

The consequences of thinking about evidence in natural sciences

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Introduction

In recent times, the initial criterion of the truth of science has increasingly been replaced by the criterion of utility, thus leading to 'isolation ethics' (Teutsch, 1979) in the sense of self-interest. Today, a reversal in ethical development could take place if the revelational or convictional ethics, which have already been justified, are now augmented with cognitive ethics.

Epistemology, a science of understanding

The assumed subjectivity of thinking (Kant, 1877) contradicts the experience of the engineer, who – by 'objectively' thinking and understanding and acting – can effectively influence the inorganic sphere of the world. To overcome this contradiction, a science of understanding is required that shows how man can understand the world. This epistemology was successfully established and implemented by Steiner (1921). In trying to observe one's own cognition processes, one can easily apply and modify Furrer's (1980) arguments: 'It is not enough for us to think, act and perceive. Experiments can only be carried out if nature itself is thinkable, treatable and perceivable. Yet we can only find out by experiment whether nature has these qualities.'

However, nature's essential quality is not its questionability but its mental conceivability and its functionality. One could even say that any science is the science of behaviour i.e. ethology, since all thinkable expectations of behaviour (hypotheses) are observed in the experiment as nature's actual behaviour.

The cognition process can be followed by anyone who observes his or her own efforts to understand. This is illustrated in Figure 1.

The perceivable and questionable world phenomena – which need explanations – draw on human concepts created through thinking. Experiments show whether or not the expectations concerning behaviour are confirmed by world behaviour. If this is the case, the world of phenomena is no longer questionable; its functionality and its laws will be recognised and understood. In other words, the world becomes real; we can realise the world. By linking conception and perception, our concepts – which always have a generic character – become individualized, i.e. a generic concept becomes an individual representation (Witzenmann, 1983).

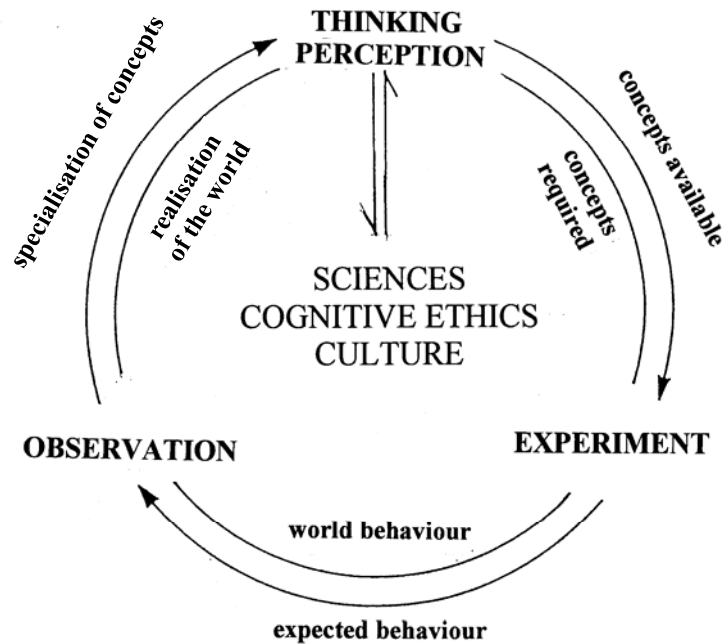


Figure 1 Diagram of the process and evolution of sciences, cognitive ethics and culture

By carrying out this cognition process in all the different spheres of conception – corresponding to the different spheres of being (inorganic, physiological, psychological and spiritual) – mankind recognises the world and thus creates the different sciences (physics, biology, psychology and the humanities). Cognitive ethics derives from the links between scientific understanding of the world and of human nature. Implementing these ethics by acting according to reason and understanding leads to cultural progress in the form of a metamorphosis of natural evolution.

Autonomous beings and causality

From the above point of view it follows that for *autonomous* beings – including human beings in their knowing and doing – external circumstances are not the causes of this autonomous activity, but they are more or less favourable conditions under which the autonomous being produces these activities. Conversely, it follows that physical causality, the principle of external cause and stimulus, always presupposes that the factors under consideration manifest no autonomous activity, that they are passive. This applies to non-living things (M. Rist, 1985).

