

Waldorf Journal Project #14
February 2010
AWSNA

DARWIN

(AND MORE)

Compiled and edited by

David Mitchell

The highest possible stage in moral culture is when we recognize that we ought to control our thoughts.

A moral being is one who is capable of reflecting on his past actions and their motives—of approving of some and disapproving of others.

— Charles Darwin

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Foreword

The Waldorf Journal Project, sponsored by the Waldorf Curriculum Fund, brings translations of essays, magazine articles, and specialized studies from around the world to English-speaking audiences. This fourteenth edition of translations is comprised of articles intended for personal and faculty study.

The anniversary of Charles Darwin is a focus of the scientific community this year and this *Journal* begins with three thought-provoking articles by Wolfgang Schad on this theme. The following articles are related to this theme at different levels. The contents includes practical articles useful for teachers, more philosophical articles stressing the importance of a particular theme, and two articles examining community and governance in Waldorf schools.

We hope that you will be inspired by these presentations.

All the articles are available on-line at

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The editor is interested in receiving your comments on the material selected. We would also be interested in hearing what areas you would like to see represented in future Journal projects. If you know of specific articles that you would like to see translated, please contact me.

— David Mitchell, editor

What Makes Human Beings Human?

by
Wolfgang Schad

Translated by Ted Warren

The oldest known human remains were found in 2002 by French researchers in the Sahe region of the South Sahara by the Tschad Sea. It is an extraordinary skull with an age of seven million years, something that was incomprehensible twenty years ago. The discoverer named it *Sahelanthropus tchadensis*. The vertical facial piece of the cranium and the positioning of the holes at the back of the head indicate the head was situated for upright walking and therefore for a human being. The skull has no forehead and a very small forehead brain area with a flat, prolonged form stretching from the forehead to the back of the skull, indicating similarities with the apes. We consider this skull a mixed formation, human-like (hominid) and ape-like (pongid). The characteristics are united within each other. We assume that we will one day find in earlier strata an even stronger mixture of characteristics among the common ancestors of hominids and pongids. Already in 1908 Rudolf Steiner spoke about the fact that our human ancestors once carried animal forms and then in a brotherly way set those forms outside of the human form. (GA 104.S. 95/95)

In the picture below we see a casting of the *Sahelanthropus* cranium positioned between the skull of a present-day human being and a present-day chimpanzee. Our first impression is how small it is. Indeed, the entire form must have been smaller than both moderns. It is of special interest that the various forms of the heads show no chaotic variations but an apparent order. Human characteristics appear in each face. We can already observe the verticality. While the *Sahelanthropus* cranium does not have the elongated cuspids of the ape, the skull surrounding the brain has animal-like characteristics starting from the eyebrows at the front and controlled all the way to the pointed corner of the neck at the back of the skull.



Chimpanzees have just the opposite form. The forehead is a bit swollen and has a nose-like obtrusion. The cuspids are powerfully prolonged, both above and below, enabling the chimpanzee to stick out its tongue much farther than a human being can.

Modern humans have not only a vertical face, but also an erect forehead, and the protruding chin gives the entire face an even stronger verticality. The skull of the brain is fully vertical along the walls at the sides and in the back of the head. The cerebrum is powerfully enlarged.

According to what we can learn from comparisons with the recently discovered skull, the Sahel people experienced human evolution in an erect body with specific human characteristics in the facial region of the eyes, ears, nose and mouth long before the ice age during the Miocene Epoch of the Tertiary Period twenty-five to ten million years ago. The verticality of the human form and the openness to the world are the first physical indications we can grasp. The extended development of the brain is a later event that came during the ice age roughly 150,000 years ago, accounting for two percent of the seven million years. While in earlier times we thought that the human brain makes the human a human being, today we know that it is a significant, late product from the final developmental phase of the physical body within human development.

According to our present understanding stretching over the long timeframe for human development, and compared with all other human organs, the brain has remained “imprisoned” in a mixed, animal-like state for the longest time. Only later did it transform into a conscious organ for building concepts. Yet to this day our concepts immediately grab the sensory impressions lightning-quick, almost like vultures. We think, that is that and something else is something else. Aristotle, the greatest thinker of Classical Greece, thusly described human logic as a kind of zoology. First, when we learn to observe something from many different angles, our thinking becomes human. Next we can think into other

people and understand the world more profoundly. Then we may become more social and more open to the world.

Steiner suggested to teachers of the fourth grade, who are the first in the curriculum to teach about the human being, to tell the children that the head is not the most important part of the human body, but rather the limbs are—because the legs enable us to stand upright and the hands give us the freedom to act. That is not to say that the head has no important task. But all too often we revert to the private world of our brain.

When someone falls and is hurt, there is a difference whether he thinks about what he will do or he actually does something. His reflection is not so important, but what is important is his openness to the world: to be courageous and make the decision to act. For every difficult situation today there are good ideas, but what is carried out matters. Our brain-oriented intelligence can be helpful, but deeds are decisive. Waldorf education strives to give the world practical and diligent people. The humorist Erick Kramer said it beautifully:

“Nothing is good unless you do it.”

Darwin's Incomplete Knowledge of Death

by
Wolfgang Schad

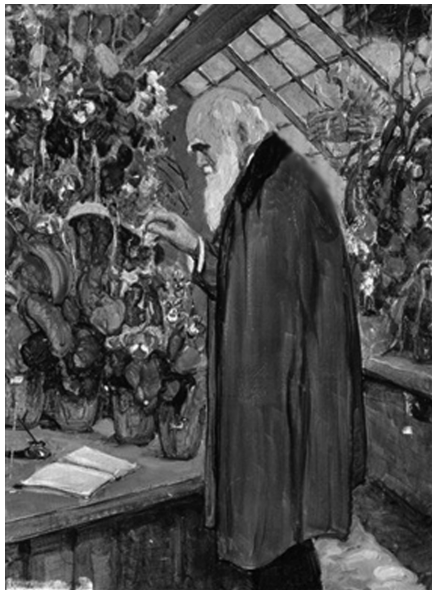
Translated by Ted Warren

This year Charles Darwin will be celebrated worldwide as the founder of the theory of evolution, something he certainly was not. The leading German-American evolutionary biologist Ernst Mayr discovered, as did many others before him, that Darwin adopted his five theories from his predecessors. Once Darwin even accused himself of having created nothing original in his theory of evolution, but merely bundled existing theories. (Kutschera)

Darwin certainly brought forth new ideas in other areas, for example the presentation of Ringatolle, the coral island in the South Sea; the close relationship between tropical orchid leaves and the colibri as their pollinators; and also in his final work on the value of night crawlers for the creation of topsoil as the basis for topsoil cultivation. But the general public made Darwin into a genius and hero of the theory of evolution, something that does not hold

from a historic/scientific standpoint when regarding the originality of his ideas.

His grandfather, Dr. Erasmus Darwin, wrote two books in which he presented the development of living organisms through alterations of the species, as had many scientists and doctors on the continent done before him, among them Lamarck, Leibniz, di Maillee and Maupertuis. Almost two hundred advocates of the legitimacy of natural evolution before Charles Darwin may be proven. Yet in England the conservatism



Charles Darwin observing plants

of the Anglican Church had created pent-up needs that Darwin was able to fulfill. (Hauff) It is important to know that on the Continent the theory of evolution was found merely in academic circles, whereas, thanks to Darwin and his energetic propagandist Ernst Haeckel, it rapidly became general knowledge at all levels of society.

The five parts of Darwin's Theory are:

1. The reality of evolution through the creation of a species (Evolutionism)
2. The lineage of all organisms from common ancestors through genealogy (Realgenese)
3. The appearance of new species while retaining the original species (The Principle of Divergence)
4. Evolutionary changes in small steps (Gradualism)
5. The survival of adapted genetic variations and the natural decline of those that are less adaptable (Natural Selection)

All five aspects are not necessarily related to each other but may appear separately (Mayr). Indeed, these ideas were historically independent from each other when Darwin became aware of them. The idea of evolution was probably brought to his attention through family traditions stemming from his grandfather's works, though Darwin seldom refers to him. The theory of natural selection was obtained from the works of the sociologist Malthus. The survival of the species theory was obtained from his contemporary, the philosopher Herbert Spencer (the struggle for existence). Darwin's contribution was to bundle the components and add a large amount of factual material to prove the theories quantitatively, as no one had previously done.

Darwin and Wallace

Darwin decided to write a multi-edition work on evolution. In 1858 he obtained a paper from the young biologist Alfred Russel Wallace that treated the central theme—the survival of the fittest within the environment. Wallace therefore had the priority for recognition, namely the first publication. But Darwin read the paper in the Royal Society in London. He immediately drew up his outline and published it as his main work in November 1859. The book landed literally like a bomb! *On the Origin of Species* sold out very quickly. New editions followed and it was soon translated into every European language. Darwin helped the process by sending ninety discussion documents to every

biologist he could reach and asked for their thoughts. Yet who had first priority for recognition—Wallace or Darwin? The Royal Society left it up to the two men to decide. As a polite gentleman Wallace gave Darwin the right of way. He explained that he had only recently (also after a lecture by Malthus) realized the value of natural selection, while Darwin had discovered many years previously that the Malthusian principle worked for interpreting nature. Both men enjoyed a lifelong friendship, and Wallace was one of six pallbearers who laid Darwin to rest in Westminster Abbey.



Alfred Russel Wallace

Yet there was historical disagreement on whether the principle of natural selection could pertain to human evolution. In 1859 Darwin shied away from providing his opinion in his crown work, knowing full well which public battles he would be forced to face. For despite the theory of the survival of the fittest, Darwin loved personal peace. Twelve years later in his book, *Descent of Man* (1871), he declared his support for natural selection in human evolution; Wallace remained strictly against it. In an exchange of letters we can read how Wallace urgently pleaded with Darwin to declare that the removal of weak and needy people is not the natural progression for mankind: This would lead to the decline of Christian Europe. Darwin asked Wallace just as vehemently to join his side: “When I allow an exception, my whole theory will collapse.” But Wallace did not do him this favor. For as clearly as he supported natural selection for the environment, he clearly removed it from humanity.

Darwin suffered emotionally from his interpretation of the principle of natural selection. “I felt as if I had committed murder.” His wife Emma, a religious woman, warned him to retract his theory of natural selection. Although he considered Emma to be much more morally developed than himself, Darwin argued that moral feelings should not speak within the world of science. He kept his scientific reasoning strictly separate from any moral feelings. Yet this dilemma did not lead him to become atheist. Before his journey around the world he studied theology and became a vicar in the Anglican Church. To excuse himself Darwin adopted a rather strange theory: He had done a good deed in declaring how life evolved without God, and thereby removed God from any responsibility for creating brutality and bloodshed.

In this way he attempted to retain an image of a flawless God. Through his strict separation between sharp reasoning and soft feelings, he created the opposite of what Baruch Spinoza and Goethe both held on high, to observe God and nature as an indivisible unity (*Deus sine natura*).

The Value of a Knowledge of Death

Darwin and Wallace started with an indisputable state of affairs: All organisms always create an abundance of offspring. The superfluous offspring become nutrition for others before they can reproduce, and only a small number lives out their natural lifespan. The great majority dies at an early stage. For example, if a beech tree creates so many beechnuts and a female carp creates so many eggs that the entire biosphere on the earth is affected, the entire land would rapidly become beech trees, and in freshwater only carp would exist when their offspring all obtain their natural age.

That is not possible ecologically. The survival of a species is secured by a limited number of reproductive specimens. The rest serves as nutrition for bacteria, the bacteria eaters, the plant eaters and the animal eaters. On the earth we have just as much creation as destruction of living organisms. We need not only knowledge of life, a biology, but also knowledge of death, a thanatology. With his theory of natural selection Darwin made us aware of this and thereby opened up a widespread controversy.

What takes place in the ecological communities relates to the biochemical and cellular processes that increase and decrease during the interchange of substances and energy in each separate organism. All ecosystems thereby show that they are eco-organisms. Yet in the past decade medicine has made an important distinction: Cell death is not merely cell death. There is a cell death that is damaging for the entire organism: necrosis. For example, when a membrane is damaged in an accident, its cells become necrotic. Also within the human body permanent and healthy cell necrosis occurs when all excessive cells kill themselves: apoptosis. Every day the intestinal mucous secretes vast quantities of intestinal cells into the soft food substances in order to clean and reabsorb them, for example the dying proteins that return. In healthy people there are also cancer cells that the immune system traces daily and removes via apoptosis.

The same is true of the ecological organisms. There are damaging interventions that cause the ecological equilibrium to collapse. There are healthy

processes that bring all excessive individuals back within the rotation of the whole—ultimately within the dynamic equilibrium of the entire biosphere of the Earth as a super organism. The natural selection that Darwin places at the center of his theory is the apoptosis of the ecological system. Goethe observed this in nature:

“Tell me, how will I be rid of these birds?” said the gardener,
“And the caterpillars, the beetles as well,
The larvae, wasps, worms and other creatures of the devil?”
“Leave them alone and they will devour each other.”

(Words of Wisdom from Bukis)

Just as the variation of species changes the eco-organism when new species appear, so does natural selection change as the new adaptors configure themselves differently. That process is described by an unfortunate word: adaptation. Unfortunate, because it has a passive connotation of something merely brought forth by outside activity, when actually every organism actively enters into the environment and changes it. Not only do the trees grow according to the local environment, but they also change the climate. Not only do the pioneer plants prosper according to the raw soil, but they soon change the quality of the very same soil. This is actually biologically implicit, for in life there is never a one-sided mono-causality, but always conditions of “changing causes” (as Rudolf Steiner taught the first biology teachers at the Waldorf School). The popular expression “ecological niche” gives the organism a passive role at the edge of survival. It is not as Harvard biologist Lewontin determined. Extrinsic and intrinsic factors are always active in changing relationships. That is fact.

Nonetheless, we are moved by the death of a tree when it is struck by lightning, the death of a night crawler when the blackbird pulls it out of the grass, or the death of a graceful gazelle that is knocked down by a leopard. Only a few species have no enemy that can be threatening, such as the elephant or whale. Here natural selection can take place prematurely instead through infectious disease, which is often the case in the early stages of overpopulation of most other organisms. On islands, archaic and distressed species survive when there are no predatory animals or the evolutionary progress through ecological apoptosis does not function properly.

Death among Plants, Animals and Human Beings

Considering death as a positive force in life does not immediately cross our minds. To grasp the positive side of Darwinism we need a more differentiated concept of death: Death and death are not the same. Rudolf Steiner was the first to proclaim this in his lecture of February 29, 1912, in Berlin entitled *Death among Human Beings, Animals and Plants*. He mentions a statement by Leo Tolstoy that natural science unfolded profound knowledge concerning life in nature, but from it we have not yet received true enlightenment concerning death. Steiner's position is that the death of an animal is qualitatively different from the death of a plant. So is the death of a human being something quite different than the death of an animal. All too often we generalize by limiting ourselves to a view in the outer world. From a spiritual-soul perspective—and this is the side that moves us when we look at the death processes in nature—there are very different events.

The special quality of plants that moves us inwardly is that they are totally free of the subjective soul activity that denotes animals and human beings. Plants have no separation between inner and outer realities. Their “digestive organs,” the leaves with inverse “digestion” (photosynthesis), are in the “outer world” where their life elements of light, air, water and earth are found. In a great discovery in the field of botany, nineteenth century botanist Wilhelm Hofmeister once described organisms that are inversed in relation to the outer world. Once again Goethe had previously discovered the purely enlivened relationships that are not limited to separate entities:

No living being is a One,
Always there is a Multiple.
(Epirrhema)

When a plant dies, it is not an individual subject that dies. From each part of every living cell in a plant today cell cultivation can regenerate the entire plant. Every part contains “potential immortality.” That is not the case with an animal. An animal is always one generation as determined by reproduction (diploidic or haploidic). Only the germination cell contains the simplest factor for reproduction (haploidic.) When the central reproduction organs are located within the body, the inner soul sensations grow by way of the evolving nervous system, something plants do not have. And therefore the system of organs in the

animal become principally more and more mortal (somatic). Birds and mammals are the most soul-like animals and their germination-cell-building tissue and the germination cells of all other body tissue (soma) are preformed to a final soma—unless tumor illnesses with unlimited growth become destructive. The animal feels with its body that remains alive throughout its life by controlling the death processes. Almost every part of the body remains indivisible or “individual.” From the point of view of soul, the animal lives in an early childhood-like muster of feelings that takes place collectively according to its species. It cannot individually distance itself from this form of life. This is where we find the difference between animals and human beings.

In the Middle Ages, when a horse harmed a human being by accident or even stepped on one and killed him, the horse was put on trial and punished. This was an inappropriate, grotesque event! The animal cannot control itself due to an inner distance from itself. It never acts responsibly.

The human being can develop as a being of culture only when he does not revert to his biological processes as an animal does, but rather carefully limits his soul desires or instincts and thereby succumbs to a partial death. Even when he is hungry, a human can wait for food and wait for everyone to sit at the table and say a prayer. In this way he achieves something on another level other than just satisfying his desires. All human culture is build upon a gentle, and naturally not a total, emotional abstinence.

This is present because most children experience, in roughly their ninth year, that the only certain fact in their uncertain future is that they will someday die. No animal has this knowledge. And people never forget it. This makes the child careful with her momentary emotions that she shares in common with animals. The death of a human being has a different value than an animal's—it is the final event in a unique biography. Therefore every person has the right to a biography that is not violated. According to Kant, this basic dignity entails the ability to carry your own irreplaceable goals.

Therefore organizations for the protection of animals do not merely serve individual animals that are replaceable within their species. The protection of animals is protection of the species. The species is irreplaceable. Planning for and then killing a human being is murder. Killing one of many representatives of an animal species is not murder as long as the species is not damaged. Annihilating the species would be murder. This is the basis for every effort toward the protection of animals and plants. The death of a soulless plant, of a collectively

ensouled animal, and an irreplaceable human being are three qualitatively very different events. Steiner went so far as to say that only a human being suffers a true death. Every human being is, in his own right, a separate species. Wallace saw this clearly, Darwin hardly at all.

But is not nature gruesome? Rarely do grazing animals suffer when attacked by predators. Today we know that endomorphine and kephaline hormones are secreted during an emotional shock, making the animal for the most part insensitive. The gruesome, horrible nature that Darwin wanted to liberate from God's responsibility is an anthropomorphic projection that does not apply. The animal does not know the question, "Why me?" With the exception of the higher-developed apes that have a small amount, animals have no self-reflecting "I"-consciousness. Therefore efforts are made to give them their own legal rights.

Further Development through Limitation

Let us summarize and complete the picture we have developed. We have met many times the motive that in order for a higher quality to evolve, a certain level of existence must be taken back. This is also true of inorganic processes. For example the minerals in the stones must yield to the weathering of their crystal structures in order to move into dissolution or a colloidal state, such as clay. Then plant life can populate the land and humus can build up. Likewise in the plant, photosynthesis must diminish in the newly-grown stem in order that flowers and fruit can develop. Certain animals, in turn, pollinate the flowers and spread the seeds. And in animals, the unlimited potential for regeneration that we find in plants is slowly reduced in order to make room for the strengthened, inwardly life of feeling. The animalistic instincts within the human being are reduced when he develops his cultural capacities. Thus the evolutionary path through the kingdoms of nature is made possible by limiting the next level of capability:

- The partial limitation of emotions sets free the spiritual capacities of the human being.
- The partial reduction of plant growth builds the most valuable organs for communication with animals.
- The partial dissolution of minerals prepares plant life.

