it may seem, there will be in the future chemists and physicists who will not teach chemistry and physics as they are now taught under the influence of the backward Egypto-Chaldean spirits; but who will teach that 'matter is built up in the way in which the Christ gradually ordained it.' The Christ will be found working even in the very laws of chemistry and physics. It is a spiritual chemistry and spiritual physics that will come in the future."⁽⁴⁾

1. *Natural Science in the History of the World*, 24 December, 1922, trans. G.A. Kaufmann in *Anthroposophical Movement*, vol. VI, No. 29, 28 July 1929, p. 246.
2. *Karmic Relationships*, vol. III, lecture 9, 3 August 1924, p. 131.
3. *Three Streams in the Evolution of Mankind*, 13 October 1918, p. 122.
4. *The Spiritual Guidance of Man* (1911), p. 56.

THREE REALMS OF SCIENTIFIC WORK

by Arthur G. Zajonc

Above the central south portal of Chartres cathedral are the nine hierarchies, depicted as overlooking the judgment of human souls at the end of time. They stand rank upon rank in the archivolt surrounding the Christ, who is seated with arms upraised in the center of the tympanum. Beneath his feet is arrayed humanity filing to the left and right, to heaven and hell. The dead are raised from their graves and, if worthy, they are taken by the hand and invited to join the heavenly company of Angels, Archangels, Archai and all the heavenly hosts. At the far right the yawning jaws of the inferno open downward to receive the condemned. It, too, is an entryway to another kingdom, the kingdom of Satan descending in its depths as deep as the heavens ascend above them. Man stands poised between two worlds in the Gothic imagination, and the Christ, who shared in the life of man, is depicted in both.

The anthroposophical imagination is as vast in its scope as anything the Gothic cathedral builder could capture in stone and glass. In it, too, the cosmos is created and sustained by hierarchical beings that rank above and below man, beings who passed through their human

stages during the Saturn, Sun, or Moon phase of world evolution. Likewise, adversary beings—Lucifer, Ahriman, and the Asuras—relentlessly attempt to deflect us from a middle course. As we enact our evolutionary drama, we participate in three arenas that I will designate as the supersensible, sensible, and sub-sensible realms. The way in which we have related to each has changed over time, reflecting our evolving consciousness. As Rudolf Steiner has so often described, man has gradually come to penetrate the sense world with a thinking more and more connected to the physical body, and more recently has gone on to investigate the sub-sensible realms of electricity, magnetism, and nuclear forces.(1) The cost of that mastery has been the diminution and finally the loss of a consciousness suited to supersensible experience.(2)

With the dawn of the consciousness soul in the fifteenth century, natural science as we now know it was born. The accomplishments of ancient Greece and even the Middle Ages all pointed to a past, to the final glow of an Eastern spirituality and wisdom. In the birth of natural science there arose an impulse that pointed to the future. Nor was it to be understood as an aberration, for within it were and are to be seen the seeds of what will become spiritual science.(3)

Left to itself, the science of nature begun by Galileo, Descartes, Newton, and others quite naturally is threatened by the cold brilliance of Ahriman. It helps to remind oneself that Ahriman will play for humanity today a role similar to that played by Lucifer in the third millennium before Christ. We owe the gifts of the arts to Lucifer, the "bearer of light." The "gifts" of technology we owe to Ahriman. The time has now come when our attention as a civilization has been turned from light to darkness. One of the great tasks will be to find the courage to stand fully within that darkness, within the dragon's belly, with the light-filled consciousness of spiritual knowledge. The will to do just this arose at the same time as the birth of science, and has been quietly carried into earthly existence by a particular individual, Christian Rosenkretz, and his intimate disciples.(4)

Anthroposophy has brought that impulse onto the stage of external history. We know from Rudolf Steiner's autobiographical sketch that he had to wait for three scientific advances before presenting a modern Rosicrucianism to the public. The three discoveries were: 1) spectral analysis of the elements and especially of starlight leading to the conviction that the universe is entirely material throughout, 2) the theory of biological evolution and man's descent from the animal kingdom, and 3) the discovery of hypnosis. By the end of the nineteenth century these three discoveries had been made, and at the turning of the twentieth century Rudolf Steiner began lecturing and writing on what would become known as anthroposophy.(5)

What effects will the new Rosicrucian striving brought by Rudolf Steiner have on the sciences? How can the spiritual vistas opened up by anthroposophy act back upon the sciences that so dominate contemporary

thought? In addressing this question, the answers to which are many, I would like to use the division laid out initially between the three worlds: supersensible, sensible, and sub-sensible.

Modern Science

One aspect of the world is its material or physical nature, and it was in this domain that natural science first triumphed. The futility of battling materialism is based on the fact that, within its own domain, materialism is correct. However, when materialistic thinking oversteps its rightful bounds and attempts to explain other domains, real problems arise. In the eighteenth and nineteenth centuries, science took a further step in its evolutionary descent with the study of electricity and magnetism. In doing so, scientists began to probe what Rudolf Steiner calls the realms of the fallen ethers, and what I have been calling the sub-sensible. Yet when rightly used, the results of modern science, whether in the physical or sub-sensible domains, can be of great significance to the spiritual researcher.

