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Models and Representations in Science

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Model and normativity
On the relation of nature—technology—ethics

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1 Introduction: The significance of models and problems of normativity in the transitional situation of modernity

Models are created and varied in situations of transition and crisis. When traditional assumptions of truth become fragile or questionable, the challenge arises to develop new models. In the natural sciences, this is obvious when we think of atomic models, or the discovery of the benzole ring by Kekulé, to whom this model appeared in dreams. Or let us think of the conceptual change in physics by Galileo and Newton, in terms of looking at the function of objects rather than their cosmological order as a law of nature, that is, studying what objects do rather than what they are. Models are created and varied in the search for suitable meaningful explanations for certain factual observations. Less noticed is this method of understanding and self-understanding through models of explanation and making reality tangible through models in the humanities or even in theology. And it is precisely in theology that models are present from the very beginning. Such models can be seen in all mythological narratives, which can be understood as origin stories. Especially in the development from tribal religions, in archaic societies, to high religions, models of reference to God and transcendence emerge, as Jan Assmann has shown, for example, for the development of monotheism in ancient Egypt[1].

My thesis is that theology, as a meta-level of understanding the Christian faith, always represents a model—or is represented by a model. Theology virtually stands for modelling, insofar as its object—God—is the permanently withdrawn, an unobjectifiable entity, which is why theology cannot go beyond being a model. To be a model corresponds—at least in modern perception— to the character of theology. It is part of this character to represent a model in order to approach the object and to test and plausibilise its truthfulness by discussing different models. The question of theology as a model thus directly concerns theology as a science, i.e., Christian theology as a meta-level of understanding the Christian faith.

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[1]Cf. Jan Assmann, Moses der Ägypter, Entzifferung einer Gedächtnisspur, Berlin 2000.

From the very beginning, however, we find such a meta-level of attempts at understanding, which resemble models, in the formations of myths already mentioned. Therefore, they too can be regarded as models in a certain sense, even if only on a pre-reflective level, and they already point to the scope of models in theology, namely to the fact that with religion or the object of theology we are dealing with something that cannot go beyond models at all. The fact that it is precisely the non-rational or supra-rational aspect of faith that plays a role here does not detract from the rationality of models. So it can apply to models in general: They can be based on and stimulated by experiences of evidence. However, these are subsequently consolidated by arguments ex post and, above all, made communicable, but always within the limits of the model.

With the model character of theology we therefore enter the meta-level of rational understanding of religious worldviews, their values and norms. These worldviews themselves meet as certainty of experience in contrast to certainty of knowledge, which would have as its flip side scepticism or the denial of truth knowledge. However, it is precisely this level of certainty of knowledge that must account for the accuracy of models.

Therefore, when we speak of models in theology, we must distinguish between the level of faith and the level of reflection of faith. It is this meta-level of reflection on faith that characterises theology as a science, which leads to the concept of theology as a model. The value of self-reflexive theology is to be aware of this model character. For it is precisely for theology that there is a danger of overlooking or ignoring the model character of its doctrinal statements, since theology is concerned with understanding reality. Therefore, there is always the possibility of confusing models with reality. But the insight into the reality of faith is based precisely on the fact that such models cannot represent reality as such, that is, reality in the form of the wholeness of a world view, but that models want to refer to this wholeness, namely in and through the reality of experience and the experience of reality of individuals. This experience of reality manifests itself in evidence that cannot be generalised. This generalising approach has been the endeavour of metaphysics. But we have to face the critique of metaphysics, according to which a general reference to truth, to reality, as represented by metaphysics, is regarded as speculation—at the latest since Kant's destruction of the proofs for the existence of God. The modern turn of philosophy to the subject—for example with Descartes—exposes and therefore demands the model as model instead of a direct reference to any truth, if one holds on to a concept of reality and normativity at all.

This way of making models/concepts explicit confirms the modern insight that knowledge of reality cannot be generalised and therefore cannot be rationally grasped. Nevertheless, the search for reality and normativity can

claim its own place as experience through the figure of the individual. Now we have to consider that it is this experience of the individual that makes it possible to establish a reference to reality at all. There, in the individual, the grasp of reality goes hand in hand with the claim to appreciate something universal in the individual. And this is possible with regard to a certainty that is legitimised by an experience that is somehow evidential.

The general is therefore to be distinguished from the universal when it comes to the question of an epistemological access to reality. This distinction between the general and the universal is possible because the universal can be seen as transcending the general—and thus human reason—while at the same time offering a unique evidence and certainty about reality that can be glimpsed, so to speak, at certain moments. It is therefore obvious that the focus on the individual, the individual as the guarantor of access to reality, represents a spiritual and intellectual-historical transition within modernity. The individual represents an entity that provides a contingent insight into reality. This leads to a shift in the broader cultural context, expressed through the development of new models that, among other things, validate the concept of the model itself.

