

NATURAL SCIENCE AND THE MYSTICAL WORLD VIEW

Albert Hofmann

Which is true: the picture of reality that natural science presents us, or the one that the mystic experiences in visions? This question can only be asked by one who thinks that natural science and the mystical world view are mutually exclusive. But that is not the case. On the contrary, natural science and the mystical experience complete each other. To demonstrate that is the purpose of my exposition.

The subject of natural science is the material universe, of which our bodily selves are part. Research in natural science limits itself to the analysis and description of the external world that we can objectively identify with our senses, and to inquiry into the laws that govern it.

Such an objective view of nature presupposes a conscious splitting of one's experience of the world into subject and object. Such a dualistic experience of the world first emerged in Europe. This perspective was already apparent in the Judeo-Christian world view of God high on a throne above creation who commanded humanity to have dominion over nature. The natural sciences are a product of this European mind.

In the beginning of contemporary natural scientific research in the seventeenth century science was still largely related to religion. The scientist confronted nature as creation enlivened by the spirit of God. Kepler recognized the harmony of the world God created in the planetary laws; and in none of the old botanical treatises did the author forget to praise the creator for the wonders of the plant world.

A change of great consequence in the character of natural science took place after the revolutionary discoveries by Galileo and Newton. Research turned more exclusively towards the quantitative, measurable aspects of nature. The qualitative, holistic way of viewing nature, which Goethe defended

with his color theory, fell more and more into the background. The quantitative methods of natural research demanded increasingly more complicated and refined equipment for its surveys. Physics and chemistry, the disciplines dealing with the measurable aspects of nature, became more prominent. Physical and chemical methods also entered into other areas of natural science, into biology, botany and zoology.

The grand successes of the natural sciences, especially in the area of physics and chemistry, provided insight into the macrocosmos of the galaxies and into the microcosmos of the atoms. And most importantly, the practical use of the many inventions and discoveries that characterize our era further reinforces today's predominantly materialistic theory of life.

This led to an enormous overrating of the importance of chemistry and physics in the Creation. It needs to be recognized that the one-sided belief in the scientific world view is based on a grave error. All of its content is indeed true, but this content represents only one half of reality, only its material part. All physically and chemically incomprehensible, spiritual, dimensions of reality, to which the essential attributes of the living belong, are missing.

The objective here is not to question the validity of scientific perceptions or to diminish the value of quantitative natural research, but to point out its titanic one-sidedness.

Smaller and smaller components of atoms are thought to be the latest reality of our world. The epitome of a purely materialistic world view is the theory of Creation, according to which coincidence and necessity, by means of chemistry and physics, created the cosmos, including all living creatures and plants.

I would like to demonstrate the absurdity of such a theory with a metaphor: the construction of a house. Suppose all the material necessary for the construction of a house existed; the technology and the necessary energy were also at hand. Without the idea of an architect, without the design and its realization according to plan, a house would never be created, even if one would grant chance eons for this enterprise.

If this is true even for a house, which lacks the dimension of life, how much more does it hold true for the living universe, for every flower and insect? The absurdity of such theories about the origin of creation, even if they come from a Nobel Laureate natural scientist like Jacques Monod, is obvious.

In addition to the practical abuse of the knowledge of science, which led to mechanization, industrialization, and destruction of vast areas of life, is the spiritual damage of such nihilistic theories. They deprive life of its spiritual and religious basis and leave man lonely and insecure in a dead, mechanized world.

Nevertheless, the positive effects of natural science on the modern world outweigh the negative ones. I am not primarily thinking of the obviously practical achievements, the progress in medicine, hygiene, longevity, and all the comfort in our daily lives, including television, stereos, computers, and so forth – to which we must add at once that all these comfortable achievements only benefit a small part of the world population. The meaning of natural science in the history of mankind, its revolutionary sense, may lie in the way it has brought about expansion of human consciousness, yielding deeper insight into the essence of reality, the unity of all living beings, and in the belonging of man in the cosmos. As examples of such natural scientific understanding we have gained the following biochemical understandings.

Every higher organism, no matter if plant, animal or human being, has its origin in one single cell in the fertilized ovum. The smallest units of all living beings, from which all organisms originate, are the cells. The cells of plants, animals and human beings do not only show similar structures, but they also contain a widely similar chemical composition. Protein, carbohydrate, fat, phosphate, and so forth – these same classes of organic connections physically constitute plant and animal bodies. This uniformity of material composition is connected to the larger metabolistic and energetic cycle of all living beings, in which plants, animals, and humanity are united. The energy that keeps this cycle of life going comes from the sun. The plant, the green carpet of the plant world, is able to – in motherly receptiveness – absorb light as immaterial energy flow and store it in the form of chemically bound energy.