On the lowest level the simultaneous death of a dead being takes place. In the plant a finer death process must take place in order for the flower to appear (the end of peak growth, no more photosynthesis) and the symbiotic closeness to animals is obtained. In the animal a progressive process of soma and self-guided permanent death process takes place that allows feelings to arise in the soul.

The human being is such because he has already transformed three death qualities during his life. At all three levels there is a positive side to the partial death processes. At all three levels there are also a challenging and healthy “apoptose.” Such distinctions in thanatology were not available to Darwin. Therefore, with depressive melancholy he fought his own image of the gruesomeness of the kingdom of nature. Despite this battle Darwin’s theory of natural selection prepared the way for the first thanatology.

One question remains that each human must ask himself in the end: What happens when I die? In all cultures, in all times, there has been and still is an inkling that the human being enters a higher world than this one. Could that not be a source of health we are always striving for on earth but have not yet found? Novalis wrote:

“In death we become aware of eternal life;
You are death and you make us healthy.”

(Anthem on the Night)

In biology and chemistry lessons in the upper classes in the Waldorf school, I often found the right moment for the students to bring the biological processes in relation to death processes. In my closing statements to our study, I would present and thoroughly handle all three levels of partial death processes in nature, in the human organism, and in self-understanding. When I knew the class very well after four years of upper school teaching, then I would ask one more question: “What could human beings possibly imagine as the greatest event that may create health?” I would never give them the answer, but in every class the answer usually resounded: “That must be the event when that which stands higher than any human being, Christ himself, went through death.” In this way the students build the bridge between the theory of evolution and the central event in Christianity.

Darwin Suffered from Darwinism

by
Wolfgang Schad

Translated by Ted Warren

In mainstream schools for the past one hundred years science lessons have taught the factors of natural evolution according to Darwin: overproduction of offspring, variations from parents and among each other, and the natural selection of less adaptable species. Darwin suffered emotionally from his theory—so gruesome are the ways of nature. Yet on their vacations everyone travels to untouched natural environments to restore themselves in this theoretically “gruesome” world. They search for harmony in idyllic settings as if the Darwin of their school lessons never existed. Then they return to the daily stress of our dog-eat-dog society. Something is not right in our enlightened but dark society. Do we suffer from a split consciousness? Is Darwin’s “struggle for life” a human projection by our society upon nature? No chemist or physicist speak of a “battle” between molecules in a reagent glass. The life sciences view life as a chemistry and physics of molecules. Then they can also speak about the “gruesome battle” among living beings. But today, more than ever, they speak a military strategy style language as the fight for survival where one tricks one another and fights. Here the theory rules as well as split consciousness. They even speak of the gene molecule as having an ego, for it is considered egotistical in social biology.

Then this military-like “biologism” is applied to human beings, first in the business world among adults as a confirmation of and a justification for the theory of competition in natural science, then within the social promotion policies of the schools. For ninety years the Waldorf schools have proven by example that education works without selecting children according to number, i.e. letter or number grades.

Often the Waldorf classes as of the fifth grade are filled with “non-adaptable” pupils from the public schools, and those who are fortunate continue on in the middle school and the high school. These children discover their abilities, fulfill their graduation requirements despite difficult social conditions, and enter their careers of choice. What is the value of social Darwinism in the schools?

Social Darwinism Does Not Exist!?

More problematic is when Darwinism is applied as a theory for large-scale politics. This is no attack on Darwin as a person. He was a loving father who avoided conflict whenever possible. Yet the dangers of his incomplete theory that are celebrated this year were already exposed during his lifetime by his friend Alfred Russel Wallace. We cannot deny the fact that Darwinism was the basis for acts of gruesome inhumanity because Darwin refused to take Wallace’s advice to not apply his ideas of natural selection and the survival of the fittest to human beings. The colonization of the late nineteenth and early twentieth centuries found support *expressis verbis* in the Darwinian Theory of Evolution.

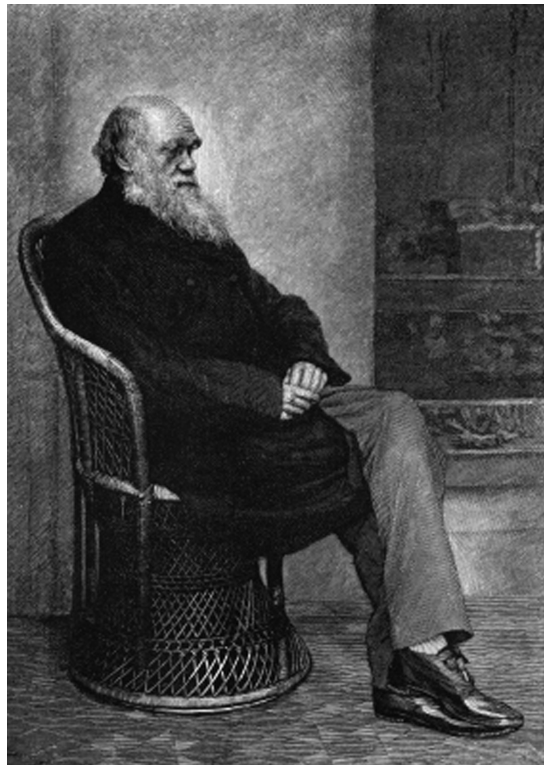
While I was visiting the teacher training center for the Waldorf school in Nairobi, Kenya, a teacher candidate from the Kikuyu tribe, who had heard that the whites believe the blacks are descended from gorillas, asked me very elegantly from which apes are the whites descended. Here we have to go back to the reality that no member of the human race is descended from a known group of apes. Ernst Haeckel knew this. To this day vulgar Darwinism and human understanding immediately repel each other.

Now there are apologetic theories for Darwin. The English biologist Robert Berry (1996) relieves Darwin of his “thesis on struggling” by saying that Darwin took the expression “the struggle for life” from the philosopher Herbert Spencer’s expression “the struggle for existence.” Therefore Social Darwinism never existed, only a Social Spencerism that is guilty of all of the subsequent behavior. Berry omits that Spencer’s belief was not only taken over by Darwin and advocated but also spread to every group of people in Europe. Further, since 1985 Robert Young has declared that science has always worked in a socially beneficial way, and because Darwin was a scientist, his writings were socially productive. Therefore a Social Darwinism could never have existed.

Darwin: A Man of Feelings

On his expedition around the world, Darwin met native peoples at the southern tip of South America on the Tierra del Fuego Islands and categorized them among the most primitive races in the world. On one hand he considered it barbaric for whites to live with colored peoples. On the other hand, upon his return he wrote that he was glad to no longer live in a land where there was slavery. This statement caused the leading natural scientific magazine in the English language, *Nature*, in their editorial to declare it as proof of the fact that Darwinism is not racist. The Irish philosopher of science Peter Bowler declared Lamarck as the guilty one because Spencer used him to reach his evolution of the human race, and therefore it would be more accurate to speak of Social Lamarckism. Here the cause is turned around full circle, for also by Darwin we find some Lamarckism. Once again it is denied that Darwin's theory was the basis, worldwide, for promoting the origin of mankind from apes, step for step until the present human races. This evolutionary interpretation for all human races is denied as politically incorrect. Luckily it is avoided whenever possible. Despite this, the legitimacy of the theory of human evolution based on the selection of non-adaptable species is held high. It remains at the level of judgment determined by feelings that refute all reason.

Darwin had two souls in his breast. As a man of feelings, he can be appreciated for his general friendliness. As a man of reason, he bundled important theories together and proved them with relevant materials. Yet like many before him, he fell for the temptation of totalizing a partial truth, namely by using it on human beings, and for this partial truth, latent totalitarianism did not wait very long. Unlike Wallace, Darwin did not envision the possible misuse of his theories and he did not take a distance from



Charles Darwin in contemplation

them in advance. Therefore the attempts to rehabilitate him historically from the social consequences of his theory of evolution do not work. His most important, remaining success is in spreading to all peoples the foundation of evolution—the development of all living beings and their common origin.

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Body Movements Are Invisible Thinking, Mathematical Thinking Is Inner Movement

by
Erik Marstrander

Translated by Ted Warren

On one hand mathematics is thinking; on the other it is life forces. The path from childhood to adulthood starts with the body and then moves to the head, in other words from movement to thinking. This is how the small child demonstrates its method to the rest of the world in the first three years: Walk, talk and think!

Mathematics is under a lot of pressure to change. The current teacher-controlled pedagogy, whereby the teacher presents the problem and then answers it, is a method that effectively develops the ability to understand abstractions, something that many consider to be old-fashioned.

In which direction shall we head? Professor Befring at the University of Oslo wrote in a newspaper article the Fall of 1998 that the best thing to do would be to stop the subject of mathematics all together and instead incorporate problem solving in other school subjects. A direction that has won more and more favor in the past years is to allow pupils to learn mathematics by doing. The teacher can arrange a store in the classroom where the pupils count their buying and selling transactions. If we give them paper and scissors and let them make volume forms, they will better understand volume calculations than if they just imagined the forms. The concept is to let understanding spring from practical work. Then each situation becomes experiential and connected to the child's joy of discovery, while providing exercises in being independent. Children must be allowed to discover the world, not just learn about it. Later they will develop the formal and abstract language of mathematics. This summarizes the public debate to date.

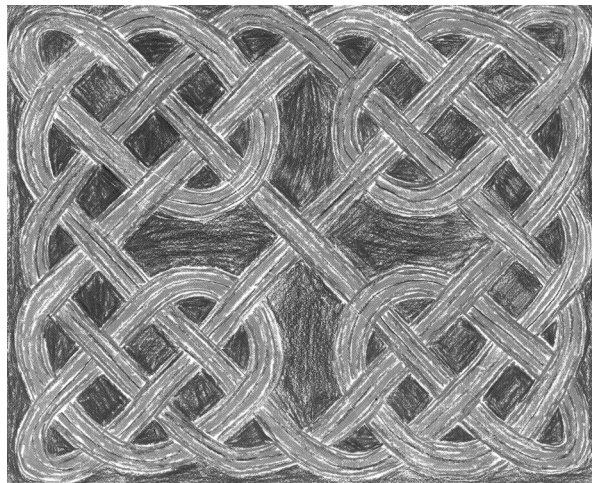
The Position of Mathematics

Within a larger perspective we can follow a similar polarization in the historical development of mathematics. In Classical times geometry, which is the perceivable part of mathematics, was considered primary. Numbers and counting were secondary. First in the Middle Ages and in the Renaissance did mathematics become algebra-oriented, and not until the nineteenth century was a productive synthesis of both disciplines made. In the 1960s there was a renewal of algebra's dominating position. An international research group was formed and given the task to "create" a "new" mathematics. All mathematical concepts were to be developed algebraically from the most simple to the most difficult. Mathematics should become mere thought, and geometry was considered a secondary discipline.

The project was called Boukari and is written down in multiple bands of a large work. In connection with this thinking, the so-called New Math was created in the 1970s. Lessons should lead directly into abstract thinking at an early stage, actually in the first grade, in which pupils should jump over the heavy and time-consuming learning of elementary counting and arithmetic. Measuring quantities should replace elementary arithmetic, and so on. The experiment speaks for itself. In the last decade educational circles have clearly seen that pupils need more practical arithmetic and geometry. Practically everyone can work with concrete problems, and the ability for abstract thinking results as a product of their work.

Within mathematical circles today many are searching for games, movement and invention that awaken the child to independent thinking. Yet do they understand why it is that children experience pedagogy positively? What is the relationship between physical body movements and mathematics, which are after all, pure thinking processes?

Before we reach a degree of understanding of such questions, the moving back and forth between methods will continue both in academic circles and in schools. Can we find ideas that unite these two directions?



Waldorf form drawing

Thinking and Willing

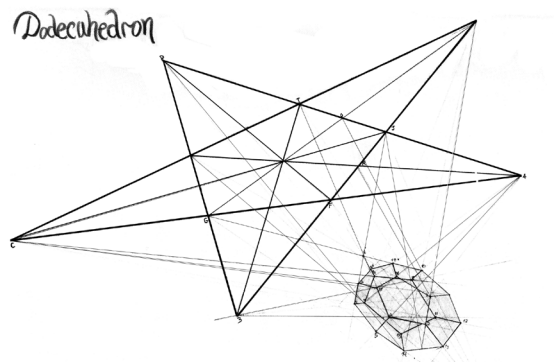
The Waldorf schools work from the conviction that both directions are expressions of the same thing. Especially during the traditional school years between the seventh and the fourteenth years, the child's inner world of thoughts, feelings and willpower are connected with each other. To think entails bringing thoughts together willfully, to move is to carry out the forms of the thoughts. We influence our children's life of thought by letting them move in forms, and we influence their forces of will by thinking in movement. In this way we can consider movement to be an outer life of thoughts and thinking to be an inner force of will.

One of the clearest signs of this is found in the child's development during the first three years. At approximately the age of one, a child stands and walks; at the age of two he begins to speak; and at the age of three, thinking first appears. The path starts with movement of the body and continues into movement of thoughts.

If one observes this connection, one can also see that the entirety of childhood is a transition. The process takes place over many years and there are clear stations along the way. The developing ability to do mathematics displays that the child's willpower is not stuck in movements of the body but rather flows on to movements of thought. To do mathematics, in the sense of developing abstract thoughts, can therefore be understood like a thermometer that measures how long a process has evolved. When you go into details there is a gradual liberation of willpower that is not directly easy to describe. Despite this, let us describe some of the stations.

Thoughts Are United with the Body and with Movements

During the first three years children learn to walk, to speak and to think, but they do not think the way adults think. Very few of us can remember anything from this time and we cannot explain how we understood or learned anything. Memory and consciousness were present but connected so thoroughly to the processes in the physical body that we could not consciously and freely relate to them. Our thinking at this age was connected to the physical body and its movements. Yet during these years, human beings begin a lifelong theme for our development of consciousness: walk, speak and think. Can children truly count and calculate at this age? Normally not. But the foundation is laid. The first experiences with the concepts of identity, difference and equilibrium are made. All progress is inspired by closeness and love between parents and children.



Thoughts Lie Veiled within Life Circumstances

Children spend their fourth to seventh years in kindergarten, in play and in fantasy. As children we sensed so much but could not speak about it—it was not understood until we became adults. We could play, move and find things. Most of our activities that took place within mental images and concepts were enveloped by fascinating situations in our lives.

During these years mathematics can be found in the child's body, in movements. Everything from walking normally to running, hopping and climbing are developed in an emerging understanding of balance and imbalance. Children use their bodies to create experiences that can awaken reflections, that is, thoughts. In this stage thoughts are pictures from life and concepts lie hidden as secrets within those pictures.

Thoughts Appear in Life

In the first three or four school years a new level is reached. For the first time children can speak about the world. What does life show us then? It displays forms, quantities and situations. Stories—from life—and arithmetic belong together. Reflections appear when the world is described. Counting is freed from the objects and arithmetic is freed from the situations in life. For example, after a child moves in an octagon, the form can be drawn. Movements are the basis for the beginning of geometry, namely form drawing. Running and hopping provide the basis for number rhythms, multiplying. The movements of our bodies provide the basis for the movements of our thoughts.

Thoughts Appear from Life

At the age of nine another leap in children's development takes place. There is a distance between objects on the outside and the objects inside, i.e., mental images can be formed. The development of thought and concept

becomes more removed from the situations in life. Realities that appear directly can have a symbolic meaning. The objects and activities in the world become “raw material” for analytical reflection. This process intensifies during the ages between twelve and thirteen. Pure mathematics provides the basis for conscious work with parts of the whole, i.e. fractions. This is a major step for children. They cannot only divide the whole into parts but the parts can be put back into the whole. Consciousness works within comparisons of the whole, for example how large a part of the whole a piece may be. In my consciousness I move in the parts, measure them, weigh them and compare them. From my inner feeling for symmetry I judge the fraction.

Life Appears from Thoughts

From the twelfth to fifteenth year the liberation of thought and concept from life situations reaches a level where, in the mental images, the sensory qualities are less apparent. The gradual liberation of the forces of thinking results in the world’s becoming more and more lifeless. This becomes the basis for abstract thoughts. Now thoughts have their own world, and the young person stands with a “skeleton” in their thoughts. Thoughts are no longer a part of life processes in the body. The abstract thoughts are indeed threatened by their own rigidity and can be positive only if they are placed in a meaningful context. A superior process based on human judgment must be developed and put in place.

During these years it is important to use problems from daily life as the entrance to mathematics. Projects and testing the pupil’s independence are used consciously as part of mathematics. Now the time has come for algebra, equations and geometry. This work is built upon the movement, rhythm, balance, equilibrium and symmetry that have become inner qualities in the child’s thinking. What is an equation other than an inner equilibrium? How important is symmetry for understanding geometry? Movements and transformations in normal arithmetic can be repeated algebraically.

Rediscover Life in Thinking

In the first years after puberty, roughly from ages fifteen to seventeen, there are big challenges to address. How can we keep a person’s concepts of the world from becoming a collection of abstractions, void of any context? The goal must be to rediscover the same motives and truths in both worlds. The life forces that were important experiences in childhood—movement, equilibrium, symmetry and rhythm—may now be found in nature by using the abstract

thinking. At its best thinking can be an imaginative game filled with life and also a path to objective truths.

If we develop the principles behind a parable mathematically and then recreate it experimentally in a fling, we have an example of how to meet teenagers pedagogically. Simple probability calculations, combinations and exponential growth point in the same direction. The (*gyldne snitt*) “golden rule” is a third theme that is very appropriate. The math is easy and one can easily find the physical proportions of the bodies.

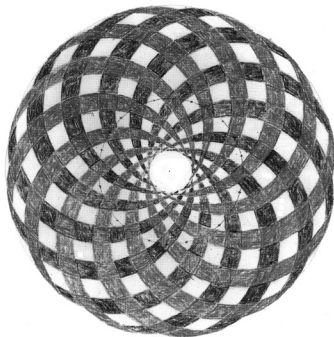
Life as Veiled Thinking

Does the world make sense when thinking about it, and can one create a meaningful picture of it? Or is the world fragmented and random? Are there limits to our knowledge? These and many more existential questions live in our youth between the ages of seventeen and twenty-one. It is important to challenge their thinking with paradoxes, where the answer is not just “yes” or “no” but often “both.” Thinking gives me not an absolute picture of the world, but a basis with which I can relate to the world. I am not my thinking, but free thinking can give me an objective insight into the world.

We remain conscious of the world in many ways and mathematics is just one of them. At the same time we can say that everything in the world can be analyzed and researched. Within every context there is mathematics. Life itself and nature can be judged as thinking placed behind a veil. During these times we work with the themes of derivation, integration, and projective geometry.

Movement and Life Challenge Thinking

As adults we have hopefully achieved a quality of thinking that is alive and in motion. Of course we also meet the opposite qualities of thinking. If one is able to turn these forces inwardly in a rich, positive way, then flexible thinking



appears, a thinking oriented not necessarily towards mathematics but to a rich world of flexible, pliable concepts.

Movements of the body are hidden thinking. And mathematical thinking is inner movement. Therefore mathematic lessons must contain both flexible and concrete concepts.