In his introductions to Goethe’s scientific writings on the distinction between the phenomena of inorganic and organic nature, Rudolf Steiner commented as follows: ‘An example of the former kind, for instance, is the collision between two elastic balls. [...] We have *comprehended* this phenomenon when we are able to state the velocity and direction of the second ball on the basis of the mass, direction and velocity of the first and the mass of the second; when we see that, under the given conditions, that phenomenon must occur as a matter of *necessity*. But this means only

that what is presented to our senses must appear as a necessary result of what we have to postulate in the idea. If such is the case we have to say that concept and phenomenon coincide. There is nothing in the concept which is not also in the phenomenon, and nothing in the phenomenon which is not also in the concept.'

Living beings, such as plants and animals, are different in that in the constant metabolism, change of shape and behaviour, the autonomous activity of the animal or plant species comes to expression. It is characteristic that, throughout their life history, organisms of a species remain the same, whereas their material composition constantly changes. Because of this, the modern geneticist is forced to speak of a genetic 'programme'. Rudolf Steiner (1884 – 1887) expressed it thus: 'For instance, it cannot be said of the plant that size, form, position, etc. of the roots determine the sense perceptible characteristics of the leaves or the flowers. A body in which such would be the case would not be an organism but a machine. It must be admitted, rather, that physical characteristics in a living entity do not appear as effects of other physically perceptible conditions, as is the case in inorganic nature. All sensible qualities appear here rather as a result of something which is not perceptible to the senses. [...] We must go beyond the sense world. What is perceived does not any longer suffice; if we are to explain the phenomena we must conceptually grasp the unity.' Goethe described this higher ideal unity whence all animal and plant species come as the 'type' (*Typus*) or as Rudolf Steiner (1886) put it: 'The type is the true primal organism; either primal plant or primal animal according as it specialises ideally. It cannot be any single sensibly real living entity.'

This ideal differentiation of the primal organism is based on two formative tendencies (see Figure 2): plants are organisms which both functionally and morphologically – from seed, through seedling and green leaf to flower – open out more and more to the environment, and indeed lose themselves in it as pollen. In fertilisation this abandonment to the environment (*Weltensein*) reverses and in fruit and seed formation leads back once again to the closed form of autonomy (*Eigensein*). This counteracting form-tendency prevails in the animal organism. Animals increasingly close themselves off from the outer world with their skin (fur, feathers, shell etc.) thus emphasising their autonomy or *Eigensein* (M. Rist, 1993). This gives only the main tendencies, the ultimate form depending on two aspects:

How the autonomy of particular plant (*Weltensein*) or animal species (*Eigensein*) metamorphoses, specifically develops: 'The type (*Typus*), i.e. the revelation of the principle in the organism, its idea, the animality in the animal, which out of the life that unfolds from it, has the power and ability to develop a multiplicity of outer forms (species, genera) out of its inner potential.' (Steiner, 1884 – 1897).

How the outer conditions are formed, amongst which the individualisations of the type take place.

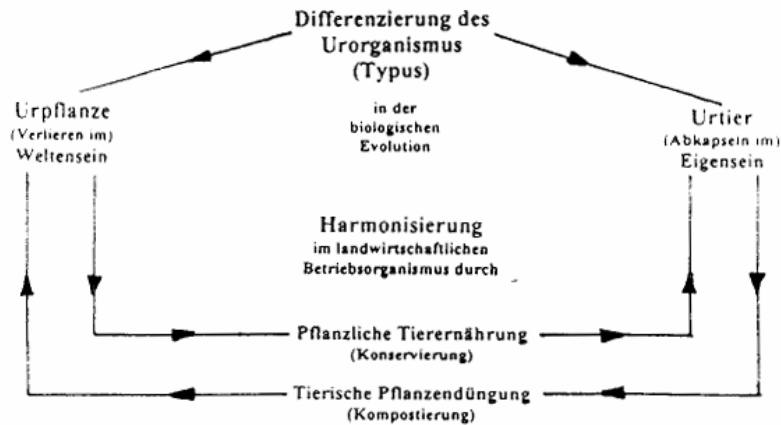


Figure 2 Differentiation of the primal organism (Uroorganismus) in primal plant (Urpflanze) and primal animal (Urtier), and the harmonisation of this polarity through agriculture, where plants are food for the animals and animal excrement is food for the plants