By this process the plant transforms – with the help of chlorophyll as catalyst, and light as energy source – water and carbonic acid into organic compositions, into plant substance. This process, called photosynthesis, also delivers through the plant the building blocks of the animal and human organism. All life and all living processes are based energetically on this absorption of light through the plant. The human being's digestive process breaks down plant or animal food, transforming it back into carbonic acid and water. This liberates the same amount of energy as was absorbed in the photosynthesis and makes it available for the body.

Light is the original cosmic energy source. All life, the life of plants, animals and human beings, is formed and sustained by light. Even the thought process of the human brain is fed by this energy source. Therefore the human mind, our consciousness, represents the highest, most sublime energetic transformation of light. We are light beings; that is not only a mystical experience but scientific knowledge as well. This example should be sufficient to point out that natural science and mysticism contain not contrary but complementary empirical knowledge.

Of all the insights into the nature of objective reality which we owe to natural science, it seems to me that knowledge about the nature of our perception is of especially great significance. It pays to reflect upon the fact that perception by the senses, (seeing, hearing, smelling, tasting, feeling) not only mediates our contact with the material outer world, but these senses are also the key to the opening of the spiritual world.

Let us recall the words of the mystic poet William Blake (1757-1827):

*If the doors of perception were cleansed,
everything would appear to man as it is, infinite.*

To demonstrate the relationship of the external material world to the internal psycho-spiritual world it may be useful to compare it to the way picture and sound are created in a television broadcast.

The material world in the outer sphere works as a sender, sending out optic and acoustic waves and delivering touch, taste, and smell signals. The reception is formed by the consciousness inside each individual, where the impulses received by the sense organs, the antennas, are transformed into sensual and mental experiences of the outer world.

If one of the two is missing, the sender or the receiver, no human reality would occur; the television screen would stay blank and without sound.

What follows is based on scientific knowledge about human physiology concerning the function as receiver as well as about the mechanism of reception and experience of reality.

The antennas of human receivers are our five sense organs. The antenna for optical images, the eye, is able to receive electromagnetic waves, light waves, which produces an image on the retina that corresponds to the object from which those waves came. From there the nervous impulses that correspond to the image are transmitted through the optic nerve into the optical center of the brain, where the electrophysiological energetic occurrence, the subjective psychic phenomenon, the vision, results. Vision is a psychic phenomenon that is not further explainable scientifically.

It is important to realize that our eye and the inner psychic screen only use a very small sector from the enormous spectrum of electromagnetic waves to make the outer world visible. Out of the electromagnetic spectrum of waves, which covers wavelengths of billionths of millimeters, the range of X-rays, to radio waves meters in length, our optical apparatus only responds to the very small range of 0.4 to 0.7 thousandths of millimeters. Only this very little sector can be received by our eyes and be perceived as light.

Within the visible wave range, we are able to perceive the different wavelengths as various colors. It is important to realize that no color exists in the outer world. In general, one is not aware of this fundamental fact. What is objectively present in the outer world of an object that we see as colored is

exclusively *substance*, which sends out electromagnetic vibrations of certain wavelengths. If an object reflects light that falls on it, in waves of 0.4 thousandths of millimeters, then we say that it is "blue." If it sends out waves of 0.7 thousandths of millimeters, we name that optical result as "red." But it is impossible to determine whether or not all people have the same color experience within the reception of a particular wavelength. The perception of color is purely a psychic, subjective experience, which takes place in the inner world of an individual. The colorful world, as we see it, does not objectively exist outside, but originates on the psychic screen in the inside of the individual person.

In the acoustic world analogous relationships exist between a sender in the outer world and a receiver in the inner world. The antenna for acoustic signals, the ear, in its function as part of the human receiver, likewise shows only a restricted range of reception. Like colors, sounds do not objectively exist. What objectively exists in the process of hearing are, again, waves, wave-like condensations and expansions of the air, which are registered by the membrane of the ear and are transformed into the psychic experience of sound in the hearing center of the brain. Our receiver for acoustic waves perceives the range of 20 vibrations per second up to 20,000 vibrations, which correspond to form the deepest, up to the highest, audible sounds.

The other aspects of reality which are made accessible by the remaining three senses of taste, smell, and touch originate as well from an interaction between material and energy senders in the outer world and a psychic receiver in the inner world of the individual person. The sensations of taste, smell, and touch are, like colors and sounds, not objectively identifiable. They only exist on the psychic monitor inside of the person.

From this knowledge it follows that the world as we perceive it with our eyes and the other sense organs presents a reality specific to the human being: a reality that is determined by the abilities and restrictions of the human sensory organs. Animals, with their different sensory organs, with antennas that react to different impulses, and with different receivers, have a different consciousness, which lacks psycho-mental-spiritual perception and the ability to love. They see and experience the outer world completely differently; which means that they live in a different reality.