What Is Goetheanism?

by

Trond Skaftnesmo

Translated by Ted Warren

Most people know Johan Wolfgang Goethe for his poetry, yet he considered his scientific research to be more important. Goethe researched many areas of science, like zoology, botany, meteorology and geology, optics and color. Today his methods is naturally given more attention than his results. And that attention is increasing! Danish author Hans-Jorgen Nielsen is one who has noticed the renewed interest in Goethe's scientific approach:

In the beginning of the 1970s the Danish biochemist, Jesper Hoffmeyer compared Goethe's research with the biological tradition from Linne' to the French biologist Monod. At the same time, the pioneer of the chaos theory in the United States, Mitchell Feigenbaum, became interested in Goethe's "Theory of Color" that had previously been considered merely the fixed idea of a great man. Until recently, only Rudolf Steiner had taken him seriously. The interest for Goethe is not limited to researchers in these areas. Ilya Prigogine, the Nobel Prize winner in chemistry mentions him, and another pioneer, Albert Libchaber, has worked seriously with Goethe's theory on plant's morphology, their dynamics of transformations.

When Rudolf Steiner was twenty-one years old he was commissioned to edit the first publication of Goethe's natural scientific works. During these efforts, Steiner discovered that Goethe had created a new method for scientific research. He considered Goethe to be a "Galilei of Biology." He later named the center for Anthroposophy in Switzerland, Goetheanum and placed Goethe's method at the center of science lessons in the Waldorf School.

How Did Bulls Get Their Horns?

What is the idea behind Goethe's approach? Put simply; it is to allow the phenomena - in all of their immediate reality - to appear and speak. Goethe developed the phenomenological method for scientific research a hundred years before phenomenology was introduced as a philosophic discipline.

To understand this radically new approach we must look back to the godfathers of modern science, such as Galileo Galilei and Francis Bacon. Both turned against the Aristotelian tradition that considered nature to have "intentions"; e.g. a stone falls to the ground because it "seeks the center of the earth."

Both scientists considered it important to relate strongly to the objective and especially the measurable facts. Galilei's motto was, "Measure everything that is measurable. Make every thing measurable that is not already so." Bacon added to this the experimental method, which the philosopher Leibnitz summed up in the all-encompassing motto, "Place nature on the rack and force the answers."

Bacon's own motto was, "Knowledge is power," that is, power over nature.

The result of this research program was a very powerful science with the ability to control and manipulate nature. In Goethe's days the dark side of science was less considered. But Goethe understood what was on the way. Few people can today deny the dark side of scientific research and practice, where the list goes from Hiroshima to Tsjernobyl, from mad cow disease to climate change. Some go so far as to say that we have to admit that all culture damages and destroys nature. Natural science has no responsibility for this. If someone is to blame it must be stupid and irresponsible politicians.

Regarding stupidity and irresponsibility, our politicians have an equal amount as do the rest of us. We have to ask, "Where have they learned their way of thinking?" Apparently – in great part – from schools. Natural science cannot be acquitted of its contribution to the situation considering its leading role in developing culture for the past 400 years. To come to terms with what is wrong and get to know what we can do about it is another issue. Goethe's solution was not to abandon the Galilean method but rather to complement it. Galilei looked for the causes in nature. Why do stones fall? Why does steam rise? Why do bulls have horns? To ask these why-questions is an effective method if one's goal is to control nature and use it for one's own benefit.

The problems arise when this kind of questioning becomes the only way of questioning. It leads to a technological and instrumental relationship with nature. But there are other ways of thinking and inquiring. In a conversation with

his assistant, Mr. Eckerman, Goethe discusses why bulls have horns. In his day it was still relevant to wonder to what purpose the Good Lord had made nature.

The common answer was: God equipped the bull with horns so that he can defend himself. Today the question would be answered from a mechanical, cause-and-effect thinking: The bull that accidentally developed horns, received a selective advantage, and therefore spread this ability to the rest of its population. Goethe summarized his age's finalistic explanation in the following way:

The defenders of finality are afraid of losing their God if they cannot worship the one who gave the bulls horns so that it could defend itself. But now we may ask: why do sheep not have horns? And if they do, why are they wrapped around their ears so that they are of no use to them? It is very different if I say: The bull defends itself with horns, because it has them. The question about purpose is, in this situation, very unscientific. But we will come a bit further if we ask: How? If I namely ask how the bull got its horns this will lead me to an understanding of its organization. And that will lead to an understanding of why lions have no horns and could never have them.

The question of how bulls have horns invites us to look more carefully at the bull's horns. Not only that: we are also invited to look at them in a new way, as expressive parts of the bull as a whole. We are invited to read them like the words of a text. And that text or context does not end with the bull's organization. It reaches to the lion, the horse and other animals, with or without horns, to their ecosystems and to nature as a whole.

A Deep Ecological Science

The question of causality (cause and effect) does not invite us to dive down into the bull's qualities where the horns are part of the total picture. But Goethe's path of inquiry is a science in which the questions what and how come first. The path to understand a phenomenon – who are you, bull? – begins with the question: How are you expressing yourself? How is your way of being? If we start with that question, we have to let the phenomena work into us. We are not easily satisfied with a causal explanation. For even if it is true that the bull received its horns through a process of selection, we get the same answer when we ask about the elephant's trunk or the giraffe's neck. We shall not cease to ask why. We shall, however, start to ask how and what. Within the humanities it is

well known that the linear, causal explanation has its limitations and must be complemented with a contextual, understanding method. For example, Henrik Ibsen opens *Per Gynt* with the lines:

“Per, you are a liar!”

At this early stage of the drama, the statement is but an accusation that Per has told a lie. But if we look at the play as a contextual whole we discover that Per is a notorious liar, who in act after act is hunted down by his lies. The opening statement thus takes on a new meaning and depth. In a text there is an ecological situation with multiple relationships intertwined. Every sentence (organism) has its separate meaning. But within the interaction with other sentences (within its milieu) it becomes modified and deepened. The whole is not only built from the parts but it also gives real meaning to every separate part. In Craig Holdrege’s article, “The Sloth: A Study in Wholeness.” 1), we find an excellent example of this goetheanistic principle in use.

We need a science of nature that takes seriously the qualities of nature and approach it as a whole. Though it is still dominated by Galilei’s and Bacon’s methods, ecology carries the message of such a science. Goethe’s science is a deep ecological method that indicates the next step science must take if life on earth is to survive: To begin to know the inherent qualities of what we manipulate, preferably before we fire off our “gene guns.” In my story on “The Hippo and the Eagle” I try to do what I have indicated here in general terms.

Sources:

1. Craig Holdrege, “The Sloth: A Study in Wholeness.” *Newsletter of the Society for the Evolution of Science* 14(1): 1–25, 1998.

The Hippopotamus and the Eagle

by

Trond Skaftnesmo

Translated by Ted Warren

We had an all-day exam at school and I arrived for the third watch. But I had forgotten to bring along a book to read. All I had was a pen and some white pieces of paper. It was an excellent opportunity to do some creative writing! The result—some time later—was a solid, Goethean-style book on animals for children and adults: *Why the Horse Has No Horns and Other Animal Riddles*.

What follows is a glimpse from one chapter. It is a conversation between one of the world's best animal-story tellers, Johann Wolfgang, and the twelve-year-old Rein Lowe. His name translates to Reindeer Lion.

It may be noticed that Johan is able to “transform himself into the animals he speaks about. Therefore I must warn you about some heavy scenes.

* * *

“Look it up in your animal book,” said Johan. “There is a picture of a hippopotamus and sit down with a cushion behind your back. Then you can listen to a story about the hippo as told by a bushman.”

* * *

God created the hippopotamus as a grass eater. The idea was that it would walk on the savannah and eat grass like the other animals; the zebras, the wildebeests, giraffes and the buffalo. But the hippo was not very satisfied with that. To walk and chew grass the whole day long – no, that life was much too exhausting. Besides, it had no fur – for it was totally naked – and the sun was such a nuisance. So were the insects! How did the Good Lord think the hippo should protect itself against the insects when He had only equipped it with a little tassel of a tail? “No,” thought the hippo, “I am made to live in water. I love water. It is cool, and I feel so light when I sink down into it. And there are no bothersome insects down there.

When the wading birds and other animals that find their food in the water heard the hippo say this, they became anxious. They went to the Good Lord and

said, “If you let the hippo live in the water and find its food there, it will quickly eat up all of the fish. Just look at the huge jaws and the large teeth it has! And what will we eat when all of the fish are gone?”

The Good Lord listened to one animal after the other. Then He asked the hippopotamus to come before His throne. “Since you love water so much and are bothered by the insects and the sun, you may live in the water when the sun is steaming down and the insects are flying around. But you may not eat anything under the water and absolutely no fish. At night you must go to land and find your food on the savannah near the great reed lakes. You must promise one thing, though. Because I will give you such a comfortable life you shall be My gardener and take care of the grass near the reed lakes. Drop your manure all over and spread it out evenly so there will be very good conditions for the plants to grow that give protection and nutrition to the birds and other animals.”

The hippo promised to do so. And so it was. During the day the hippo lay comfortably resting, sunken beneath the water. And he keeps his word. For to this day no one has found any fish bones in his manure. At night the hippo goes up on land and eats grass on the savannah, near the green lakes. Before the sun rises he has fertilized God’s green fields and taken care of everything like a diligent gardener.

* * *

- Is this true? said the Rein? Is this how it is to be a hippopotamus?
- Everything in the story is true in a certain way. But let us take it in the right order. The first thing you must know is that its name is not right....
- Do you mean it should have been named something other than hippopotamus?
- Of course that is what I mean,” said Johan and looked a little undignified.

Uff. Listen to it! Hippopotamus! – Do you know what that means? River horse! But the hippo is no horse. The bushmen know exactly what I mean: they call it the old aunt water cow. The Arabs named it water buffalo. And the ancient Egyptians were not far off either; they called it river hog. Uff. Like a horse!

- But listen, said Rein. I have read that the hippo is the most dangerous animal in Africa and that they have killed more people than lions have!
- Well now, maybe that is because people know how to look out for lions!

However, I cannot deny that hippos can become terribly mad if they are disturbed. And they have a terrifying mouth with horrendously ugly teeth. But if people know how to avoid them, the hippopotamus is the world's most peaceful animal.

- But how do people know how to avoid them? And what makes them so terribly angry?
- Just imagine that you work in an office or you are quietly reading a book and then—without a warning yet insistently—a mob of tourists and journalists storms in and starts taking pictures of you. Flash bulbs light up in your face. I think even you would get angry then. And that is just what happens to the hippos. They lie quietly down below the water, with only their eyes and nostrils sticking out. The enormous amount of grass that is carefully chewed and swallowed during the night—it can up be to two hundred kg.—must now be digested in the enormous stomach and go through more than sixty meters of intestines and become manure that nourishes the land. Think about it, the hippopotamus actually lies and bathes in its own fertilizer water. And while the animals lie there, deeply ensconced, digesting, a gang of tourists rushes in and surrounds them. They all want close-up shots! As if the world does not already have enough close-up shots of hippos. And now, all hell breaks loose!

* * *

At that moment I was suddenly given the role of the obnoxious tourist who enraged the flock of hippos. From his stool by the door, Johann crossed the room in a raging outburst of hippopotamus anger. Didn't we speak of the most peaceful animal in the world? Sure, but only until it gets mad!

- OK! I got it! I think I know what you mean. Is there something more to say?
- A lot more.... every animal is a bottomless riddle. However, enough about hippos. I want to speak about the absolute opposite!
- Which is?
- Which is of course the eagle. And in this case the eagle represents all birds. For it is the king of the birds, the one that flies the highest.

Then Johann opened the animal book that lay on the bed before me. He searched the pages for the picture of the golden eagle. “Look here. Can you see what I mean when I say that the eagle is the exact opposite of the hippopotamus?”

“I know that it is very different from the hippo. That is easy to see. But as for the ‘exact opposite,’ why not choose the bats? They are light and dynamic.” Johann let out a deep breath and sat back down on his stool. “When the sun rises over the savannah, the hippo sinks down into its warm lake. At the same time it sinks into itself, into its digestive process. If you want to find its opposite you need to find an animal that lives more in its environment than in itself, more in its vision and senses than its stomach and intestines. It must be an animal that lives in its heights and on the plateaus and in the sunlight. Eagles live such a life, not bats.”

– Tell me more!

– You have certainly seen how the eagle can circle high, very high in the air without even flapping its wings. They are carried by warm airstreams that flow up from the valley during the day. The eagle is at home high up in the sunlight. From there it spies down on its prey, a hare or a little lemming that darts between bushes a hundred meters below. That is what we mean when we say: ‘Eagle eye!’ When the eagle circles on high it covers a large area with its sharp vision. And it covers a wide area with its attention. If it has chosen a victim it is immediately concentrated on that little dot below. Then it dives steeply from a great height. Holding awesome speed in a bow-shaped dive towards the victim it grasps the prey in its claws and rises quickly upwards again.

Johann suddenly stood up from the stool, stuck forward his head, folded out his arms like wings and became an ‘eagle.’ He snapped up an invisible animal on the floor so quickly that I jumped into my bed. He soared back to the stool, which he used as a mountain ledge and demonstrated how the prey was held in the claws and divided into pieces for the baby eagles in the nest.

– It is important to mention that the eagle is just as superficial in its digestion as it is accurate in its vision. The food flows right through it. And since it is not guaranteed to receive food every day it must take in a lot of food when possible. An eagle weighing seven pounds can easily eat three and a half pounds in one meal. That is a half of its weight. Not bad. By the way how much do you weigh?”

- I weigh about ninety pounds so that would be like eating forty-five pounds in one meal. Yikes! How can it lift off after such a big meal?
- After such a meal it sits for awhile on its mountain ledge. But remember, most of the eagle is still air and feathers. Did you know that the bones of birds are filled with air? Yes, they actually pull air into their bones. When we breathe in we pull in oxygen from the air and then breath it out again. Birds pull oxygen out of the air both when they breathe in and when they breathe out. And with so much air inside they become very dried out.... Think about the eagle's dried beak and then compare it with a cow's wet nose. And have you ever touched an eagle feather?

Johann did not know I have a collection of feathers under my bed, among them an eagle feather. I pulled them out and showed him triumphantly. Johann looked excitedly through the bag and quickly held high the black eagle feather. "What an unbelievable work of precision! Feel how light it is. Almost no material is used here: not in the mid-rib, nor in the branching veins that are filled with air. Do you know how many feathers a sparrow has?

- I guess close to one thousand... But tell me, have you really cleaned a sparrow and counted the feathers?
- Not I, but there are people who do such research. And they say sparrows have 3400 feathers. Do you know how much they all weigh?
- Since you ask it cannot be much. Ten grams maybe?"
- Less than two grams! Do you understand this language? Here is the least possible material and the most possible form. If you think of the hippopotamus then you have an enormous difference. In a hippopotamus we have 7000 pounds of living mass shaped like a barrel. It is the most possible material and the least possible form. The hippo has a naked, living skin. And do not forget that it gives life and nutrition to its environment. To the contrary the eagle's coat of feathers is a dead shelter and it lives by killing... such is its task in nature.
- Does that mean that the hippopotamus is a blessing and the eagle is a curse? I know that few people bless the eagle since it kills lambs and reindeer calves, but I cannot curse it. When I see an eagle high in the sky I become excited. There is something royal about it. It feels like Sunday inside me."
- Now you are speaking like a wise man! To bless the hippopotamus and curse the eagle, that is like blessing the stomach and cursing the head—just because the head consumes the nutrition that the stomach creates. No one is

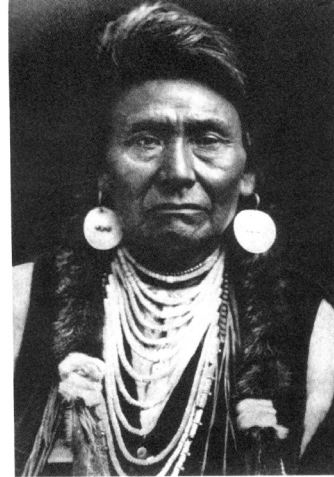
so ridiculous. Yes, it is truly the ‘sun-day’ when we see the eagle soar above. While the hippopotamus is active at night under the moonshine the eagle is nature’s picture of daylight-filled, majestic sun wisdom. The Native Americans on the prairie, among others the Lakota Sioux knew this. They dressed their chief with a majestic crown of eagle feathers as a sign of his wisdom and power of thought. Tatanka Iyotake, known as Sitting Bull, wore feathers from the American Bald Eagle.”

– That is strange, a sitting bull with eagle feathers!

- Yes, imagine that! No chief could be better prepared than with the strength of a bull combined with the eagle’s sharp vision of wisdom. And you know that the eagle feather was used for many years as a pen, a tool for wisdom and the power of thought. Can you think of a better coincidence?”

– Is that a coincidence?

– Well. I will not deny that there are some coincidences in the world. But nowadays, in my opinion, people are very superstitious in this regard. In truth there are far fewer coincidences in the world than most people believe.”



Sitting Bull



The eagle

Merely eye, beak and claw
Copper sun and sudden death
Air breathed into the bones
Light stiffened into a feather dress
Reluctantly it touches the earth
Rather it flew into the sun

– TS

Close Contact with the Earth: Necessary Experiences that Provide a Basis for Lessons in Natural Sciences

An Interview with Linda Jolly
by Eli Tronsmo

Translated by Ted Warren

“I had not taught biology in the Waldorf high school for very long before I noticed the pupils did not have the experiences necessary to make the lessons productive and whole. The lessons became too abstract; they did not resonate with the youth. The basis for learning was not present,” said Linda Jolly. With this educational problem in the natural sciences, she began her diligent work in finding the arena where pupils could make the necessary experiences to provide meaning in their theoretical lessons.

“From a child’s starting point, the world is now complex and abstract. While children and youth deal with new technology in their daily lives, they do not know how things are created. This steals from them the joy of learning and the self-confidence that could be theirs to discover and research,” comments Linda.

The School Garden: A Starting Point

Every person who has visited the Bergen Waldorf School in Paradis, Norway, cannot avoid noticing the school garden—its size, lushness and activities. It is actually several gardens, and this has something to do with more than Bergen’s abundance of precipitation. For many years Linda Jolly could be found in the garden, afternoons and vacations, with dirt under her nails and weeding on her facial expressions, often with school children nearby. Surrounded by green houses, tall flowers and rich vegetable beds, she always had time to speak about the earth’s significance in education. Since 2006 she has been a researcher for the Section for Teacher Education at UMB.

“When I moved to Norway in the ’70s, the Waldorf School of Bergen had just started their high school and they were looking for a biology teacher. At first I taught study blocks, and in 1979 I moved to Bergen. Until 2002, I worked more or less fulltime at the school.

“When I began to teach biology and chemistry in the upper school, it became clear to me that the students had an acute deficiency of first-hand experiences with nature. To really engage them in these subjects it was necessary to offer them a basis that stretched far beyond the classroom and mountain climbing. You cannot create interest for a subject that pupils have never touched with their senses. I became more and more concerned that this basis for learning must be present. This was my starting point for my thirty years’ work and engagement in the practical experience of agriculture for the students. We created and further developed multiple gardens.”

Linda Jolly makes a point of the importance of the practical side of natural sciences. Currently she is interviewing former pupils who participated in her agriculture study blocks during the tenth grades between 1980 and 2008, and collecting written responses about their work together. “For me it is very interesting reading, and the responses tell me how the pupils were engaged and touched. The responses from some students simply say that it is good to have a change from normal lessons, while others say these experiences were important in a larger context. Some pupils continued to participate in the agriculture study blocks after they graduated from the school. They guided the upcoming tenth graders. I have some pupils who have participated year after year. As one of them said, ‘I want to buy a little farm. Actually I want to move my whole life into an agriculture study block.’”