It is not that external circumstances shape the organism, but that these can provide more or less favourable conditions. What appear physically are only particular metamorphoses, individualisations of particular species that develop from the type. The species as such are not physically perceptible, only their representatives in the form of individual organisms, which under particular conditions are not exactly the same, but, because they belong to the same species, are similar. ‘...since it [the organism] is here subject, not only to its own formative principles, but also to the conditioning influences of the external world – since it is not such as it ought to be according to the nature of the self-determining entelechy Principle, but also such as it is through the influence of something else upon which it depends – it therefore appears as if never in full accord with itself, as if never heeding only its own nature. Here human reason now enters and forms in *idea* an organism not corresponding to the influences of the external world, but heeding only that principle.’ (Steiner, 1884-1897)

This shows that the species are soul-spiritual beings which, stemming from the spiritual cosmos, enter into earthly events. That a plant or animal species is not an abstract concept, not even a subjective scheme for putting things in order, but soul-spiritual potential, can be clarified by the following example: we know that soul-spiritual conditions affect our bodily functions, such as blushing, trembling with excitement or raised adrenaline levels with stronger stimuli. This has been demonstrated experimentally in bullocks which had differing blood adrenaline level according to the level of psychological stimulus (Unshelm et. al., 1978). The hormone production is the result of the stimulus and not the reverse. Hormones provide the conditions for our soul-spiritual state to affect our bodies. Hence we call them messenger substances. Interestingly, certain hormones can affect the genes and exert a regulatory influence in genetic processes (Wehner & Gehring, 1990). Thus information flows not only from DNA to protein, but also from immaterial, soul-

spiritual potentiality of the species to the hormone and then to the DNA. Thus we can answer the question raised above as to what life is in the following manner: *life is the autonomous interaction of the respective plant or animal species or human individuality with the prevailing environmental conditions.*

Consequences for our perspective on genes

A way of looking at genes that accords with the spirit should comprise more than the inadequate view that genetic substance builds up the organism in a physical causative way. Rather, the genetic substance is the *condition* under which the omnipotence of the species individualises itself to a specific phenomenal form, similar to its predecessors, from whom the genetic substance came (L. Rist, 2000). The genetic substance is the condition for obtaining a Friesian calf by mating a Friesian cow with a Friesian bull. That an organism of the cattle kind arises at all is not attributable to the genetic substance, but to the soul-spiritual 'information' of the species of cattle. The soul-spiritual information can be seen as being associated with the 'morphogenetic fields', as proposed by Rupert Sheldrake (1983 and 1991).

Unbiased observation of gene *technology* or genetic *engineering* suggests that these designations are inappropriate because for one thing many experiments do not 'succeed', i.e. do not deliver confirmation of the materialistic theory (Goodwin, 1984; Holliday, 1988; Heusser, 1989; Reiber, 1995; Strohmman, 1997), or when they do 'succeed', malformations result or unexpected results are produced. It is not so much a matter of a mature 'technology', but rather can be regarded as an interesting field of scientific research. To this one might add that many experiments which have not succeeded according to the current theory have not been reported (Fox, 1991). If mechanical technology had a similarly uncertain outcome, hardly anyone would set foot in an airplane or even a train.

The most extensive proliferation of gene manipulation has been with bacteria. The reason is probably because bacteria can be easily cultured in millions, and the few good examples easily isolated and multiplied. It is also worth noting that bacteria have a natural tendency to exchange genes. Furthermore, bacteria allow the introduction of genes from higher organisms, but even then the outcome is not at all certain, as shown for example by the *Escherichia coli* bacterium, which received a foreign gene for the oxidation of naphthalene to salicylate, but unexpectedly produced the dye indigo (Ensley et al., 1983). In addition we need to consider that in prokaryotes (organisms with no cell nucleus, including bacteria) it is always the whole gene that is expressed whereas with eukaryotes (organisms with a proper cell nucleus, which include almost all plants and all animals,) only a part of the gene is expressed. Here, even at the molecular level, lies a functional difference between the simpler and the more developed species.

In some cases DNA sequences code for more than one protein, and genes can overlap. By varying the splicing (Lewin, 1991), different proteins can be obtained from the same nucleotide sequence. The more highly developed species are less able to adapt to different environmental conditions than universal organisms, which can appear under various conditions and therefore from an experimenter's point of view are more easily manipulable.