We can only see, hear, smell, taste, and feel as much of the outer world as we can perceive with our restricted senses. Only that much is real for us, only that much becomes reality. Matthias Claudius expressed that poetically in his beautiful poem, where it says, "So there are indeed some things that we easily laugh at, because our eyes do not see them."

The sender and receiver metaphor brings to light that the seemingly objective image of the outer world, which we refer to as "reality," is, as a matter

of fact, a subjective image. It is a fundamental fact that the screen is located on the inside of every human being. Each human being carries their own personally created image of reality. It is their true image of the world, because it is what they can perceive with their own eyes and with the other senses.

The screen is not external, but dwells within each person. Every person carries their own personal image of reality within – created by their private receiver. This image reveals the world-creating potency that is every individual's due. Every human being is the creator of their own world, because simply and solely within do the earth, the colorful life on her, the stars, and the sky become reality.

That sounds very mystical, is mystical, but in the same way it is natural scientific truth, a fact understandable and verifiable by everybody. Founded on this truly cosmogonic ability is the true dignity of the individual; in it lies the actual freedom and responsibility of every human being, which reaches far beyond the significance of his political freedom and responsibility.

When I realize what reality is objectively outside and what happens subjectively within me, then I know better what I can change in my life, where I have a choice, and consequently for what I am responsible; on the other hand, what lies beyond my power and my will, or has to be accepted as unchangeable fact. It is me, who gives color to the objects which objectively in the outer world are only formed material, but through my attention and love also gives them meaning. That is not only valid for the lifeless environment but also for the living creatures, for plants and animals, and also for my fellow men.

This clarification of responsibility is an invaluable aid to life.

I would like to point to one further insight which the sender-receiver model conveys. The model demonstrates the fundamental fact that reality is not a clearly-defined condition, but the result of continuous processes, consisting of a continuous input of material and energetic signals from the outer world and its continuous decoding and transformation into psychic experiences and perceptions in the inner world. Reality is a dynamic process; it is constantly created new in every moment. Actual reality is consequently only in the here and now, in the moment.

That explains why the child, who lives much more in the moment than the adult, perceives a real image of the world. There is more reality in the childhood paradise than in the world experience of adults. Within that lies a deep meaning. Why else would Jesus have said the kingdom of heaven is theirs?

The experience of true reality in the moment is a main goal of mysticism. A childlike and mystical world view meet here. Here is a poem from the Baroque era by Andreas Gryphius:

*Mine are not the years, that time took from me.
 Mine are not the years, that perchance might come.
 The moment is mine, and if I take care of it,
 It will be mine, that which made time and eternity.*

If reality was not the result of uninterrupted changes, but was a stationary condition, then there would not only be no moment, there would also be no time, because sensation of time is created only through the perception of change. The process-like character of material reality creates time.

In conclusion, I would like to explain a further insight that arises from the sender-receiver model of reality. It is an insight regarding communication. I don't mean communication disseminated by mass media, but the existential basis of communication, given that we are physical beings.

The sender-receiver model shows how we, as receiver of material and energetic impulses of the outer world, experience the outer world. We are not only recipients of messages from the outer world but also, as part of this outer world, senders. As I am recipient for the messages of my fellow man, so am I, on the other hand, sender for him. I can convey my concerns to him, even a purely spiritual one, a thought or my love, only through that which characterizes the sender, namely, through material and energy, through my body.

A wordless understanding as well, which manifests itself in a look or tender touch, can simply only be expressed through material eyes, material fingers, through the material bodies of the loving partners. Without substance and energy, communication would not be possible. That is not only true for the relationship between humans, but also for cosmic relationships. The creator as well can transmit his messages only through his vast sender, through creation, through the material cosmos.

Paracelsus, the great doctor, natural researcher, and philosopher of the Renaissance, called creation a book written by the finger of God that we need to learn to read. It contains the message first hand. It is the message of the infinity of the starry sky and the beauty of our earth with all its exquisite creatures. Natural science always decodes further new texts from this message, and the religious man experiences in meditation, in the mystical view, its totality and within that the wonder of our existence. This could become the basis of a new, earth-sweeping spirituality. In that spirit I would like to conclude with this quotation from the script "Sadhana" by Rabindranath Tagore:

Through the progress of natural science the totality of the world and our oneness with it becomes clearer to our spirit. When this realization of the complete unity is not only an intellectual realization, when it opens up our whole being to the light of total consciousness, then it becomes a radiant joy, an all encompassing love.

—Translated by Frauke Zajac and Nina Graboi