The Agriculture Study Block

Asked what such an agriculture study block offers pupils, Linda answered, “It is many things. The block must be seen in the context of experiences the pupils

have had in previous years, for example in the school kitchen and in natural scientific lessons. Therefore it is very important to work with other teachers. I

enjoyed a special relationship with Marlene Nygaard, the school kitchen teacher. It is essential to have someone in the kitchen who will work with our produce. Through the entire fall of the eighth grade, the class preserves food and they can use raw materials from the school



gardens. When they later study ‘the Chemistry of Food’ in their curriculum, they already have rich experiences from which to understand the theoretical side of the subject.

“But to say more about the agriculture period, for young people much depends on direct experiences and mastering the areas they have already been in contact with. In addition they are doing something significant in the garden, they are participating in a huge, common effort. They do not need to Work (with a capital W). Something as simple as chopping wood, repairing a fence, or making a meal for everyone provides important experiences. And most importantly they can see their tasks in a context.

“The agriculture block was organized so pupils had a week in the classroom before summer vacation. This was a preparation time, during which we covered areas they could deepen during vacation, themes such as: ‘The Use of Insecticides,’ ‘Genetic Manipulation of Animals and Plants,’ and ‘Pollution in Agriculture,’ ‘The Use of Energy,’ and ‘Changing Landscapes.’ I think it is very important at this age to work in the school lessons on relevant issues. One day it may be mad cow disease, another time it can be hoof and mouth disease. The issues surrounding the preparation of food are always relevant. There are many overweight and undernourished people on the earth. Why is this so? And what about food prices—what does it cost to produce ethically responsible food?

“I gave the students reading materials to work with so they could begin an independent study. One week before school started in August, we traveled to Skillebyholm in Jarna, Sweden, for two weeks at the biodynamic gardens. It is a teacher’s dream to have such an study block with students—long days filled with many opportunities for theoretical, artistic and practical work hand in hand, You can challenge the students on many levels. For the most part, the class teacher

participates and once in a while the music teacher. And often we take along former students who see this as a volunteer job.

“The meaningful side of gardens is the multitude of tasks. Some students have been in the machine yard to repair tractors and other equipment while some work in the fields, building a fence, or in the greenhouses or the fantastic herb garden, some work in food production (I have no idea how many jars of pesto they have made.) Others work in the compost, the berry bushes, the fruit trees, the woods or in making lumber. Not to forget the popular job of digging ditches! Yes, we also chop wood and take care of the animals.

“As the teacher it is always interesting to observe the difference between the two weeks. Not used to such physical work, the students are often tired during the first week. In the second week their self-confidence has grown, and they ask questions such as: ‘Do we have to go back to school?’ or ‘This is how school should be.’ Children and young adults today are often not used to watching adults work, let alone work themselves. Before we leave the farm, each pupil takes an objective test and gives a presentation. I make demands of them in the subjects and we have many hours of book learning. It is interesting to see how powerfully they are connected with their newly-won knowledge after the visit.”

Ecological Sciences

What are the ultimate goals with lessons in the natural sciences?

“If students would understand ecology as anything other than abstract theory, they must have a fundamental understanding of the earth. They must know which soil is found under hardwood trees and which soil is found under pine forests. Most people cannot differentiate between mineral soil and living humus. And most pupils do not know how a plant grows. In his book, *Beyond Ecophobia: Reclaiming the Heart in Nature Education*, David Sobol emphasizes that you cannot protect something you do not care for. Today many children learn more about the rainforest and threatened animals in Africa than about the nature at their front door. Contact with nature and first-hand experiences are the greatest challenges for an up to date ecology lesson.”

If students often do not know the fundamental competencies about the earth and agriculture, is that not also the case for most teachers as well?

“Yes, many are unsure how they should present this field. Many wish to further develop their teaching methods in natural science lessons but feel helpless

when it comes to practical work. For teachers and farmers to find new ways to work with these subjects, we offer courses here at UMB. A one-year course is directed to those who want to make school gardens. Most people who attend are not Waldorf teachers. They are often very impressed with the first years of the Waldorf curriculum. Today roots are being set for the necessary experiences for lessons in natural sciences in many places in Norway.”



Linda Jolly studied biology, botany and education at the University of California at Santa Cruz, at Freiburg University in Germany, and at the University for Environment and Biosciences (UMB) in Aas, Norway.

Physics Lessons that Start with the Human Being

by
Geir Øyen

translated by Ted Warren

Can a visit to a pitch-black grotto on a brilliantly sunny, winter day or listening attentively to birds singing in the woods be important aspects of meaningful physics lessons? If so, what kind of physics instruction are we talking about? What is the ultimate goal for Waldorf physics in the seventh grade?

Acoustics

Imagine the very first lesson in the seventh grade. All of the pupils are gathered around the piano in the music room. There is excitement in the air. One pupil is playing a little piece by Mozart while everyone listens. She plays the same piece again. The pupils listen more attentively. Are there more deep tones or light tones? Which tones cling the longest? Now the piano lid is opened wide and the entire inside of the instrument is visible. We can see all of the strings—from the one-and-a-half-meter long, thickest strings at the far left side to the ones that are barely as long as my hand to the right, together with a bunch of felt-clothed hammers and finely fitted wooden pins. She plays the melody a third time. We listen, we feel with our hands and we watch. How are the tones created? From where do the deep, long tones and the light, short tones appear?

The next day it is time for reflection and conversation. In the little Mozart piece we heard more light tones, fewer deep ones. The light tones were of shorter duration, the deep ones longer. The short, light tones came from the thin strings to the right while the deep tones came from the long, heavy strings in the left. Soon our conversation turns to the small, light birds with light, short chirps and to the big, heavy cows with dark, long “moos,” and to big people with peaceful, dark voices compared to babies with excited, light voices. It looks like

together we have found a series of laws, a general rule for music among people and in nature. That which is small and light gives light, short tones. That which is large and heavy gives deep, long tones. We try to imagine a cicada with a deep, bass voice and a cow with a light, chirping voice. It is comical. It does not work. “But,” says one pupil, “what about the whale? Doesn’t it have a very light voice, and it is huge!” We understand that we have not understood everything yet and realize the voice of a whale carries a significant secret.

We continue by exploring how music would affect us if it the opposite were the case. Imagine that music entailed very few long, light tones or many fast, deep base tones. We try some long, piercing, light flute tones and quickly notice that these tones pull us so far up that we become lame in our bodies and have headaches. The short bass tones do the opposite; we go down into our bodies and want to act quickly without thinking or tact. [The tact used in military marches and hard rock music exploit this to the utmost.] We find that a fine balance between many light, short tones and a few long, deep tones in a lot of music and in nature seems to work harmoniously into the whole human being.

The acoustics lesson continues by researching the relationship between musical intervals and their respective string lengths. The pupils are impressed to learn that the most basic mathematical fractions are found in the intervals of the scale. Octave, quart and quint are exactly the same as $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{5}$. With the Chladni plates the pupils re-experience the relationship between light/shortness and deep/long and simple. They also discover that a pure tone for their ear is also a pure tone for their eyes.

Optics

The class visits a cave. It is bitter cold, close to 5 degrees Fahrenheit, bright sun and fresh, white powdery snow on the road. It is a fifteen-minute walk from the school to the cave. Before us walks a long row of pupils dressed colorfully. The colors are bleached in the sharp sun. The opening of the cave is black in contrast to the white snow. Inside the cave it quickly becomes dark and warm and even a little scary! We go out again and look at the colors on our clothes. Then we re-enter the cave slowly. What happened to the colors? We gradually move from pitch-black where all of the colors and forms disappear to blinding light and back again. Which colors best tolerate light? It takes a long time and many repeated rounds to figure it out.

On the following day, back in the classroom, we share our cave experiences and try to find some natural laws: The colors disappear as the light around us becomes darker; at dusk all of the cats are gray. When it becomes dark enough, the forms also disappear. The same happens when there is too much light: Colors fade and we again have a light, gray form. If the light becomes even stronger, the forms fade and a blinding white appears. Red is the color that best tolerates the dark; as the red color disappears in the dark, everything is black. In this way the color red resembles black. On the opposite end, at the cave opening it appears the violet color holds its strength the longest in the light. When the violet fades in intense light, also the forms disappear. Colors and forms lie between light and darkness. For human beings to see and experience the world of color and form, there must be a balance between light and darkness. We need both. We have discovered something profound and important.

We continue the optics lessons with the topic of complementary resonance pictures. The pupils experience how, after seeing a colored surface, our eyes always create a complementary-colored impression. The color we see in the outside world and the complementary-colored impression are one, total picture. If these colors are blended, the result is almost colorless. The outside and the inner experiences are interrelated.

Warmth

When we speak about heating water for cooking, I find out right away that most pupils know very little about what happens when they cook water almost every day. Just *how* does it happen? What is happening with the bubbles, the sounds, the steam and the rising temperature? We decide to follow a complete cooking/melting process attentively. We put smashed, dry, ice-cold ice (10 degrees Celsius) in a beaker and warm it by a propane flame. We follow the process with a thermometer. The temperature rises slowly and regularly to 0 degrees Celsius but something unexpected takes place. New warmth is continually poured into the vessel from the propane burner, but the temperature remains constant. The dry ice disappears slowly and water appears in the vessel. Once all of the ice is melted, the temperature begins to rise again. It increases gradually until it is just below 100 degrees Celsius. The water that was still and clear begins to move.

Just after the melting a weak stream of water and many tiny bubbles from the bottom of the vessel move to the surface. The bubbles contract and

most of them disappear on the way up to the surface. A faint, but increasing hissing sound can be heard. The bubbles at the bottom of the vessel become smaller and eventually collapse. The hissing, which was at first crackling dry and whistling, becomes stronger and deeper. At almost 100 degrees Celsius, the hissing stops for a moment. Then it is replaced by a resounding, belly-flop sound. The bubbles from the bottom of the vessel reach the surface and create a large waterfall-like display of steaming water. The water is cooking. The air just above the bubbling surface is clear as glass, a little higher it turns to gray, rising steam. The temperature in the water remains constant at 100 degrees Celsius no matter how much warmth is added. (We experiment with stronger flames and multiple burners.) For the time being the amount of water is reduced. And there is more steam in the air. Dew forms on the cold windows.

During the following days we experience cold and warmth in a number of ways. After anesthetizing our arms with ice, we scratch our arms with the tip of the compasses. We listen as ice-cold water and cooking hot water are emptied into the sink. We calculate the time it takes for cold water and warm water to run through a long, glass pipe. We slip some drops of ink into ice cold and cooking hot water and see what happens. We study the play of colors in a block of ice. We warm up various metals until they glow and watch the development of colors. And we melt tin.

Adding warmth leads to movement, lightness, dissolution, unclarity, watered-down tones and colors close to darkness (red, orange). Adding cold leads to stillness, weight, the creation of forms, clarity, sharp tones and colors that especially tolerate light (blue, violet). Fluent water resists when we try to freeze it to ice (solid form) or cook it to steam (gas form). Very much cold or warmth must be added to change the form. We talk about how warmth acts in a social way: it can lead to us relaxing and forgetting about ourselves. Some people need more warmth (as does water) or just a little (like tin) before they transform. It is important not to be too hot in the head if we are to think clearly and act wisely; individual thinking needs a certain aspect of coldness. To conclude: In human life we need both warmth and cold.

Methods

I use age-appropriate methods based on certain principles. For all three areas of experience, I start with a limited theme concerning human life and with phenomena that affect us in our daily lives. We work with music, natural sounds

between deep bass and light, distant sounds, then colors and forms between light and darkness, and then further to the life-giving warmth and fresh coldness between burning heat and freezing cold. In our approach to physics, darkness and cold have the same ontological status as light and warmth. Darkness exists in the same way as light, and cold exists in the same way as warmth. It is within the collaboration among the extremes, the nuances and the diversity that life takes place. In Waldorf lessons working with polar opposites increases our understanding of the phenomena that lie between.

From a Whole to the Holistic

Every new theme or subject is introduced to the pupils in an experience of the whole, the entity as a whole. The introductions, be they an entire Mozart piece, a cave or the process of boiling water from ice to steam, give room for experiences that affect us and that pupils can recognize. The experience of a total entity is not only multi-sensory but calls on their feelings and active participation. It is holistic in another way as well: In all three introductory experiences the phenomena are presented in their full spectrum while also related to human experience. This gives the pupils close contact with the subject at hand. In other words, we start by setting up a large canvas on which we can later paint in the details. The method does not set up disconnected and fragmented knowledge but prepares a meaningful context into which the experience of phenomena and facts can be placed.

The students work with their observations individually and collectively. When the teacher introduces the themes, the pupils observe phenomena without many questions or sharing of multiple perspectives; the initial experience is individual. There are no rights or wrongs. Nor do we make general conclusions. The next observation is directed toward a specific goal in order to find the answer to a specific question. To arrive at thorough and precise answers requires repeated experiences of the phenomena. After the pupils find their own answers, then the group discussion on the following day helps them form even better answers. In this way the pupils practice making their own observations and forming conclusions while listening to each other.

The Relationship between Several Expressions—Multi-sensory Experiences

We emphasize observing phenomena with all of our senses before describing the experience. In that we establish and verify the eventual

relationships, for example between tones, colors, and temperature. This is where we find the meeting in speaking about warm colors and cold tones.

The Relationship between Inner and Outer, Feelings and Phenomena

We also observe the atmosphere in our souls when we experience the phenomena. How do the pitch-black darkness and the bitter cold affect us? When our inner life is filled with darkness, colors disappear and also the nuances of shade. Our reaction reminds us of what we see in the outer world. We strengthen our connection to the outer world because we recognize something within and without. What we experience in our own life is seen as a picture and a reality in the outer world.

Not Reductionist

In the Waldorf school physics lesson during the seventh grade, we do not search for the explanation behind the phenomena; i.e., we do not introduce parallel phenomena at a micro level (molecules, atoms, wavelengths). We remain at the decimeter level and try to find and establish relationships within this level. In this way physics lessons remain down to earth and maybe connect with the child's own experiences. We avoid traditional reductionist "explanations," for example: "With a thermometer we register the change of temperature that is really caused by change in the movement of atoms," or "What we experience as lively yellow color is actually only an electromagnetic wavelength that swings between a frequency of roughly 520 terahertz/Thz." Such parallel phenomena are interesting and can be relevant later but not in the introductory lessons of the seventh grade.

We use this method to strengthen the pupil's trust in and curiosity about the environment. When the sensory and the obvious around us carry true riddles and enlighten the relationships for the pupils, a productive meeting between the school subject and the child takes place. Our goal is for each child to experience a connection with the world and enter an active, creative dialogue with the phenomena that surrounds it. During the first physics lessons the pupils will confirm reality by trusting their own senses and their observations rather than through a presentation of abstract laws and non-sensory atomic models.

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The Power of Observation in Literature Lessons

by
Tom Horn

translated by Ted Warren

The Detective as Phenomenologist

American author Edgar Allen Poe was passionately concerned with the relationship between observation and understanding, and he expressed this powerfully in his short detective stories in which his character Dupin solves a series of crimes in a very surprising way. At the same time Dupin explains his train of thought, thus exposing his method based on observations that take place free of prejudice. He gradually eyes a pattern that he looks into to see if there are general activities, and in the end he reaches his conclusion with scientific perfection. The deciding element in his method is when he collects the observations into an inner picture, which he allows to “speak for itself,” and the character of the picture is such that it does not express a conclusion, but rather he collects the observations and forms a context that appears from the observations rather than from the interpretation of the observations.

Dupin explains his method in the story “The Stolen Fox.” He tells about a schoolboy who plays a game in which one must always guess correctly how many stones one boy has in his hands. One boy is so good at experiencing the other boy’s thinking process that he can predict how many stones he will put in his hands. Dupin continues:

When I asked which methods he used to achieve full insight in the opponent’s thinking—right there, where his excellent results appeared—I received the following answer:
If I want to find out how dumb or smart, how good or how bad another was or what he thinks in the immediate moment,

I give my face the same expression that his face has, so that within me a correspondence with his expression appears and I wait to see which thoughts and feelings appear within me that correspond with the expression that both my opponent and I have on our faces.

The pictures this schoolboy creates are based on the observations that he makes “inwardly” by identifying with his opponent. He creates an understanding that is not only defined rationally but also upon feelings and actions. This is a phenomenological method that unites an artistic element with the ability to have empathic experiences. In addition it includes the person, the subject, within the act of observation. It differs from the scientific phenomenological methods that strive for objectivity after connecting the observations to the object and allowing the observer to be as neutral as possible.

Phenomenology’s Hindrances

Humanistic phenomenology is difficult to practice because we easily fall into set mental images. When we observe the content of a story, if we read a novel or observe a work of art, right from the beginning we have the need to obtain a basic understanding of what we observe. You can easily identify this tendency by observing how you relate to an existing content. In a historical document we look for confirmation of a certain human perspective or an ideology. In a novel we look for something in the author’s life that is reflected in the story. When looking at an abstract piece of art, we wonder what the motive may be or what it is supposed to represent. In literature we tend to look for an interpretation before we have observed by listening, reading and seeing. Very often we are more oriented towards ourselves than towards our observations. When our attention does go to the observer, a disturbed mirror-image of our self often appears. This, in turn, prevents us from paying attention to our consciousness where something new may appear that is not already present.

The Apple

The practice of phenomenological observation of the environment can provide for inner growth. It not only confirms what we see in ourselves, but forces us to notice what is really there. This is an important area to practice at school. For example, in the ninth grade we will describe an apple. The pupils should let go of all of their mental images of apples, as well as their concepts

of what an apple is, and then paint the apple with words, just as a painter would paint it with color and form. It is too easy to say an apple is red and round. All variations of its form, all color nuances, small marks, the flower, the angle and form of the stalk are described. From this one should be able to see the apple and paint it, even if one had never seen an apple before. This is quite a difficult task. Many questions appear: How detailed should the description be? How can I describe the shine on the apple with words? What about light and shadow that change with the movement of the sun as we write?

During the description previous experiences with apples will probably enter into our minds. Sour and sweet tastes appear. We remember hard and soft bites into various apples. We remember pictures of rotten apples on the ground or of snail holes in the apples which taste the best. All of these past experiences enliven the process of observation. They improve our vocabulary as we write but they do not improve prejudice-free conclusions in our description of the apple. Experiences always take place in the present reality, though they are often based on previous observations.

Observation in Reading

In the apple exercise we described the apple's form, color, light and shine. We let our previous experiences fade into the background. Now we can do the same with a text as the object of our observation. What takes place in the text? How can we characterize the actions? Is it filled with action or is it more stable and filled with atmosphere? How is the story told? Is the storyteller present? Is it in the first person? What does the storyteller know about the past, about the inner life of the characters or their motives? How does he present this to the reader? Within which time span does it take place? How about the vocabulary and the sentence structure? Are there many poetic images or is it told plainly?

The central aspect of a story is not the plot. If you look merely at the plot, then the apple is round and red, nothing more. Many other relationships play into a story. The more one observes them, the deeper one enters into the text.