In the transition from bacteria to higher organisms it is clear that genetic engineering experiments are most successful with plants that are more closely related to one another (Potrykus, 1991). Even here the boundaries are once again closely set, as for example with the 'tomatato' which was a protoplast crossing between the two nightshade species tomato and potato. Although it grew, it resulted in neither an edible tomato nor an edible potato. Both species could still influence the genetic material but this led to corresponding disturbances in their species-specific formative tendencies, especially their assimilation into the corresponding fruit or root regions. In addition it should be noted that in plants, genes foreign to the species are soon no longer expressed, i.e. brought to appearance, but through a molecular reaction (methylation) are inactivated (Meyer, 1996). This is known as 'gene silencing': the transgene concerned poses an unfavourable condition for the plant species and can be silenced by it.

Stable expression of such transgenes is difficult to attain, especially when the environmental conditions vary a lot. Thus in an open air experiment petunias containing a so called colour gene from maize initially showed the desired colour. But when a period of hot weather arrived – i.e. a change in the environmental conditions – they lost the colouration, showing that the gene had been inactivated (Linn, 1990). So-called pleiotropic effects also appeared, whereby features other than pigmentation were affected. The transgenic petunias had more leaves and shoots per plant and were more resistant to pathogenic fungi. They showed greater vitality and lower fertility than the unmanipulated petunias (Meyer, 1995). During the hot weather the vitality of the transgenic petunias was suppressed. This illustrates clearly how the petunia species can more or less effectively influence its hereditary material depending on the environmental conditions.

Gene manipulation encounters the greatest difficulties with mammals. An example is the 'knockout experiments' on mice in which genes are switched off by a molecular technique. Out of approximately a million treated cells, only one with the desired effect could be found (Capecchi, 1994). In the 'production' of transgenic animals one can hardly fail to notice the enormous 'embryo consumption'. In a large experiment on pigs lasting three years, only 8% of the manipulated egg cells gave rise to births. Of these 8%, only 7% had in fact taken up the transgene. This corresponds to a success rate of only 0.6% (Pursel et. al., 1989). In the animals that actually took up the foreign gene, its effect in most cases showed up as deformations or functional disturbances. For instance, the pigs grew faster. But in the long run this was detrimental to health as the pigs showed a strong tendency to gastric ulcers, arthritis, cardiomegaly, dermatitis and kidney diseases. Through this intervention, the conditions for the porcine species became so unfavourable that it could only imperfectly form its organism. The 'growth hormone' gene became – in the language of genetics – an arthritis gene.

In the aforementioned knockout experiments, people hope to gain information on the function of the deleted gene in the organism. To the amazement of the experts a large number of these deletions were without visible consequences for the organism, or quite different characteristics were affected from the ones predicted from theory (Tautz, 1992; Brookfield, 1992). When the species is capable of forming a complete organism without a gene presupposed to be essential, it can only mean that genes are

not the cause of the organism's existence, but only provide more or less favourable conditions and in some cases can be completely absent.

In a study in mice, Wuerbel (2000) 'knocked out' a gene thought to be responsible for an important 'memory-receptor'. The underlying idea was that, without this specific gene (the cause of a good memory), mice would have memory problems. Effectively, mice with this memory-knock-out could not remember things they learned one day earlier, but only if they were kept in a standard cage. Therefore, the experiment seemed to confirm the hypothesis that this 'memory-gene' is important for memory functioning. But no effect was observed with the same mice if they were kept in a species-typical, enriched environment, i.e. the cage was different from the poorly designed standard cage. Under species-typical, enriched conditions the knock-out of this gene had no effects on memory-function and mice could remember as well as control mice without knock-out. The loss of genetic information could be overcome by the mice. The mice developed a kind of 'gene-therapy' themselves. In essence, this is easily understandable because, under species-typical conditions, every species is better incorporated in its own organism and can develop a species-typical, healthy body with normal capacities. A detailed overview of such phenomena can be found in L. Rist (2000).

That soul-spiritual doings can influence physiology is easy to observe scientifically. For example, moods of the soul like sadness are first of all pure soul-spiritual processes, i.e. a sad thought comes into the consciousness and this thought can then become so strong that the physiological activation of lacrimation occurs. That the sadness occurs previously to the lacrimation is clear and observable, and is therefore a demonstration that non-material processes can influence material ones. The same is true, but more difficult to observe, for the handling of genes. They do not give cause to a certain effect but provide conditions under which the species has to deal with its physiology. The genes are a tool of the species and not their determinants.