In 1920 Rudolf Steiner collaborated with scientists in an attempt to create scientific research institutes grounded in anthroposophy.(6) In speaking about them, he said that the existing scientific literature, especially in America, is filled with the most interesting facts. He felt sure that, with the right kind of understanding, "magnificent results would be achieved," and that within these institutes "really important foundations could be laid for practical work."

What are the implications of these remarks for scientific work today? The "facts" of science are as interesting as ever, and their potential as the basis for spiritual research is surely as great. Every area of modern science is rich with possibilities for anthroposophical engagement. I can mention a few known to me as examples.

Foundational questions in quantum mechanics: During the last ten years a number of truly remarkable experiments have been done that realize in the laboratory what had only been a gleam in the eye of Neils Bohr and Albert Einstein. These experiments show in often very dramatic ways the fundamental difficulties in thinking about quantum phenomena using the language and concepts of classical physics. That is to say, the essentially mechanical concepts of classical physics work fine for material objects in our daily environment, but these concepts simply fail on the quantum level. One view, that of Bohr, is simply to give up understanding this range of phenomena in any usual sense. Others however, such as David Bohm, suggest that a new mode of thinking, and fundamentally new concepts are required. If one understands the quantum world as the fallen, sub-sensible image of the etheric (I believe of the life ether), then one should not be surprised that it displays a structure reflecting its origin, even at second-hand. Study of this domain is an example of one area ripe for anthroposophically-inspired research.(7)

Chaos and dissipative structures: For many decades scientists have been deeply puzzled by the apparent stability of very complex forms in nature from vortices to tress. Traditional thermodynamics would lead one to expect that all such structures would be short-lived, transient phenomena and that they would tend toward greater "entropy," that is toward greater disorder. Yet, beautiful, long-lived forms fill our environment. How do they arise and why do they persist? For the first time serious scientists in significant numbers are attempting to address these questions on both an experimental and a theoretical basis.

Scientists are also interested in the specific ways in which order changes to chaos. As it turns out, the "pathways" to chaos are themselves highly structured. All of this opens up a rich area for those interested in macroscopic phenomena from fluid flow to weather prediction. Prof. Ernst-August Miller, a director of the Max Planck Institute for Fluid-Flow Research, for example, is seriously interested in the study of chaos from an anthroposophical perspective. Denis Klocek's article approaches these issues from the standpoint of climatology.

~~Biochemistry of life: The U.S. government recently~~ funded a scientific project the scope of which rivals that of putting a man on the moon, namely the complete transcription of human DNA. Once finished, scientists feel that they will then be in a position to program into the human body any and all biological features desired. The ultimate goal of eugenics will thereby have been attained. We have arrived at the time of a second genesis of man, but now controlled by the hand of man himself. Yet, as Professor Seyhan Ege of the University of Michigan has pointed out at a recent meeting of the Society for Literature and Science, the very scientists now engaged in detailed microbiological research are stunned by the unexpected intricacies and subtle logic that even the simplest organisms display. As with many scientists engaged in quantum mechanics, these scientists feel that the very way we now think about organisms will have to change in a fundamental way. I feel here again that a thinking bound to the physical body cannot grasp what is essentially a life process grounded in the etheric. What is required is a new mobility of thought of the kind involved in Imaginative cognition.

Artificial Intelligence: The artificial intelligence (AI) debate has reached another *niveau* in the last several years. Major advances have been made especially with new developments in elaborate "connectionist" machines, the architecture of which is designed to mimic the neural networks of the human brain. With such advances, AI advocates now feel more confident than ever that during the next fifty years machines will be made that reach "human equivalency" for the price of today's personal computer. The distinguished robotics scientist from Carnegie-Mellon University, Hans Moravec, in his book *Mind Children*, predicts that biological evolution will shortly become obsolete and computer evolution will take

over. That is, we will transfer our minds to machines and continue to evolve as a species in that form, within the body of a robot. If this sounds like science fiction, please know that Moravec's book was published by Harvard University Press after scrupulous review by other computer scientists. As Joseph Weizenbaum recently said, it does not matter whether the scenario depicted will ever take place. What is important is whether we think it will, because we will act on that assumption now. Weizenbaum is only one of several computer scientists interested in anthroposophy who are attempting to meet the challenges of artificial intelligence head-on. There are others, for example, at IBM and the David Sarnoff Research Center equally concerned.

Understanding the nature of thinking, as AI researchers attempt to do, is a high goal. Yet, the question is a profoundly spiritual one, and requires the full range of spiritual capacities and concepts to address it. Thinking is profoundly connected to the etheric world and the human etheric body. Anthroposophical research can and should take its place in the debate on intelligence. Over against the machine intelligence of Moravec and others will then be placed the Cosmic Intelligence of Michael.

~~In each of these areas Ahriman provides one way of~~ understanding the data, a brilliant and captivating way in which every spiritual aspiration from self-development to immortality finds its perverse fulfillment. Who will provide the counterweight to him and achieve a truly moral way of understanding each of these areas?