In addition the reader will have a certain background with the author, according to the times in which he lives. History may play an important role in the formation of the text. Or the reader knows other works by the same author. All of these factors are expressed in a text. Therefore one can read a literary text in many ways. Three ways of reading text have dominated throughout history: biographical, new criticism and reading-oriented texts.

Biographical, New Criticism and Reading-oriented Texts

The Danish literature expert, Georg Brandes, used the biographical approach seriously in the 1860s when he wrote a series of biographies of famous writers. He worked with the relationship between an author's life and what that author brought forth in his writings. The method became very popular and continues to this day. One of his most famous examples is the relationship between the life of Hans Christian Andersen and his fairy tale "The Ugly Duckling." The duck is abused and mishandled but in truth it is a swan. The happy ending occurs when it returns to its species.

At the beginning of the twentieth century, especially in America and England, there was opposition to this interpretive approach. It was called "new criticism," and one of its most important authors and proponents was T.S. Eliot. The new critics considered texts to be autonomous and not an expression of a certain idea-historic period or of the author's biography. The text was considered a complete entity of language, i.e., the entire meaning is within the text.

New criticism dominated until a new perspective arose in the 1960s. This perspective works with the relationship between text and reader; in addition it works with the actual reading process and the reader's reaction to the reading. What did the reader experience? Is the reader's experience a part of the entire literary expression within a certain text? The text comes alive when the reader reads it out of his own experiences in life and personality. The Italian author and critic, Umberto Eco, went a step further by stating that the structure of the text is not only important but essential. They call it "reading orientation."

Literature Lessons from All Three Approaches

Behind these approaches we notice a historical process starting with the author and moving to the text and then to the reader. As a teacher we must relate to all three. Each approach presents phenomenology within a specific perspective. From the biographical perspective the phenomenological side comes through when we observe the biography objectively, as a description of a life that has been lived. This increases our interest for life beyond us. On the other hand it can limit our understanding of a text if we exaggerate and define everything in light of the author's biography. That would also prevent a phenomenological observation of the text.

With the new critical method we focus on the text by removing the historical and idea-historical relationships and the biographical perspective. We

allow the text to work on us. The relationship between language and content comes through. Here the limitation arises when we strive to set the text in a larger context. We need to find a balance when using each approach.

The reading-oriented approach comes to life the minute the text is read in the exchange between the text and the reader's abilities. The reader sees the text and creates inner pictures. These pictures come from many places: memories, archetypes, dreams, sensory impressions, and illustrations. The text that is read is the main content, but it is heavily influenced by all the pictures.

The Content of Literature Lessons

When we tell fairy tales in the first grade, the children take their first step in learning how to think. The stronger the inner picture creativity among young children grows, the more they are able to create their own concepts in the future. In fairy tales the world is a totality where supernatural beings work into the lives of people and their animals in a mixture of fantasy and reality. Goodness wins over evil.

This changes in the second grade with fables and legends. The fables are about animals that are given human qualities but due to their weaknesses, physical limitations and instincts end up unsuccessful. The legends express the good deeds of human beings at whatever sacrifice they must make.

Many years later when the same pupils meet Nietzsche's powerful work, *Thus Spake Zarathustra*, in the high school, they learn of a man who lives alone in the mountains. He is filled with wisdom and will soon go down to visit people in the valley. There he meets a crowd that watches a juggler who performs a wire act. Zarathustra says to the crowd: "Human beings are wire, tensioned between animals and super humans—a wire across an abyss." And he continues by saying that human beings cannot continue standing on the wire but must move in one direction or another, either back to the animals or forward to human ideals. The inner dialogue between the teenage reader and the text recalls the fables and legends the children worked with in the second grade. There is no need for abstract or moralizing conclusions to the statement, for the children who are now teens understand the dynamics.

Literature lessons unfold when the observer and the observed, the reader and the text meet. The more we use biographies, texts and conversations to create inner pictures, the deeper our pupils will understand literature. Like Dupin, we always begin with observation. Our pupils

will gradually find a pattern in the text and then look for a more general understanding. In the end they will reach their own conclusions based on the inner pictures that have been formed into their own understanding, which they can then share with others.

Insight into Human Nature as a Basis for Waldorf Education: Anthroposophy and Modern Brain Research

by
Helge Godager

translated by Ted Warren

A glimpse at the neurobiological view of learning at the beginning of the 21st Century and how such knowledge can be used in education. Where anthroposophical research and non-anthroposophical brain research find common ground.

Early specialization that builds upon a rigid but, according to many neurologists, limited network in the brain is not sustainable in relation to rapid changes in society or business. According to Gerald Huther, prominent brain researcher, a child who is prematurely forced to agree with the convictions of his society

experiences his *mystical phase in consciousness* in only a reduced and empty way and will probably not succeed later in life in developing a reflective consciousness based upon his own convictions. Without a consciousness developed on his own, the child is trapped within mental images he has learned from other people unconsciously and without reflection.¹

A professor in neurobiology at the psychiatric clinic at the University of Gottingen in Germany, Huther criticizes our ambitious information press on children that results in limiting their time to develop inner pictures of their own. According to him the consequences are drastic. An increasing number of children do not develop their own self-security, which results in a state of “pseudo-

autonomous self-centeredness.” This is one of the main reasons for restlessness, emptiness, psychological illness and lack of willpower. In addition to the personal tragedies that result, the future of our society in all key areas is at stake. Schools are also responsible.

Huther defines the general premises for brain development:

We human beings, as opposed to animals, have a brain that to a certain degree programs itself according to how we use it. We have to decide how and why we will use it. If an individual decides not to make such a decision, the result is connections in his brain that are automatically growing up. He becomes a prisoner of the disposition he passively receives and what he is given. —And later, when a person decides to use his brain in a special way for a certain cause, he is in danger of the brain’s inner organization continually adapting to existing, one-sided use. He becomes more and more a prisoner of the decisions he made previously.²

How can teachers prevent putting their pupils in this situation? What can we accomplish in our pedagogical work? Huther describes a successful learning process:

The characteristics of broad-minded and considerate persons are not their looks, power or influence, but how they use their brains as often and as encompassing as possible. What they are looking for is not certain. And because the goal can never be obtained, they make the path the goal.³

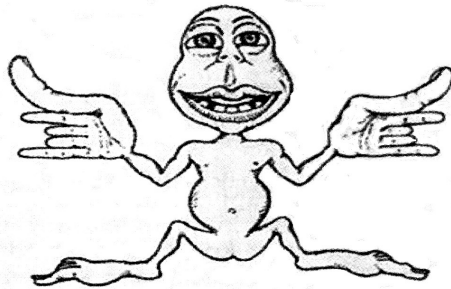
Huther emphasizes environment and education as the most influential factors. In Waldorf education we consider the child a being that is in no way limited to his physical body, but must continually adapt to his unique being and the corresponding developmental needs in order to incarnate fully. How can we help children develop their brains in such a way that enables free choices later in life? To find the answer, let us look first at research into how the brain is affected and developed by learning processes, as well as our thinking, feeling and willing.

Central Neurobiological Studies

At the end of the 1980s, brain researchers believed that the body's cortical mapping in the brain was a defined set of cells for the entire life. (Kandel & Hawken, 1992) They refer to work done at the University of California in which a group showed that cortical mapping was modified due to the use of sensory pathways. Apes were trained to rotate a piece of apple for one hour every day for three months. The apes were rewarded with juice whenever they completed their training. And they were allowed to use only fingers one and two, not finger four. At the end of the experiment researchers found that the area of their brain, in the somatic-sensory cortex, that represents the active fingers had increased considerably.

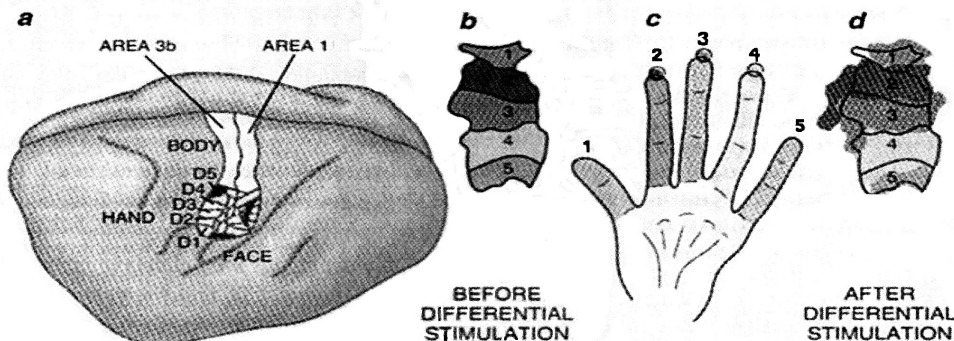
The authors proclaimed the hypothesis that the studies show basic, adaptable cortical processes that are behind the cortex's contribution to perception and learning. (W.M. Jenkins, M.M. Merzenich, et al., 1990) This was one of the first experiments that demonstrated experience-dependent changes of the cortical mapping.

Representation of the Surface of the Body in the Cortex



The homunculus ("little man") is a traditional way of illustrating how the surface of the body is represented in the somatosensory cortex. Larger areas of the cortex are devoted to parts of the body that have greater sensitivity, such as the fingers and lips.

Recently the effects of sensitivity training have been shown in the owl monkey. The monkey's digits are represented in areas 3b and 1 of the somatosensory cortex (a). The diagrams (b and d) outline the regions that map the surface of the digits of an adult monkey (c) before and after training. During training the monkey rotated a disk for one hour a day, using only digits 2, 3 and occasionally 4. After three months of this activity, the area representing the stimulated fingers in the brain had increased substantially.



From a Kandel & Hawken article published in Scientific American, November, 2006 p. 59

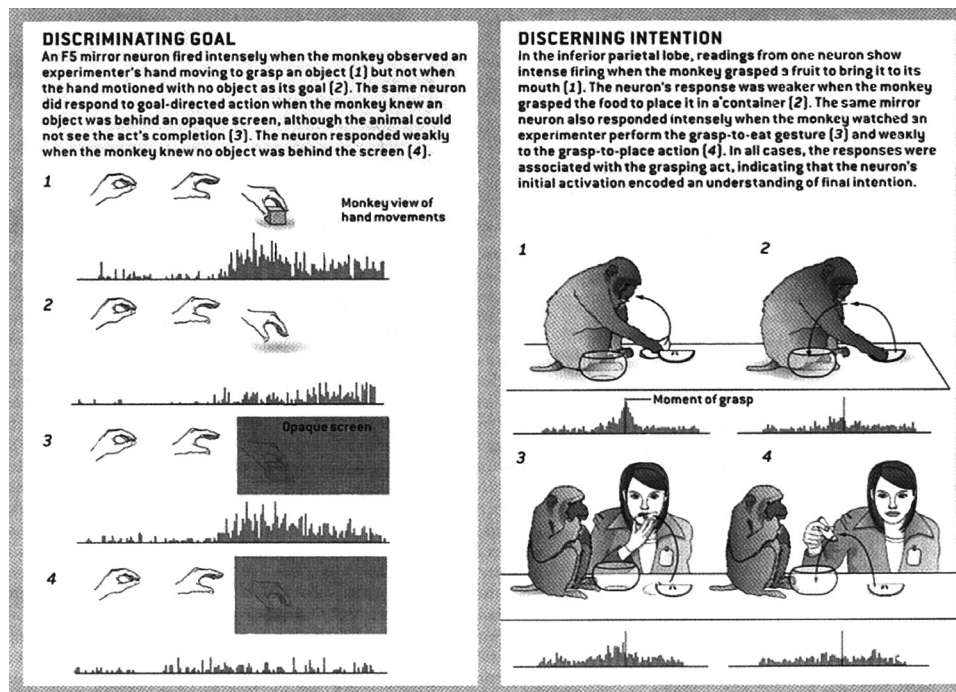
A further experiment was conducted using different activities. The apes were to distinguish between the swinging frequencies of a little plate using fingers two, three and four. First the researchers used frequencies that the apes could not distinguish. The apes were then trained for two hours a day for two months: Every time they were able to distinguish the plates, they received some juice. A second group of apes received juice as often as they liked while they carried out their tasks (passive training). The result was comparable with the previous study, except the passive-training apes learned nothing. Nor could researchers prove an increase in the apes' overlapping/relocalizing of the cortical mapping (G.H. Recanzone, M.M. Merzenich, et al., 1992).

Manfred Spitzer, professor of psychiatry at the University of Ulm, commented on the discovery:

How can we understand this? If the correct cortical mapping appears and changes according to experiences, this experiment would also show neuro-changes. But this did not occur. There is something in this simple theory that does not work. Without paying attention to the experiences that are being learned, massive "bombardment" of the brain has no effect. The reason is a lack of selective attention and thereby less activation of the area that should be the function for learning of the corresponding content. Therefore attentive reflection of the information provides the necessary amount of activity in the corresponding areas of the brain.⁴

When we consider the importance of daily schoolwork and activities among children, this insight supports the value of active willpower among our pupils. It means teachers must, in addition to presenting the correct content, find out *how to teach* according to the child's age.

For me these experiments raise the issue of over-training and under-training. How attentive are pupils when they do something? If we indulge too long in presenting a subject or topic, will the cortical mapping be too encompassing and hinder the development of other areas that are as or more important? And how about the opposite effect? Will the practice time be too short so that the cortical mapping does not reach the effect necessary to support the child's next level of learning? And how does this affect the difficult learning processes around puberty?



From Scientific American, November 2006, p. 33

Mirror Neurons

Another very interesting area of research presently under development is the discovery and interpretation of mirror neurons. A research unit at the University of Parma, Italy, under the direction of Giacomo Rizzolatti, accidentally discovered in a study of crab-eating macaques that if a researcher grabbed for a piece of fruit, the same reaction took place in the monkey's brain as if it had grabbed for the fruit itself. Further research showed that this is normal even if the monkey does not see the action being completed.

The mirror neurons are in the premotor cortex (pc), which is the center for intelligent actions that is closest to the motor neurons that researchers believe cause the movement of muscles once the pc give the impulse to what and how an action shall be carried out. (J. Bauer, 2006) Human beings also have the tendency to mirror other people's intentions as if they were prepared to carry out the intentions themselves. This characteristic "makes possible direct and immediate understanding of other's behavior without complex cognitive processes."²⁵ It is tempting to call mirror neurons "social" neurons. Rizzolatti goes so far as to say that a person can feel another person's pain.

The practical consequences of our knowledge of mirror neurons for bringing up children according to their developmental stages are enormous when we realize that our thoughts, feelings and actions have such a great effect on

the children we live with. The conditions in which children grow up have direct physiological consequences. There is a huge difference when we tell a fairy tale that we have penetrated with our thoughts, feelings and willpower, that we also understand at a deeper level within the evolution of humanity, than a story we do not really understand or like. Anthroposophy is therefore a tremendous help in the necessary preparation of our subjects and in our personal development as teachers.

Where do television and computer games stand in relation to mirror neurons? As far as I know, this connection has not been researched as much as we would like, but we can raise our own questions. For starters, can you create a trusting relationship with a person on television who encourages your child to follow his intentions? And if so, does this person have a positive and broad perspective on the world that your child should mirror?

The phenomena of mirror neurons are proven so far in relation to sensory experiences by sight and hearing by Rizzolatti, et al. Their research is being followed up by others who think mirror neurons have more functions. Now let us turn our attention to anthroposophical research that inspires Waldorf teachers and parents, while guiding us to deeper insight in the learning and growing activities of our pupils.

Thinking, feeling and willing as physiologically active forces

The soul of a child, or astral body as Rudolf Steiner refers to it, contains three powerful forces of growth and learning: thinking, feeling and willing. Thinking is connected to the child's nerve-sensory system, feeling works in her rhythmic forces, and willpower is connected with her limbs. In this way a child's soul life is connected with her physiology. It is not hard to understand that the central nervous system, including the brain, is connected to the astral body's function of speech. It is more difficult to find the connection between the lungs, heart and blood circulation and the feelings our children experience in their souls. Two examples of physical expressions of feeling we can all imagine are shame or shyness which leads to blushing, and shock which causes the blood to contract and the person pales.

To understand willpower as a quality of soul is also difficult. We may believe that willpower connects to the physical body where all of our actions are carried out. When we evaluate a child's temperaments according to how they are expressed in the soul, it is easier to agree that willpower is part of the soul.

A phlegmatic child takes his time before he acts and considers for a long time, while a choleric often acts before he has even thought about it. The phlegmatic child considers many sides of an action before he gets the right feeling that leads to action. For the choleric the feeling appears immediately and demands action, while thinking is left to provide self-criticism after the action. Both cases entail a stream of inner soul activity without discontinuity that leads to an action in the outer world.

Waldorf teacher and researcher Wolfgang Schad, from the University of Witten in Germany, describes how thinking, feeling and willing are present in the human organism:

The past, the present and the future are simultaneously present in the human being. This is not only a soul characteristic but also a physiological one. It is easiest to find in newborn babies. A child's nerve-sensory system is so well developed before birth that the birth could have taken place two months previously. The fact that a seven-month old baby can survive, sometimes even without modern medical facilities, testifies to this. Digestion and the limb organization are still at an early embryonic state at birth, when you consider them with physiological criteria. For many months the child must have its special transition nutrition: mother's milk. It takes, on average, one year to reach the level of maturity that corresponds to the nerve-system, and it manifests in the limbs when the child can stand and walk upright. At the moment of birth, neither before nor after, but actively in the actual moment, the rhythmical organ functionality is prepared for the outer world—the lungs expand, the heart's walls close, the rhythmical child is born. If we observe this from another perspective, the trinity of the human organism is a direct result of separate developments in time. The nerve-sensory organism, the rhythmical organism, and the metabolic system including the limbs do not develop at an equal pace but at very different tempos. This so-called heterokroni (*hetero* = many, *kroni* = time) among human organ-systems is not the same as among other newborn mammals. The newborn human is, in relation to the head, a "late birth." The rhythmical human is normal at birth.

But at the time of birth the “limb human” has a long path ahead before full functional competency is reached. At birth, the human being displays three people of different ages together in one place.⁶

With this background we can now make a discovery. Thinking is rapid; it takes place in seconds. Feelings take more time, possibly one minute before we recognize them. And willpower (and here I am not considering reflexive actions) takes even longer before it is ready to go into action.

Let us look again at the rather strange insight that we are born with three physiological systems with separate development stages in time. And we see that it must have been our soul’s (astral body’s) need for thinking, feeling and willing that broke through and took control over the physical development during pregnancy and continued during the first years of childhood. The consequences of this must be that the astral body at this stage of development has direct contact with the child’s physical-etheric organization and steers it. This corresponds to Steiner’s explanation of the relationship between the physical body and the soul during the child’s first seven years of life:

Before the loss of teeth, the soul-spiritual and the physical-etheric are a unity. That which was the physical (physical-etheric) organization and which worked in cooperation with the psychological (soul-spiritual) organization is expressed in the forming of teeth. What previously worked on the formation of teeth has separated itself in an ideal, powerful progression to become memory, accurate memory.⁷

If we consider the child’s state before this crossroads, we see two things: The etheric body has had access to the outer world especially within the mother’s etheric forces. This is an essential prerequisite for learning by imitation. On the other hand the child’s own etheric body has been “very closely united with its physical body.”⁸ One consequence is that we should not infringe on these etheric forces by using memory training, for example learning letters by heart. Waldorf teachers choose to avoid such training because these forces are building the child’s body and its organs, which is a very demanding process of adaptation. If this process is not fully carried through, one consequence can be problems with inner organs later on in life.