Consequences of this perspective for healing processes

Because every human being possesses individual skills and autonomy (self-regulation) everyone is his or her own species, and success or failure of external actions taken (medication, therapeutic regimens etc.) depends mostly on the ability to reactivate the processes of autonomous intervention or self-regulation. In the end, healing always means self-healing.

Medication, for example, can establish favourable conditions for better self-regulation (for further explanations of the term self-regulation see Grossarth-Maticek, 1999), but self-regulation is not caused by the medication. Therefore in humans with low self-regulation capacities, the same medication is less effective than in those with high self-regulation because, while it can improve the conditions under which self-regulation is expressed, it cannot improve this ability itself. For example, Stierlin & Grossarth-Maticek (1998) report that during a questionnaire study in 1973/4, from collectives of 3410 cancer patients they composed small groups of matched (and

therefore comparable) pairs according to age, sex, tumour entity, tumour expansion and therapeutic modality (i.e. radiation, chemotherapy, operation or mistletoe-therapy additional to conventional treatment). At the time when the questionnaire was distributed, they had all suffered from cancer for the same amount of time (date of first cancer diagnosis). But these matched pairs were strongly different in their psycho-social status (self-regulation abilities, well-being and other indicators). In 1995, approximately 20 years later, the survival rates were recorded. Interestingly, it was found that the groups with good self-regulation performed much better than the matched ones where all other documented factors were comparable.

For example, mistletoe-therapy with Iscador in addition to conventional treatment in a group with good psycho-social status resulted in a survival time of 12.6 years whereas the survival time in the control group (also with mistletoe-therapy in addition to conventional treatment) with low self-regulation was about 5 years. This clearly demonstrates the impact of self-regulation on measurable outcomes in medicine, and is proof that medication is a condition under which self-regulation can take part, but is not its direct cause. If the latter case were true, the difference in low and high self-regulation groups must have been the same because they received the same treatment, and had the same history and severity of cancer.

In addition to medical treatment, patients with low self-regulation must be helped to increase their self-regulation ability. But this cannot be done by external actions or another person. It must be achieved by the patient himself. All other people involved in the treatment are 'just' a help for the self-regulation: they can give hints, etc., which help the patient himself to become active, and for this, a range of non-medical therapies are appropriate.

Because the research area and medical practice extend into the field of soul-spiritual processes, building bridges and connections from the material to the non-material world, we prefer not to speak not of evidence-based medicine but of cognition-based medicine.

Science and ethics

This kind of scientific observation of the world has impacts on our own behaviour. The fact that individual human behaviour is largely determined by the individual's own philosophy of life is all too often neglected in ethics. This is illustrated in Figure 3.

If the constituent principles of life are coincidence and necessity (Monod, 1971), the individual can only fatalistically submit to these coincidences and necessities. If, however, the struggle for existence (Darwin, 1884) is the adopted principle of life, it is evident that the individual will try to win control, in order to ensure survival through individual or group egoism. If ecology is the guiding principle of life, then the individual's efforts will go into conserving and protecting the environment. However, if the world we live in is not only seen as a material world but also as a world that respects and reflects the intrinsic nature of every species, then it is only reasonable to behave accordingly.

PHILOSOPHY OF LIFE	HUMAN BEHAVIOUR
chance and necessity	fatalistic obedience
struggle for existence	individual or group egoism
ecology	conservation and protection of the environment
intrinsic nature of species	according to intrinsic nature of species

Figure 3 Philosophy of life and the resulting human behaviour

Basic research and cognitive ethics

The duties science has with regard to human behaviour go very much further than what is generally practised. Thus basic research really means searching for the relation between mankind and the world and finding out which of the previously mentioned or other constituent principles really correspond to our own world, as well as that of nature in general. These two questions cannot be answered without a suitable science, i.e. without epistemology. Consequently, such basic research would lead to cognitive ethics, to acting on the basis of a loving understanding and to true cultural progress.

This vision should not be considered an illusion. We have already made noteworthy progress, despite the obstacles and setbacks we have encountered.

Species-typical housing-systems, feeding- and breeding-methods, alternative perspectives on genes and complementary medicine are consequences of an understanding of plants, animals and human beings as autonomous partners with their species-typical, and in humans individual, needs and wants. Therefore the complementary approaches presented in this paper have a preventive function, and thus the potential for a major impact on plant, animal and human health, because they prevent the development of diseases at all levels of the respective organisms.

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