Goethean Science

At the end of the nineteenth century, Rudolf Steiner edited Goethe's scientific writings. In them he found a bridge from the orthodox science of his day to what he would later develop as spiritual science. Scientific research that draws its inspiration from Goethe will certainly play an important part in the future of anthroposophically-based scientific research.

If the primary domain of modern scientific investigation is the physical and now even more the sub-sensible (atoms, electrons, etc.), then Goethean science brings us back to the full range of phenomena evident to the senses. Whether in the realm of color, botany, biology, meteorology, or geology, Goethe attended to phenomena on what the eminent biologist Adolf Portmann called the "decimeter scale." By working carefully—even meditatively—with phenomena over long periods of time, one comes to experience first-hand the formative powers that organize our world. Rather than find them codified in formulae, one comes gradually to see them in nature with new organs schooled in nature itself.

This has been an area of real achievement for anthroposophical scientists, with many impressive studies appearing by authors such as Wolfgang Schad, Jochen Bockemühl, Michael Wilson, and others. In *Orion* magazine many fine articles working in this direction can be found, and in this issue of the *Newsletter* Mark Riegner presents us with a fine example.

As I see it, the great value of Goethe's approach to the study of nature lies less in the hope of unearthing a new fact or datum, and more in the development of spiritual capacities. Through it we slowly learn to read in the Book of Nature—a modern Michaelic task according to Rudolf Steiner. What makes this possible in Goethean science is the continued presence within the phenomena of something usually shorn from them by orthodox scientific investigation, namely what is normally translated as the "moral" aspect of the phenomenon.

As Emerson wrote in his essay "Nature," every physical fact is the reverse side of a moral or spiritual fact. That is, if one attends fully to a phenomenon, then a soul-spiritual element moves between the world and man, a kind of soul dialogue develops. Then just as the "eyes are formed out of indifferent animal organs by the light and for the light" (Goethe), so too do new organs arise through the streaming of this soul substance. The organs so created are suited to experiencing the "moral" or soul aspects of our world. In this way, the first steps toward Imaginative cognition can be taken. Goetheanism is, then, a spiritual practice, one that can lead to real scientific insights.(8)

Spiritual Science

The investigation of the spiritual worlds properly belongs only to the qualified spiritual investigator. Only one who has attained to Inspirative cognition can understand the meaning of spiritual Imaginations. Only one fully initiated can speak with certainty concerning the results of spiritual-scientific investigation, and this Rudolf Steiner has done.

Yet, each of us can have moments of epiphany in which a small spiritual discovery is made, where we see more deeply into things, into our sufferings or the struggles of others. In fact, our lives continually call upon us to undertake spiritual research as best we can. If Waldorf teaching, for example, is to be more than a historical curiosity mimicking the work of those in Stuttgart in 1920, then every teacher must frame questions in response to the needs of his or her children and seek an answer at the deepest level they are able. Likewise in our study of nature we yearn for answers at the deepest imaginable spiritual level. The study of anthroposophy can act as a preparation for such research, a first step in spiritual practice, but the research itself requires patient meditative work with the problem in the hope that it will one day metamorphose into insight. When it does, then one has made gentle contact with spirit beings. For spiritual scientific research is ultimately a science of beings, not of occult forces. We come then to see ourselves, as in the Gothic imagination, as a being standing in relation to myriad other spiritual beings above, below, and around us whose past activities have shaped this universe, just as our own activities today will shape the future.

Anthroposophical scientific research in all three of these realms: supersensible, sensible, and sub-sensible, are of the greatest importance for our movement and, I

believe, for our times. Rudolf Steiner intended the School of Spiritual Science, through its various sections, to become the home for such research. The School was to have become quite naturally the well-spring from which new impulses would flow into all domains of life, cultural and practical. We are really only at the beginning of the task he put before us in the Christmas Foundation meeting when he refounded the Anthroposophical Society and established the School of Spiritual Science. One can be gratified that many scientists all over the world are responding to that call as best they are able.

It is said that at the Christmas foundation meeting Christian Rosenkreutz and the disciples of his supersensible school streamed into the hall to join in the renewal of the Anthroposophical Movement.(9) I feel this an apt imagination for the impulse anthroposophy can bring to natural science, one in which we can all be participants.

1. Rudolf Steiner, *The Michael Mystery*, the opening letters.
2. For further discussion, see my article "Light and Glass" in the *Journal for Anthroposophy*, Number 49, Summer 1989.
3. See the quotes at the opening of this issue.
4. See Rudolf Steiner, *Rosicrucianism and Modern Initiation*, lecture 6.
5. Robert McDermott, *The Essential Steiner* (San Francisco: Harper and Row, 1984) pp. 13-21.
6. See his lecture of 25 April 1920.
7. See my forthcoming article in *Gaia, a Way of Knowing*, vol. 2, edited by William Irwin Thompson, which describes an experiment on the foundations of quantum optics.
8. Rudolf Steiner, *The Boundaries of Natural Science*, lectures 7 and 8.
9. B.C.J. Lievegoed, *Mystery Streams in Europe and the New Mysteries*, p. 71.