According to Steiner the following takes place around the age of seven: “When the etheric body has liberated itself and no longer works upon the physical body as previously, it now works upon the soul of the child in much the same way as it worked upon the physical body.”⁹ At the age of seven we have an extreme change in the entire inner human organism. Before then the child lived in a holistic harmony between his soul-spiritual being and his physical-etheric being, where his soul experiences and the impressions had direct consequences for his physical development. One example is in relation to brain physiology where the conditions for learning change and become much more influenced by the outer world. What is a prerequisite for directing his own free learning ability to the outer world? The child’s soul-spiritual being must liberate itself from its own body. If that did not take place, the child would remain dependent on the physical body, which is the main characteristic of animals, not human beings.

The ether body now supports the soul’s thinking, feeling and willing by way of memory, and it is now the link between the soul-spiritual being and the physical human being. It is especially the etheric body’s exchange of will impulses to the glands that demonstrate how immediate this relationship really is. From a pedagogical point of view, it means the child must decide with his own free will what shall be anchored in his future physiognomy.

This also means that the parents and teachers must motivate carefully, with devotion and insight into the child’s individuality, for they are the child’s natural authorities between the ages of seven and fourteen. Why authority? Considering what has just been stated, you will experience in your child a sense of freedom. The astral body has built a physical partner that can mirror its decisions and turn them into actions within the time and space that it accesses. There is an unconscious side to this new freedom: the fear of being alone and fear to make mistakes. At the same time the child has, from now on, an inner, personal memory that provides increasing stability and a deeper connection to life. To do this, each child needs adults who they can look up to and enjoy. For the child needs will power and the courage to act, combined with loving acceptance from an adult, no matter how much is “wrong.”

The embryonic phase and the changes at puberty

How does the unity of the soul-spiritual being and physical-etheric being from conception to the age of seven provide more understanding of the changes at puberty? Although gender is determined at conception, both male (Mesonephric duct, Wolff) and female (Paramesonephric duct, Muller)

prerequisite formations for gender develop in all embryos at roughly the third week of pregnancy. In the ninth week of pregnancy, the gender formations that are not to be realized degenerate, and the genetically-determined gender formation occurs. (Glöckler, 1989) There are no documented gender differences in embryos between the third and ninth week despite the fact that gender has been predetermined genetically. Steiner makes us aware that the soul-spiritual being has no gender. In the spiritual world there are no men and women, just human beings. “It is very important to realize that the principle of gender in human beings first appears with its entrance to the physical world.”¹⁰ This helps us understand the first embryonic phase wherein the soul-spiritual being unites totally with the physical-etheric being and the entire human principle is present. Both male and female are present in equilibrium at this time and also in a physical expression.

Eventually half of this spiritual expression and the gender formation the individual shall not have degenerate and disappear almost completely. The question is what happens to the forces that created the development of the gender formations that were physically removed? These are etheric forces that are formed before the ninth week and steered by the soul-spiritual forces. They are not yet freed from the physical body; this occurs at the first change of teeth. But what do they do in the meanwhile? Let us look at the embryonic development after the ninth week.

At roughly the ninth week we begin to refer to the “fetus.” This is also when the first development of the brain occurs. It is reasonable to think that the forces of the gender formation that do not continue now work on the brain. This also makes Steiner’s comments more probable:

First when the human being is divided into two genders is the brain brought to the point where it works. And we can thank the process of giving up the other gender’s reproductive forces for the impulses in favor of brain development.¹¹

If we work with this seriously and test it in relation to everything we have addressed so far, we can expect two things: 1) There must be a difference between how male and female brains are formed, and 2) The brain is used differently according to gender. Can we find a basis for these assumptions within brain research?

Some researchers are convinced that there are centers in the female brain that are larger than in the male brain. They also consider individual differences that are dependent on gender. The majority of neurobiologists who speak about these issues believe that such gender issues are of no consequence, but it has been proven that the two genders use the brain differently—at least in regard to penetrating sensory impressions and speech. (Kimura, 1992) Some of this research is based on practical and theoretical testing that is based on hormones. The clearest difference in the use of the brain appears in the effects that brain injury has on the ability to move.

If we imagine the completed gender development in the physical body, men have an outer, somewhat extreme productivity that is quickly triggered (1.5 million semen cells per day), while women have a hidden inner quality with long rhythms. (Girls are born with all of the egg cells they will have for life; the balance of their gender development entails a slow, maturing process.) Such observations put us on track of the soul qualities that these etheric forces bring into the physical world.

The etheric forces in males that lead to physical, sexual organs are liberated in females to carry soul qualities, a process that begins around the age of seven and develops slowly. Therefore the female becomes outgoing, productive, conscious of her feelings and socially focused. To the contrary men experience a slow awakening of their feelings and need a longer maturing phase for their thinking. In general, men are more introverted, and it is not as easy for them to express their attitudes socially. These are the same qualitative forces that grasp the physical in the creation of the female's sexual organs, but are liberated in males to influence their thinking, feeling and willing. "When the etheric body has liberated itself (at seven years of age), that which previously worked in the physical body now works on the soul."¹² From this time on, these parts of the etheric body support the soul (astral body) of the individual with memory and whatever memory means for the development of thinking, feeling and willing.

Brain physiological changes in puberty and consequences for motivation

Rudolf Steiner spoke about the changes at puberty: "At puberty the human being is thrown out of the soul-spiritual life in the world and into the outer world that it may only experience through its physical body and with its etheric body."¹³

Around the age of twelve to fourteen, teens are removed from their direct access to the soul world and experience themselves as rejected. At the same time

thinking has developed well enough intellectually that their senses can be focused on nature. This is when Waldorf schools provide phenomenological pedagogy. Teens can now observe nature as a whole because they are no longer so deeply connected to it.

The soul of the teen now has a mirror in its physical body, including the brain. And this is when the brain is divided into two parts. The personal part is separated from the general brain and becomes more independent. It continues to use its part of the brain's neurological network. However the general part of the brain, that works from the outside into the brain and also from within the brain, now pulls itself out of the teen's physical body and therefore no longer needs a network of synapses in the brain. This part of the neural network stops working and degenerates because no one uses it.

The physical side of this development is proven in apes and human beings. In apes researchers have registered a reduction of active synapses by 40% within the primary visual cortex during and after puberty (Bourgeois & Rakic, 1993), and similar numbers (up to 50%) occur for human beings where the greatest loss of brain tissue (deep motor nuclei) occurs before puberty. (LONI 2007) The latter study concludes that youth lose their motor skills in, for example, writing and sports. They also conclude that this is a re-modeling of brain tissue that continues throughout the teenage years and beyond.

This re-modeling process gives our teens a unique opportunity to find their individual learning areas and also find new ones that do not merely reflect previous learning while providing all of the areas with a new anchoring in the brain. In other words, this is a great opportunity for teens to develop their own imagination and love for the world.

As a teacher in this phase, it is important to be conscious of a principle I choose to call "the physiological constitution of all pedagogy." That which is not put to use and further developed will recede. This is true not only for building muscles, but also for developing the brain.

During this phase teenagers require a lot of tolerance and forgiveness from their teachers and parents. This may comfort you: The brain has a great amount of pliable substance, that is, nerve cells that can take on new roles and old ones are discarded. (Kandel & Hawkins, 1992) Some things may be forgotten, but whatever shall be knowledge must be cared for. Deep-seated memory makes it easy to grasp 'forgotten' knowledge at a later date. And I indicated this is related to the etheric body. (Despite the fact that researchers have

proclaimed for many years that the brain is the carrier of memory, it has not been proven. This is indirectly supported by Nobel Prize winner Eric Kandel in his book, *In Search of Memory*.)

If their education has been successful, teens will discover new opportunities within. They no longer need to imitate adults or follow them due to authority. Rather, teachers have to provide reasons. According to Steiner this is also true on a subtler, unconscious level as well: “Youth have left the soul world with its values and want to enter the physical world when there are good reasons to do so.”¹⁴ If teens experience that teachers and parents cannot give the reasons for their convictions and do not see the relationships between the realities in the world, they will become disenchanted with their world of ideals that is now awakening inside them. If this happens, the boy’s inner world and the girl’s more social, value-based world are severely limited, and the result is a certain distance and apathy for other people and the world.

How do we positively motivate teens at this time? Our lessons must have real drive to them. They must be carried out with a solid context, progression and courage. Sometimes it is tempting to play intelligent, as a teacher with a vast overview of a subject, but there is always a balance to find between self-assertion and humility when one strives to awaken the teen’s enormous developmental potential.

Nor should we forget that with maturing organs of gender the possibility for love is also liberated. While sexuality is one part of this liberation, the most important motivating factor is genuine love for the world and for other human beings. “After puberty the human being is able to give birth to its own kind in the physical world. In the soul-spiritual sphere the teen can experience all of humanity within himself.”¹⁵

No motive for learning compares to guiding teens in unfolding, deep within their soul, their genuine love for the world. This has nothing to do with a scientifically balanced pedagogy. It is a matter of creating the joy of working and the love for life! The Goethean approach helps us stay focused on reality and not bring in outdated thinking or prejudices.

Education for freedom

As of the age of seven years, we focus on the separation of the physical-etheric forces from the astral-spiritual forces in the child. Does this separation continue throughout life until the final separation at death, or is there the

possibility for a reconnection? And what are the prerequisites for them to work together as a new unity? We find Rudolf Steiner's research into these questions in a lecture of April 1924:

A strange thing happens. What was developed as life-filled pictures in childhood between the first loss of teeth and puberty has become musically-formed inner possessions of the soul. These are grasped by the intellect. And human beings take up nothing from the intellect that is forced upon them intellectually from the outside world. Using their intellect, human beings merely take into themselves that which has grown forth in a different way. This is a decisive moment in human development: You have prepared what must be realized after puberty for a child to develop in a healthy way. The child understands what he already possesses within. Everything the child has understood in pictures appears from his inner life now enveloped within the light of understanding. The child now uses his intellect to perceive within himself. This is how he grasps his own human being using his Self. In this moment a new connection occurs between the astral body that works musically and the etheric body that works formatively, yes, sculpturally. Through this new connection the child becomes conscious of his own being in a healthy way after puberty. When two sides of the human being connect together after puberty, the child understands what he previously perceived in a correct, inner experience of human freedom.¹⁶

This healthy connection between the astral body and the etheric body of our children is what Waldorf teachers all over the world are striving for. But there is no guarantee. Many obstacles lie along the way. Gerald Huther identified one of the biggest problems we face in the Western world today. A child that is prematurely forced to agree with the convictions of its society

experiences his *mystical phase in consciousness* in only a reduced and empty way and will probably not succeed later in life in developing a reflective consciousness based upon his own

convictions. Without a consciousness developed on his own the child is trapped within mental images he has learned from other people unconsciously and without reflection.¹⁷

Huther says that the number of self-centered, pseudo-autonomous people is rapidly increasing in Central Europe. Let us look closer at this statement. First of all, he uses the term “self-centered.” This points to an unfree situation in a human being. He considers such youth to be superficial, with a reduced capacity for experiencing their own consciousness. If we compare that statement with what Steiner expressed concerning the decisive moment in healthy development after puberty, we notice that personal freedom has not been achieved by many young people. Huther uses less detail than Steiner, but he notices that these young people have not been allowed to live through their mystical consciousness long enough or deeply enough. When it was critical for them to live into and create their inner world of pictures, they had a reduced experience in childhood.

It is inspiring to find a researcher who is not an anthroposophist but finds, after many years of neurobiological and psychiatric research, the same results as Steiner. We live in a time of media; when it comes to time spent each day, television and computer games out-compete our schools. The problem is that media provide outer pictures that young children cannot use in their inner world. We know very little about which pictures the children then create inwardly when they watch television or spend hours in the aggressive world of computer games. In Waldorf schools we consider the years between seven and twelve as the time for their inner work, mystical consciousness. Only after the twelfth year do we use methods and content that focus more on the outer world. Steiner emphasizes that the pictures must be filled with life; they shall be interchangeable and deep. Television, film and computer-game pictures do not have the same healthy quality as the pictures our pupils create inwardly from the spoken word, artistic work, and drama—themes from fairy tales, legends, the Old Testament, northern-Germanic mythology, ancient civilizations, the Middle Ages, zoology, geology and botany. The finished products on the screens are not alive in a humanly interactive process; they are de-structive. They work from the outer world upon the intellect, and children cannot take them into their inner lives as Steiner indicates above. Media is a major reason for the decrease in level of learning in Norwegian schools.

Children should meet powerful, poetical, musical and enlivening arts at school so they can form the knowledge as inner pictures they can either mourn or celebrate! Then children create healthy pictures that can be understood intellectually. These pictures are hard-won and they engage the child's willpower. Huther indicates in his book, *Die Macht der inneren Bilder*, the children living without powerful inner pictures do not have the basis for individual thinking, and thus they are dependent on what lies in their genes and what is expressed physically. But these pictures are outdated and the result of other people's thinking. They have little to do with the child's own thoughts.

If we assume the child has received a successful education for freedom so that the child's soul and its physical body are re-connected, is that not a step backwards to the stage when the soul and the body were united before they went separate ways at roughly the age of seven? Is that not an unfree situation where the child cannot distinguish between itself and the world?

Let us take one more look at the development process in this article, but now looking for what is new. The soul-spiritual being liberates itself from the etheric-physical being at roughly the age of seven. We also looked at the ninth week of pregnancy, when the physical brain is formed. These are activities that are influenced by the qualities in the etheric body, those that do not grasp the etheric-physical gender formation and steer the formation of the brain, the very same qualities that characterize the opposite gender. The part of the etheric body that shall not develop the physical gender forward to puberty is freed to continually support the soul of the child at stronger levels. The etheric forces support thinking, feeling and willing but do not unite with them. The teacher and parent can prepare a new connection by patiently working with pictures and with sufficient insight, but it is up to the child to carry out the decisive work with its awakening rational thinking. Then the etheric body that was supported up to this moment is penetrated by the child's astral body.

This is the true moment of freedom—when the actions of the child take place based on a clear understanding of the inner pictures, which the child accesses in his or her soul. These pictures may be ideals, insights, new ideas and much more! True moments of freedom are also true sources of health.

Endnotes:

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3. Ibid., p. 103.
4. Spitzer, M., 2003, p. 155.
5. Rizzolatti, et al., 2006, p. 35.
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8. Ibid., p. 53.
9. Ibid.
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12. Steiner, 1972, p. 53.
13. Steiner, 1978, p. 239.
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15. Ibid., p. 243.
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Think Globally and Act Locally: The Ecology Practicum in the 11th Grade

by
Holger Bauman

translated by Ted Warren

Are we concerned when moths, hoverflies and bees are dying out during a global financial crisis that also appears to be the ruin of large companies, banks and even countries? Does anyone care that mangrove forests are being deforested along our tropical coasts, while people in other parts of the world struggle for wealth or more often for their survival?

It has taken a long time for the environmental warnings from scientists concerning the threatening “climate catastrophe” written up in earth study textbooks in the 1980s to become somewhat conscious in the general public. Was it not before 2008? And it took just as long for worldwide evidence of endangered species to reach broader circles—namely the survival for all of mankind.

Finally, at the United Nations Summit for Biological Diversity in Bonn (May 2008), concerned scientists found a common language that people who usually think of shareholder value could also understand. When researchers calculated, for example in the case of the worldwide disappearance of the pollination insects, the subsequent loss of fruit, vegetables, oil seeds, coffee and spices to the tune of 150 billion Euro, then did bankers and investors realize why a butterfly is of any worth. Now all of the services that nature provides for the national economies can be calculated in the billions; not only the cleaning of our air by the deciduous trees but also the value of mangrove forests for the protection of the coastlines and for the tourist trade. The economy of ecosystems and biological diversity has nothing to do with unrealistic accounting forecasts and false profits. It is hardcore business!

One of the global challenges of the twenty-first century is the question: How will mankind relate to the life of the earth so that ecosystems, sustainability

and diversity remain for the betterment, even survival, of all mankind? A historical review of the development of the human being would help us understand why we have come to this point. How did mankind evolve from the beginning of history, roughly five thousand years ago in Egypt, when there was a connection with nature, to the inner alienation and uprooting that has led to a global ecological crisis today? More pertinent perhaps is the question of how Waldorf schools handle the educational challenges that arise from the global crisis. How do we teach our lessons? What do teachers do with their pupils?

As in so many other cases we do not need to reinvent the wheel. Rudolf Steiner's Anthroposophy strives to help us consciously understand the totality of life. It complements the prevailing mainstream reductionist and mechanistic worldview. It can revolutionize our understanding of the world. It can help us—it demands of us, it supports us—to approach the existential questions about the relationship between the self and the world and the riddles of unity, diversity and identity.

When thinking of the environment and our landscapes we can ask: Can we experience the relationship between the self and the world? And can we acknowledge how the human self and the world of spirit are interwoven? This motif is spoken every day in the morning verse.



Is there a concept of environmental education for Waldorf education?

As late as the 1980s educators thought that it was enough for pupils to simply know about pollution and to recycle batteries. Everyone knows how much logical insight and daily behavior differ. One concept of Waldorf education is that the children should develop an attitude of responsibility, empathy, insight into the necessities in the world and an ability to understand oneself as part of the whole.

Together with their own being, the world and the environment, the young people should discover their identity and challenges.

And if we replace the word “environment” with another concept—“world”—we replace the self-centered attitude of “that may be important but not for me” with a direct understanding that the world “is my concern.” Young people need to understand themselves as a part of nature and learn how to care for it. A goal for education is to enable young people to act ecologically, beginning in the first grade. There children learn to observe, experience, discover, participate, contribute, enjoy, be interested, practice and act affirmatively. This is intensified in the main lesson blocks.

Apparently only every third pupil in Germany between the ages of twelve and fifteen has held a bug or a butterfly in his hands. And these children spend less and less time in the woods and by the rivers. Instead they sit in front of their computers for an average of four hours a day in a digital virtual-reality world. This only points up how important it is for them to discover their own natural environment. Only then will they want to protect it.

The Waldorf curriculum emphasizes practical activities in the gardening lessons grades six through ten. The students work with composting, soil, planting, and harvesting. On rainy days in muddy boots and wet clothes, the pupils learn that growth takes place when continual effort and hard work enable them to reach their goal. In the seventh grade they have a forestry practicum during which the students learn to care for the forests as a part of the entire landscape. In the ninth grade the pupils live and work on farms. The tenth grade is marked by the final year of gardening when they learn to form and take care of both nature- and culture-biotopes. In the eleventh grade at the Waldorf School Oberberg/Gummersbach we have an ecology practicum.

The Ecological Practicum in the 11th Grade

Eleventh grade pupils want to know where they stand; they want to understand themselves and the world independently and with clear thoughts. As a subject ecology is very different from biology, chemistry, geography and social studies. When apparently unrelated factors are brought together, the prerequisites for life become apparent.

We start the theoretical part of the block during the vegetation period between May and June, learning about the extraordinary project “Biosphere II” in the desert of Arizona (1996). Four men and four women were placed in an

air- and watertight, 9000-square-meter glass dome together with 3800 plants and animals for two years. The dome included a miniature rain forest, a desert, an ocean farm, and a biofarm with fields and small cows. Their only contact with the outside world was sunlight and computer cables. Imagine what could happen! And what is needed to take care of the minimal survival needs! Is the water quality good enough not to leave a sour taste after the morning coffee?

The project “Biosphere II” is part of the preparation for future settlements on the moon and Mars. So far it is one of its kind. Therefore it is most timely and appropriate as the starting point for this study block. From this perspective the pupils reflect upon the basic needs for life in their own homes—often for the first time. They question the air they breathe, the clean water they drink, and the food they eat. In “Biosphere II” all of these basic needs were debacles that displayed the limitations of human consciousness. This perspective helps us approach the environmental factors that we are personally connected with and then develop new concepts. It became clear for the pupils that the deciduous forests, the fields, the brooks, and so forth, are all ecosystems that are intertwined. This adds new dimensions to their thinking.

The Pupil as Environmental Researcher

At first the pupils compared the forests surrounding the school through various observations in deciduous forests and pine forests. Are there differences in temperature? Do the forests smell alike? How are the deciduous forests in the fall? In the spring? In the following days the fieldwork becomes concrete and analytical. The students are divided into groups that must organize themselves. What do we want to do? Do we want to analyze the forests or the green fields? How do we work? Do we need to collect books on identifying animals and plants? Should we look for analytical methods to use? How do we comprehend the vegetation in a 10x10-meter piece of forest? How do we start to catch water organisms in the local stream to learn about the quality of the water? What is our working plan? Who will bring the sack to collect soil samples? When can we use the chemistry lab?

The fieldwork stretches over seven days in the main lesson between 8:00 and 10:00 AM. Learning independently in workgroups is a new approach, but the pupils quickly lose their initial insecurity. Quite often they approach the work scientifically. The group that is analyzing the vegetation in a field brings mountains of blooming wildflowers, grasses and herbs into the classroom in

order to identify them. The “water biologists” bring glasses of one-day-old flying larvae, flatworms and the like. These are hard to identify. The teacher cannot always answer their questions, for even a biologist does not know every living thing!

Plants are dried and pressed and spread out on papers on the classroom floor, making a maze that other subject teachers have to climb over. The species are ordered according to environmental factors or value indicators, such as the degree of acid or nitrogen content, or according to the locations in which the different conditions are discovered.

Within their groups the pupils discuss how to document together. Who will write up the sections that each group will submit for the project workbook? Who evaluates the soil chemical experiments? Who makes the indication analysis? How should the lecture be presented, and what should the drawings on the blackboard look like? In the ecology practicum the pupils not only gain knowledge of the subject, but they present their findings in a series of presentations, exhibits for the school and offerings in the monthly school celebrations.

Despite the foreboding challenges of global climate changes and ecological imbalance, we do not want to teach our pupils pessimistic views of the future. Just the opposite. Young people will often display an analysis of the world that is deeply felt and balanced between right and wrong. They will develop new ideas that show insight into human possibilities. When young people feel the seed of confidence, they become, in the words of Novalis, “The Builders of the Earth.”

Music: An Endangered “Species”?

by

Magne Skrede

translated by Ted Warren

Is Music an Endangered “Species”?

Of course it is not. We have never been as exposed to tones and sound experiences as we are now. On my computer I have several thousand CDs downloaded. We can choose and discard all kinds of music: dance music, training studio music, jogging music, meditation music, music during homework, super-market harmonies, music to fall asleep by, country rock, urban rock, music to drown our feelings, music to steal us away from ourselves, music that destroys our sense of hearing, all of these and more—for any taste.

And despite finding within the superficial acoustic experiences whatever we are looking for; the question remains, “How deep does it resound in our souls?” Does it touch our humanity, our most inner, existential questions, the questions that are the motives for all great artists: Who are we? Where do we come from? Where are we headed? Which themes provide meaning in my life?

Welhaven gave us a little sentence: “Especially blessed are those who like admiration’s eagle soar upon their broad wings.” This beautiful verse is filled with wisdom. For what is admiration, what is inspiration, and what is the being of music?

When Tones Touch a Person

If you play music on a loudspeaker in the Sahara Desert where no one hears it or you play a CD at the South Pole, can we call this music if a human being does not hear it? What we hear of tones that are carried across the vibrations and volatility in the air are only raised to the level of music when a subject gives the sounds special meaning, when we add to the intervals and melodies our tonal value, our inner evaluation. When our feeling is awakened,

when we recreate, within our inner being, the characteristic impulses behind the tones as they were in the moment before they were carried to us across the airwaves, when our breathing resounds the depth of the tones, we move closer to the being of music.

Music has many levels. It can make us dance. It can grasp our joy and pain. It can make us warm and empathetic. It can awaken love. It can make us change who we are. According to Tolstoy music can even make us remember something we have never experienced. Music can change us—a little. Music can tell us about our life but only if we are on the inside. The simplest cradlesong, a Gregorian melody with few tones, an enormous symphony—all these can touch such a quality, but it must be alive in our souls. It is not enough to tickle our nerves with electronic entertainment. Music is not our instrument's range of tones; it is something we must live within.



Inner Music: The Sounds of Destiny

The Hungarian composer Kodaly was ridiculed when he stated that music lessons should begin nine months before birth. Today the research of Alfred Thomas shows that music has deep, lasting effects on embryos. We also know that hearing is the last sense to leave us when we die.¹ To have music accompany us for the entrance to and the exit from life is not a bad idea. Nor is it far-fetched to consider that our own destiny, our own life nerve is a melody that incarnates with us, that lives with us, something only we can “sing” and redeem. From this perspective we can understand what Beethoven said about his creative work: “Composing is solving inner problems in life.”

What happens to people who are not able to realize their own melody, who cannot develop harmony in themselves and feel a common destiny with other people? Every talent, every possibility—not just musically—that does not blossom or bear fruit, makes us sick. Therefore we find health in artistic subjects. Choir, improvisation, song and dance are archetypal life medicine that should be taken seriously at every school. “The more we sing, the less criminality there will be in the world,” proclaimed Rudolf Steiner.

In the Classroom

As a teacher we have all experienced “star-moments” in lessons. The whole class is in harmony and we all feel: What the teacher is now expressing is huge, it is true but also strange. It is real and it affects my life! There is a quiet invisible unity among everyone in the classroom. The soul’s toneless music allows us to experience a sense of community. Such connectivity can take place in any subject, in any grade, and of course it is not limited to music lessons. But it is always a musical moment—we move beyond the subject and become empowered.

I believe this can help us understand Shakespeare’s words from *The Merchant of Venice*:

The man that hath no music in himself,
Nor is not moved with concord of sweet sounds,
Is fit for treason, strategems, and spoils;
The motion of his spirit are dull as night,
And his affections dark as Erebus:
Let no such man be trusted. – Mark the music.

The point is not about someone who can hear or play music by ear, nor is it about playing quickly up and down the violin. It is about having an inner melody and thus contact with one’s self and experiences of “star-moments” together with other people.

Music unfolds our entire register of feelings. It allows our thoughts to reach spiritual reality. And repeated practice strengthens our willpower. Music can comfort a tormented heart. It brings life where there is none. If there is too much activity, it can have a calming effect and slow down our pulse.

Artistic Lessons

With artistic intuition the teacher leads the class in one moment in the right direction, in the next another direction. If a melody has an upward movement, we notice a tendency to go out of ourselves. If its direction is downward, we are moved in that direction. In most we are more introverted than in the extroverted. Three-part rhythm lifts us up; two-part rhythm can make us march like soldiers. If there is a lot of life in a class, the teacher can ask the students to sing a little theme or melody backwards. Just try!

In the lower classes it is important that pupils are allowed to live into the music and learn holistically. We make musical rituals, ring games, dance and song. We enliven happy, simple musical harmonies. But we should also experiment with the higher song frequencies. Quite often teachers in the lower grades pitch their singing much too low. A child's larynx is much smaller than an adult's. Children only have problems with high notes if the adults do. They imitate everything, including the adult's efforts. They sing what they hear. Therefore it is really not easy for a male teacher to sing with young children. I had an experience once during a school performance of Mozart's "The Magic Flute" with professionals and amateurs in Bergen's Grieghallen. All of the children at the school heard the Queen of the Night, and every girl in the fourth grade wanted to try her role together with a piano accompaniment. Fourteen of the sixteen reached the very high top tone and they had very nice pitch.

After the third grade, we experiment with two-part and three-part singing, with the large and the little youngsters. If children learn to love creating tones from the sixth through the eighth grades, if they learn to love practicing their instrument—the clarinet, flute or violin—or to just sing, this activity will help them through puberty. They will be concerned with something outside their bodies or, more accurately, concerned with something in their inner life that reaches beyond their self while something is built on the inside as well.

A Meeting of the Pupils' Needs and the Teacher's Possibilities

Once in awhile we meet pupils who can express themselves powerfully, who love to sing but cannot hit a single note or carry a tune. If the teacher and other pupils are tactful, a great amount of joy can develop despite the limitations. One example is a boy in the seventh grade who already has a deep bass; he hit four to five bass tones with power. In the class play the music teacher wrote a humorous song with six bass tones. The pupil was a star in the play even though

he did not reach all of the notes! His attitude toward school changed for the better.

Pupils influence each other. One day a girl in the eighth grade heard a pupil sing a popular song. I knew she had a beautiful but weak voice. After school she asked me if she could sing for me. I wanted her to very much, but I already had an hour-long meeting arranged with colleagues. Afterwards I thought she had gone home, but she had sat outside and waited for me. I accompanied her on the piano and she sang with a beautiful voice! I said, “Now, you have sung with me in class for two years, and you can sing this well. How is this possible?” She answered, “What do you think the other girls would have said if I used my voice?” Such self-editing is more typical of girls than boys. She later sang a solo at the final school performance for students and parents.

Good education is found where the needs of the pupil meet the possibilities of the teacher, not in the tightened-down curriculum or personal limitations. If a teacher finds materials that mirror the inner needs of her pupils, she has come a long way. Some schools emphasize group musical activities and instrumental lessons while others are able to provide a thorough introduction to music theory; still others offer a rich song and chorus milieu. In the upper classes various musical genres and levels of difficulty can be useful. Teachers need to be careful about accepting what a student thinks he or she can accomplish based on what they propose themselves, rather than providing a challenge. For example, a green-haired punk girl (who will probably be pink next week) sang an expressive jazz piece. Impressive! But when she presented a religious, baroque piece by Pergolesi in correct style, she awoke great admiration in her audience!

Play, Practice and Love for Beauty

In the Waldorf school curriculum we have a main lesson block on music history in the eleventh grade. I usually end the block with a quote from a book entitled *Conversations with Great Composers*. In an interview three weeks before he died, Brahms tells about Joseph Haydn, who always dressed himself in his very best clothes before entering the music chamber where he composed because he knew he would meet the Almighty, the spiritual creative force. “It has always been such a wonderful experience, that I never before could induce myself to talk about it. I felt I was, for a moment, in tune with the infinite, and there is no thrill like it. It’s like a dream, a glimpse of the next plane—heaven.”

Today's composers will probably identify with such a statement. For Arvo Pärt and the Russian composer Sofia Gubaidulina, composing is a sacrament. Magnar Åm says, "I am just the messenger." Where do such thoughts lead? Human beings carry tones and sounds that need nourishment. This type of knowledge does not represent a luxurious, over-abundance of sound. Art is the daily food of the soul. Its ingredients are joy, spontaneous play with tones, truth-searching listening, and repetitive practice, striving to do the same thing even better, and love for beauty. That is what brings us forward and gives us access to the world of dreams and sleep with thankful hearts and expectations. Here I return to the provocative title that I gave this article. Can we live a modern life without connecting with the genius of music, without this level of experience that unites us with the world and with each other?

Rudolf Steiner once said that from an angel's perspective, admiration in a human being is the expression of the greatest maturity. He is on the same page with Welhaven. In "the code" we turn to the poet's poetic expressions in the direction of a general pedagogical motto, a motto that may help us out of superficial promises of quality and tormenting Pisa conclusions: *Blessed is the classroom whose admiration's eagle soars above, upon broad wings!*

Endnote

1. See Sacks, Oliver, *Musicophilia*, 2007.

Performing Arts versus Degraded Speech

by

Magne Skrede

translated by Ted Warren

How can we best activate our hearts, hands and minds and then unite mild and soft beauty with intense, enormous experiences of reality? How can we experience together being lifted beyond our daily lives to the place where ideals are still real and where we find the excitement we are all looking for? Can schools be the home for such experiences? Yes. By setting up a total work of art—using color, form, movement, music and drama on the stage, through a community effort in which individual limitations are gradually overcome. Yet how often dare we use such methods? And do these methods really belong in schools?

Language

We cannot avoid asking ourselves to what extent we know the possibilities within our language, given the degrading activities of abbreviations, weak expression, a lazy use of our speech organs and abstract, intellectual information. Actually all grown human beings want to experience how they can enliven sound and words on their own so their vowels and consonants become colorful and powerful. How many of us have not experienced that language has a creative power? Yes, every class should have a “Demosthenes” study block where we practice eloquent speech towards the sea with stones in our mouths. It is much worse to maltreat language than to slip your baggy pants down to your knees.

Song

Song expresses qualities other than pure language. A melodious stream of sound that lives within us in a unique way carries the word. Consonants are actually foreign bodies that initially hinder the free, melodious flow. Therefore

even good singers are often sloppy with texts in order not to ruin the line of music.

Song and music do not primarily express meaning and statements but follow a direction outside, not to something definite. Therefore opera dialogue is often easy to make fun of—it does not appear genuine. In real song our entire body is awakened to the resonance of something soulful. A special experience of freedom appears when you notice body and soul become one transparent vehicle for a musical meaning. In choruses and informal groups we strive to be one with another's inner reality. It is an area where it is totally legitimate to be excited—not only for our own efforts but also for what everyone is able to obtain together. In our limited inner world the sound of others reverberates! Those who sing—sing correctly—for a long period of time are often surprised they cannot speak afterwards. When we sing forces are released in us; when we speak we unite ourselves with our environment.



The Challenges of the Performing Arts

There are a rich variety of challenges to standing on a stage—and profound joy. If nothing else the stage is a school for learning courage, to overcome the fear of exposing oneself. One can meet one's needs in many areas that otherwise could lead down wild, destructive paths.

Even when one acts as another character, the facial expressions, mimics and movements—dance and eurythmy—reveal a lot. In other subjects students become aware of their special talents and limitations. On stage, often, very different, unexpected, and human qualities appear. Crisis, argumentation and

difficulties are easily forgotten when a friend acknowledges one's efforts, or when an audience applauds young people, or when one student or the other is so excited about the performance that he outdoes all expectations, and the results are such that even those who are not uncles and aunts become excited. Often such fundamental and new experiences appear when a class has made such an effort during a performance that they create a new identity—they speak about the class before and after the play.

The Whole Uplifts Every Part

At Waldorf schools we strive to enliven and motivate our artistic subjects, especially with eurythmy. In small and large performances alike, we often discover the enormous value that study brings to the entire performance. In many performances we found solutions that would not have been possible without eurythmy, for example, in “A Midsummer Night's Dream” in the witch scene of “Dido and Aeneas” in which the witches build their sworn evilness; or in Hades and Heaven in “Orpheus” by Gluck; or in the fire and water trial scenes in “The Magic Flute” by Mozart.

As a former director of the Bergen International Festival once said after a performance of “The Magic Flute” at the Waldorf school in Bergen, in Grieghallen, “Nowhere have I seen people move more beautifully across the stage.” In that sense the subject needs no more extra motivation. One day during the same performance a pupil said back stage, “Today we love our school.” It is not only our pupils whom we see differently during a performance. As a serious subjects teacher I have also learned, much to my surprise and admiration, that lighting, costumes and scenography are also arts. You can actually “discover” your colleagues and that makes it more meaningful to be a co-worker. It is also healthy when teachers and pupils create the excitement and willpower together. If that is strong enough, people will come to the performance and the audience will believe us.

Something for Most Schools?

Yes, you can ask this question. Does all this belong in a normal humanistic school? Are all of these artistic subjects really necessary in a school? Should we not leave it up to the initiative of parents and children, to those with special hobbies? Isn't this abundance? My experience is that abundance is necessary.

You can certainly say schools with limited resources and minimal time cannot do drama—that they have neither time nor energy for that. Yet the best prerequisites are in the daily exercises within these subjects. If you sing every day for half an hour in grade school—when you recite small poems, act out small sketches, practice pantomime and games—we have already laid the groundwork for a performance. Think of the imagination that appears when we write out dialogues in a foreign language and in the mother tongue and then act them out—or sing them! With such simple methods we create the basis for something that can grow at a later date. And also our regular school days can be happy and fun. In this way we can nourish our expectations for life. Without them it is tough to live.

From Crisis to Cooperation

by

Sylvia Fuehrer

translated by Ted Warren

Imagine the following situation: A good friend tells you that his store is in serious financial straits. You invite him over for dinner to discuss the situation and find ways in which you can help. After dinner you give him a couple thousand euros, which you are not sure you will ever receive back. But you are certain that he can save his company and help his family out of the crunch. After a couple of weeks your friend returns absolutely broken down. Nothing had improved. His store is now bankrupt because the competition, a worldwide food chain, sells the same products for much less. Acting socially in our private lives, as in the case with the friend above, adds a lot of value but can fail when we are dealing with powerful business structures. The individual is often run over, making it necessary to act cooperatively in larger entities. Due to the present global financial crisis, everyone understands this need more clearly.

Healthy medium-sized companies that make good products and employ talented people declare insolvency because demand has diminished. The people who make billions on speculation continually expand around the globe and then crash. The underlying cause is easy to see: In the long run a planet with limited resources is not capable of providing a real basis of enterprise that will support exponential growth of capital.

Exponential Growth

Let me invite you to an experiment in thinking. Heinz Florentine has planted a water lily in his lake on Grand Canary Island. The conditions are ideal for a water lily. There are no pests so the lily can grow constantly throughout the year and propagate, doubling its number every week. Therefore, the lake area covered by water lilies is doubled every week.

In the beginning, 1,2,4, and then 8 lilies appears harmless. But after 300 weeks the lake is half covered in water lilies. Mr. Florentine's smart daughter Mariela, who spends a lot of time by the lake, notices that there is an exponential growth of water lilies. She boldly says to her father, "My dear father, the lilies are so wonderful, couldn't you expand the lake when it becomes overgrown with them, so the lilies can grow another twenty-one weeks? That will be my birthday."

"Fine," answers the father. "I will."

Do you know what's going to happen? A week later Mr. Florentine must put his bulldozer into action. The entire lake is already filled with water lilies, so within just one week, the lake must be doubled in size. Within two weeks it must be four times as big. Within ten weeks it must be a thousand times larger, and within twenty weeks the surface of the lake must be more than one million times larger than the original lake! If Mr. Florentine is to keep his promise, then Grand Canary will be under water.

Wherever uncontrolled exponential functions are at work, they release a powerful force. Exponentially growing phenomena, characterized by double growth in the same amount of time, suck all life out of the surrounding environment. An obvious example is some cancer cells that spread exponentially.

Ethical people become very uncomfortable when there is exponential growth activity within the monetary system. The number columns in the worldwide accounts require relentless tribute from those affected. Through the effect of interest and interest on the interest, capital is doubled in the same time frame, for example 5.5% interest within thirteen years. With no regard for the real economic productivity of the working population, the growth of capital and its concentration in fewer hands takes on ever more extreme forms.

In Waldorf high schools it is helpful to work with mathematical exponential functions using concrete examples so that pupils learn to differentiate between 30 million and 30 billion. This is something not every adult can do today.

Exponential growth of capital has consequences. The real economy must grow obsessively, for this is where the financial returns take place that serve the increasing interest demands. This succeeded in the early stages of the interest-on-interest exponential curve, in other words in the young national economies that had built little capital and still grew. On the other hand older national economies suck out the value of their economies to pay interest in the capital markets. The

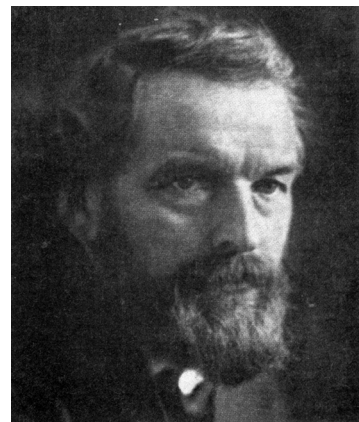
demands on workers continually increase and the return to them for their efforts in the form of salaries and benefits decreases. Due to rationalization, automation and massive layoffs, it is attempted to produce cheaper and cheaper, also at the expense of the environment.

The growth in capital is somewhat controlled by inflation and minor stock market corrections or crashes, yet under the surface the gigantic, exponential force continually drives forward its negative state of affairs. Due to the concentration of capital in fewer and fewer hands, at a certain, predictable moment there no longer exists enough businesses that are in a strong enough position to earn, through real work, the interest demanded by the creditors. The consequences are financial crisis and real economic breakdowns like the one we are now experiencing. Is that a law of nature?

Renewal within the Economic Sciences

Wolfgang Berger declares that the economic sciences try to explain the economy in much the same way as the natural sciences explain the laws of nature—the creation. However, that is a false starting point, for the economic and financial systems are not events in nature but are human creations. Berger concludes: “The economic sciences must ask themselves if it would not be better to emulate engineers when they construct a machine and rather develop our monetary and financial structures in a way that fulfills their purpose of serving life.”¹

Must it remain inevitable that money by way of interest and interest-on-interest grows exponentially? Rudolf Steiner and his contemporary, German-Argentinean economic reformer Silvio Gesell (1862–1930), did not consider it inevitable. It can be changed. Steiner predicted that money “will wear itself out, just as products wear out.”² In much the same way Gesell described his future vision of money as “aging money” or “stainless steel bills.”³ This declaration was often misunderstood, but here one way to consider: When money is neither consumed nor put in a bank for long-term credit for a loan, it should lose a small, exactly balanced percent of its value. This will motivate everyone to position their money as credit for loans to others. Although they will receive



Silvio Gesell

no interest on the loans, they will retain the initial value of their money. Instead of speaking about “depreciating” money today we speak about “circulation impulses.” The wicked circle of exponential growth through interest and interest-on-interest would be stopped: those who loan money would not need to pay interest, at the very most a risk premium.

Margrit Kennedy describes in her book, *Money without Interest and Inflation*,⁴ that money subject to a circulation impulse (or in Steiner’s words, subject to “depreciation”) can be steered economically so that no inflation is created and savings lose none of their value.

The Cooperative Paradigm

According to Steiner brotherly cooperation in business is the simple truth that everyone works for others, not primarily for themselves. He emphasizes that overcoming egotism is not an ethical challenge but rather the result of the division of labor. Everything we produce or create is used by others who in turn work for our own needs.”⁵ A healthy economic life is unthinkable without this enacted altruism.⁶

To the contrary Darwin’s laws (1809–1882) are widely uncontested and continue to be used in businesses to this day. Darwin’s thesis states that the process of selection under the pressure of the battle for the survival of the fittest, and nothing else, is the power that drives the development of species. Darwin considered the competitive battle against each other to survive as the decisive biological characteristic of all living beings, including human beings.

In his book, *The Human Principle*,⁷ Joachim Bauer shows that just the opposite is the case, namely that cooperation between all lives on earth is the leading motive of development. Each cell needs “helping molecules” in order to reproduce. Among the more highly evolved animals, experiments have shown that social isolation leads to a dramatic reduction in the brain’s neurotransmitters for well-being and motivation.

Implicit in this insight is the fact that the human being is especially created for successful cooperation. Today scientists study, in the smallest details, how the motivation center of the brain secretes dopamine and various opioids as well as oxytocin when the person succeeds in giving and receiving inter-human acknowledgment, esteem, care and affection. Because of these findings many business advisors are helping their clients reconstruct their enterprises along the paradigm of cooperation, to include such procedures, for example, as

higher-ranking leaders chosen by their co-workers and job rotation used to help everyone have an overview of the work processes in the business. And when every team opens special opportunities for the individual to develop within his abilities or communication exercises demand productive interaction among the participants, the paradigm is being developed.

Establishing Cooperative Experiences with Waldorf Education

So far the Waldorf school is the strongest pedagogical reform movement that gives children the experience of being important parts of a greater whole. Theater, intensive musical pedagogy, eurythmy and many more subjects are congruent pathways. When children stand in front of the whole school during monthly celebrations and present something artistic or pedagogical as a class, they experience cooperation. When they speak in chorus and their individual voices create nuances within a group harmony, or when the class orchestra performs, productive experiences enter their lives. The same is true in the classroom when a child shares her verse with the whole class. In the first grades speaking, singing and movements emphasize attention as the basis for observing others.

Especially classrooms that integrate children with special needs help to develop cooperative abilities. One teacher told me that every day situations arise in which children help those with special needs. In a second grade the experienced teachers could not figure out how to motivate a child with Down syndrome to keep from eating during the lessons. This child's fellow classmates discovered ways to motivate the child to wait until the breaks. They all learn from each other. From a class community a school organism is formed.

Regional Money

In 2003 the high school pupils at the Chiemgauer Waldorf School displayed how successful their education in the ability to cooperate has been. A group of six girls together with their economics teacher Christian Gelleri developed a nationally acknowledged breakthrough with their initiative, money with "a human face." They started one of the first regional currencies in circulation in the Federal Republic of Germany. The carefully designed notes, chiemgauers, have silver inscriptions, water drawings, bar codes, clear serial numbers and an artistic backside as well as electronic payment cards that bring colorful life to participating districts. Suddenly it is beyond the individuals who decided to buy locally; whoever receives their money will also buy locally.

For example, houses are built using the chiemgauer for there are enough architects, engineers, builders, and so forth, who accept this regional currency. So far there are 40 distribution centers, 640 businesses, and a total of 2000 individuals who enable new cooperation. The goal is to create many new business cycles so the region can provide 50% of their needs. This can be done by the districts producing as much of their basic needs as possible: food, buildings, energy. The remaining 50% of their needs and production will have to come from the globalized division of labor. Considering the worldwide carbon dioxide emissions, short transportation routes are overdue. Through regional initiatives the conditions in which products are produced become transparent. Do not forget that: Every piece of paper currency is a ballot with which we can decide which working conditions and production processes we want to support.

At this time the chiemgauer is growing three times as fast as the euro. In 2008 it generated 3 million chiemgauer (the exchange is 1 chiem = 1 euro), and because there is no interest involved, no one speculates in the currency. Often the currency encourages spending.⁸

The success of the chiemgauer is even more valuable when we consider that this money includes the “circulation impulses” conceived by Silvio Gesell while taking place within the context of an entire world economy that includes inflation and where the consumer is continually subjected to increasing prices. The expected escalation of the financial crisis may result in regional currencies being freed from their link to the euro and found in people’s shopping baskets as a standard of value. If an emerging hyperinflation appears, the people of the region can use the chiemgauer to provide resources among themselves.

In the meanwhile the chiemgauer has been very productive. There are now 66 initiatives in Germany committed to the value standards and quality criteria of the association for regional money.⁹ For many people regional currencies are a way to stabilize the regional economy. For others it is an example of how large projects using “circulation impulses” can prevent the exponential growth of capital. There is also an initiative among leaders such as Bernard Lietaer, Margrit Kennedy, Wolfgang Berger and others to create a Europe-wide complimentary currency with “circulation impulses,” that is money that builds cooperative relationships rather the stimulating speculation.

Multiple, coexisting currencies that circulate for different purposes can complement each other and form important foundations for stabilizing relationships between people in a region as well as promoting worldwide solidarity.

Endnotes:

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4. Margrit Kennedy, *Geld ohne Zinsen und Inflation*, München, 2006.
5. Rudolf Steiner, *National Ökonomischer Kurs*, GA 340, Dornach, 1979, p. 46.
6. Ibid., p. 47.
7. Joachim Bauer, *Prinzip Menschlichkeit, Warum wir von Natur aus kooperieren*, Hamburg, Hoffmann und Campe, 2006.
8. For more information see www.chiemgauer.info.
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Productivity and Receptiveness How Do We Work Together on the School Organism?

by

Karl-Martin Dietz

translated by Ted Warren

Successful cooperation in free cultural life depends on the tension between increasing individual initiatives, not on the reduction of such. Today, just the opposite is usually considered the norm.¹ Therefore it is worthwhile to question how the core goals of free cultural life should be understood and realized.

The purpose of free cultural life is to develop the productive, spiritual forces of each individual and to pave the way for them to be realized in social actions. Although this purpose is severely obscured today, it is increasingly supported within educational debates. Under the motto of “Individualization,” the sociological side proclaims that the liberation from traditional values and orientation entails preliminary disorientation for every single person involved. When not restored to health, the person may fall into an existential vacuum, violence, drug use, and so forth.

Ulrich Beck, who brought the process of individualization as a social process into the public limelight,² formulated the following task: “We are challenged to find active models for daily actions that place the human self at the center of our actions.” Now, twenty years later, the fulfillment of his challenge still remains distant; it appears to be lost from our minds and replaced by other goals. Yet the task of creating cooperation between individualized initiatives within free cultural life remains.

During the past years at the Waldorf schools, the cooperation within collegial self-governance has often appeared incapacitated; it appears the faculty

do not pay attention to the inner requirements. When cooperation does not work school leaders craft new models or revert to traditional ones. After many years of work, we now have schools with excellent structures, yet the challenges of self-governance have not been met; they seem barely tempered. This realization forces many people to reflect, making it relevant to consider the spiritual origin of cooperation. Cooperation is not based on laws, duties and structures (as in the state), nor is it based on needs and their fulfillment (as in the economy), but it encompasses the polarities between spiritual productivity and free receptivity.³ Rudolf Steiner described this principle in the preparations for the founding of the first Waldorf School in 1919. Until today it has seldom been considered in the Waldorf school movement's self-governing efforts.⁴

It is easy to understand the meaning of spiritual productivity. Where no one contributes anything productive, cultural life does not take place. This is not always considered, especially when rules, bylaws and traditions continue to work although their inner substance has long since disappeared. Therefore a main characteristic of work within a free cultural life is the stimulation of the individual's spiritually productive contribution. How do we work together accordingly?

Another question arises: How do individual productive initiatives unite with the creative initiatives of other colleagues within the whole school? This takes place within the social principle of "free receptivity." When no one takes up the ideas with action, then even the best ideas are prevented from taking hold. Acting upon good ideas must be the purpose of a community within a free culture. That is the supportive basis of cooperation. And where free receptivity enlivens the spiritual milieu, productivity will be stimulated. When I know that my ideas are not welcome, I will soon keep quiet and disappear. But when I know my colleagues are waiting and we will create ideas that solve present problems and lead us into the future, this works as an enormous stimulus for individual productivity. Free receptivity as a social process is an innovation Steiner first formulated in November 1917: "That which takes place between people must be created by people. What counts is the understanding that the community brings to these ideas."⁵

We find the same principle stated in more detail shortly before the first appearance of the book, *The Fundamental Points of the Social Question* in April 1919:

And we approach the third side of the social organism that must regulate its relationships and needs according to its own laws: That is the organization of culture. Culture must be based on free initiatives from people so that the human being is able to offer his individual spiritual forces to humanity within a free cultural context. From the other side of the social organism there must be free understanding and free receptivity of these spiritual forces.⁶

In the book itself Steiner states:

In everything that is brought forth by the economic life and the political/legal life into the social organism, there works a third source that originates from within the individual abilities of each person. This source encompasses everything from the highest spiritual achievement to the more or less valuable contributions that are achieved through the physical body and serve the social organism. There is no other possible way to realize healthy reception than from the impulses that stem from individual abilities that remain independent.⁷

Steiner's many and originally formulated references concerning this working principle will soon appear in a thoroughly documented book.⁸

Levels of Receptivity

Receptivity as a social principle within cultural life is a free effort. It is not subjected to any legal criteria (rights or duties included). No one can force anyone to produce an idea. Nor can anyone demand that another person works with ideas that he or someone else has produced. Even when someone has an excellent idea, no one must accept it. If no one takes up the idea, it remains socially unproductive. Therefore the cultivation of free receptivity is so important.

From society's point of view, it is very important that someone who "produces" also has a circle of people around him to which he can lecture, or that someone has a job where there are opportunities to speak his mind. We can create the right forums for people who produce.

Free receptivity is an achievement in consciousness. It is not created by a way of behaving, but more by personal preparedness to take on an idea that

comes from a new perspective, not only when the idea is a complete surprise, but also when it refutes one's own convictions. A great amount of spiritual productivity is not realized in our society. It is ignored or not understood because we are not actively receptive. In free receptivity a soul attitude will be immediately active within the social context. There are many levels to distinguish:

- Interest

When I show genuine interest for other people, situations or the phenomena of world events (nature, society, and so forth), I open myself actively for others, perhaps even for people who are different from me. Then my soul dispositions, my abilities, plus the realities and necessities I face appear in a new light.

- The Will for Knowledge

When the will for knowledge is awakened, the human being searches for broader phenomena and relationships and he discovers new realities. Now he wants to understand what he experiences in relation to his self. He wants to penetrate not only his origin but also the specific conditions. He asks for the truths and the totality as well as the origin, the consequences, and, finally, the essence of the reality he cognizes.⁹

- New Unity

If the will for knowledge originated at the distance between subject and object (between me and the object I cognized), then now it enters a new state: I place the very same knowledge in a comprehensive context to which I also belong. I realize my own part of the event and try to understand myself. This may reach to the extent that I feel challenged to produce beyond what is given. Then receptivity creates a formative power. And upon the initiative of others, my own productivity and decision-making grow.

To increasingly live into the common ground—by allowing it to evolve, and by “receptively producing”—I not only create a beautiful, additional gift but a necessity for the life of all culture. Everything that influences me without

my understanding hinders my self-development and thereby my productivity for society. The levels of receptivity that are distinguished here can also be defined as:

- Interest, curiosity, openness: Receptivity becomes activated.
- Making room for others to produce: Receptivity is the result of productivity.
- Placing what others produce in one's own context: Productivity is the result of receptivity.

In this way what is produced by others can become one's own and meld into a new unity. Then productivity and receptivity are no longer divisible, even though they are different. At every level activity and receptivity reach a new relationship:

- Practice receptivity: Allow yourself to trust the other/others: social understanding.
- Develop activity from the receptivity: Unfold initiatives to take in and respect the freedom of thought of others.
- Activity and receptivity stand in equilibrium: Place yourself in the relationship and be responsible for it.

The tension between productivity and receptivity is decisive for the individual in all activities in his life. Productivity without receptivity results in randomness and thereby cause anti-social behavior. Receptivity without productivity leads to conforming to given conditions and therefore to “de-individualization.”

For self-governance in the school organism, the principle of productivity and receptivity is extremely important. Just as it is the goal of Waldorf education to awaken and nourish the spiritual power of each child, so does this pertain to the interaction among adults in the school community. Just as the social abilities of the pupils are promoted by giving them opportunities to develop and increase their interest for others, so this is true for the cooperation between those adults who are responsible. How can we ask the pupils to develop productivity and receptivity if the adults do not take it seriously and determine their work accordingly?

From the very first day, Steiner emphasized that this should take place at the Waldorf school. It belongs to the inner requirements of the Waldorf

school. This principle makes “school principal operations”¹⁰ just as unnecessary as structural rules.¹¹ In order to pave the way for spiritual productivity, it is necessary that “the most capable teachers have a certain authority over the others, a natural authority.”¹² At the same time, it is clear that this authority is not merely due to competence, but must be supported by acceptance. It can exist only through the acknowledgment by others based on productivity and receptivity. Bylaws, normally used to regulate interpersonal cooperation, are considered by Steiner a necessary evil for the public, but in truth, “a condemnation of every activity in society that must be based on genuine cooperation.”¹³

Structures and other regulation have proven disadvantages. They regulate the conduct of individuals before an actual situation takes place. Something mechanical and rigid in social activities is created when people have to act according to regulations that were previously decided. Regulations and structures that are agreed upon by a group, and not necessarily from one individual’s perspective, are so important for the spiritual life. Further, actions determined by regulations are actions from the past, for they may not be re-created every day. In free cultural life it is essential that the individual take meaningful action within the immediate situation.

What belongs to spiritual productivity? For example, the individual creates an independent overview of the situation in order to make comprehensive judgments. To do so, one must be able to have the right thought in the right moment. This entails counting on creativity in the situation rather than applying schematic principles. Productive actions always come from one’s own abilities, not from the guidelines of others. We must not and cannot invent everything we do, but we must be responsible for our actions; otherwise they are not suitable for our culture. Through all of these insights the spiritual productivity of individuals finds its meaning. The necessary stability in our community is built upon trust, not upon formal agreements.

In the same way, free receptivity makes the tendency to obey general rules superfluous. Receptivity as a social art is put into play for individuals. I relate to what other people create: What is that idea? Where does it come from? Where does it lead us? What does it express? Receptivity is realized through one’s insight. Let us remember Goethe’s important social maxim: “Whoever recognizes acts.” Had we been working as hard on individual insight and judgment as we have on social structures, self-governing would be a good step further.

Cooperation between individuals does not take place on the basis of “emotional power plays.”¹⁴ The Waldorf teacher does not have “bylaws,” but rather recommendations that are formed according to his individuality. Every human being is different.¹⁵ Self-governing of free schools follows no inner instructions but relies on mutual advice. For the community to succeed, it needs to be based on the principle of spiritual productivity and free receptivity rather than rights and duties. Standards and rules¹⁶ are replaced by the natural authority of capable teachers.¹⁷ Initiatives of trust and ability replace laws.¹⁸

Waldorf education is not a school system.¹⁹ Many presentations of Waldorf education fall short due to inaccurate assumptions. Rudolf Steiner gave no directions nor did he develop any theories for how to do it: “Because I am not a man of programs, I will not present programs and utopias. As I am someone who wants to grasp the realities as a reality, I do not expect all of my indications to be carried out in detail. If we can work on any of the points I made today in light of the situation we face, then the content I have shared will not be one stone placed upon another but rather will lead to something that is justified in real life.”²⁰

From time to time Waldorf education is accused of being dogmatic, but one thing is certain: This is not due to Rudolf Steiner. Perhaps it is based on a fear of the necessary self-reliance, which the lack thereof that can easily lead to chaos. Yet, should everybody just do what they want to do? Should the teacher’s room become an anti-authoritarian institution? There could be no greater misunderstanding. “When you imagine that you fight against bureaucracy by replacing it with chaos, you have the wrong idea.”²¹ By working on productivity and receptivity, a more steadfast order can be created than by any system based on structures and requirements—for this order will be based on the spiritual steadfastness that includes the soul disposition and the social attitudes of those who participate.

Endnotes:

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