This validation occurs through a particular emphasis on the individual and the particular, in contrast to the modern concept of the subject. Unlike the modern subject, which sought to grasp the whole or the general, the individual now represents experiences of certainty about reality within specific areas and times, giving it only a model-like character. This perspective is consistent with a radical critique of metaphysics. The question of my paper is now concerned with the effort to maintain interest in the possibility of normative orientation, that is, the possibility of grasping reality, so to speak, in a post-metaphysical world or in a world of cognition in which models as models are the only honest way to stay within the reality of the scientific approach.

Ratiocentrism, for example, can be understood as a model of human emancipation and maturity that took place during the Enlightenment. It is characterised precisely by the fact that reason becomes in a prominent way the standard for dealing with the world, and thus the problematic relationship between reason and religion becomes an issue. This new modelling of man's relationship to the world included the fact that religion is no longer, as it used to be, the realm of man in his self-understanding of his being in the world, as was the case in antiquity and the Middle Ages, which included metaphysics and ontology as ontotheology, including ideas of nature, of the cosmological order and of natural law.

This view of unity, or of the possibility of unity through the integration of reason into a whole, superordinate cosmological order or conception of natural law, broke down in modernity and modernity and in the name of

modern rationality. The so-called ratiocentrism that grew out of it designated the new intellectual-historical model of the explanation of the world and of the self, which created a new model of the possibilities of cognition, by which theology, in the course of the critique of religion, now saw itself challenged to develop new models of the relationship between transcendence, rationality and reality.

However, with this post-metaphysical turn towards understanding reality only through models, the pressing question arises: to what extent did philosophy, in its turn away from ontology and metaphysics during the Enlightenment, not only abandon its normative foundations, but also fail to compensate for this loss? In other words, the urgent question is: how can this loss of orientation through the loss of metaphysics be countered with models alone? To answer this question, we must consider the two levels of reference to reality.

I would like to illustrate this problem with an example of a changed understanding of normativity, as it is challenged by the new technologies in their new determination of the relationship between nature and technology. This problem becomes evident in the modern hybridisation of technology and nature. The traditional distinction between technology and nature, which has been maintained since antiquity, no longer seems appropriate. Historically, the concept of nature symbolised normativity, acting as a guiding horizon and an ethical boundary for the limits of technological research and development. This model—in which nature was unquestionably seen as the boundary and standard for ethical guidelines—has already been abandoned in modern times. Today, with the rapid pace of technological progress, the notion of nature, or even 'natural law', as a boundary is increasingly disregarded. The exemplary nature of ethical guidelines or normativity can be illustrated by the concept of human nature itself, understood as humanity's unique cultural capacity expressed through specific forms of technology.

A brief look at the understanding of technology can illustrate this. When we think of technology, we usually think first of artefacts, of tools, or of specific technologies in our actions. We often overlook the dimension of technology that accompanies this—the aspect of securing our place in the world, which affects the conditions of both the world and the self for humanity as a whole. Yet it is precisely this dimension of technology that is directly linked to humanity's normative self-understanding, helping us to cope with the contingency of our existence. It seems to me crucial that we keep in mind this aspect of technology, as it relates to self-understanding and coping with contingency, if we are to determine its ethical-normative significance for human beings. Although technology has an instrumental character as a

compensation for the lack of instinct of the "deficient being" (Mängelwesen[2]), it also fulfils a normative function by securing humanity's position in the world. Both aspects reflect human freedom. However, with regard to this second dimension—which shapes humanity's self-understanding—technology risks undermining freedom itself, since the ambivalence inherent in freedom can threaten freedom itself.

This is illustrated by newer technologies, which place us at the centre of questions about the possibility and validity of norms in modernity. It's important to consider how both dimensions of technology—the instrumental, artefact-based aspect and its role in mastering the self and the world—are intertwined. When this interweaving blurs the distinction between these two dimensions, it has significant implications for our understanding of nature in its traditional, normative sense. This development of technology can thus illustrate the change in the concept of nature in relation to technology—and, what is important for us, it can also somehow illustrate the model character of nature in relation to human freedom.

2   The transformation of the concept of nature in its normative dimension and its relation to technology

Since Greek antiquity, "nature" has functioned as a decisive normative concept of orientation in ethical and legal debates.[3] In antiquity and the Middle Ages, for example, this normative function also found expression in the concept of natural law. For our Western thinking, this orienting dimension of the concept of nature as a normative boundary and background dimension has become indispensable for the orientation of our self-understanding and our understanding of the world. The concept of nature has traditionally served to set limits—both for the orientation of culture and in relation to the scope of technology. In this respect, nature had a cultural, legal and ethical normative function. We recognise this in the expressions as "against nature" or "unnatural".

The German philosopher Gernot Böhme also has this dimension of the concept of nature in mind in a monograph: "The Other of Reason"[4]. This "other" is not only the "objective" or the "excluded", but at the same time an entity that accompanies us as the inaccessible, as the background dimension of all our thinking and perceiving. And it is precisely this background

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[2]Cf. Arnold Gehlen, Der Mensch. Seine Natur und Stellung in der Welt (1940), Frankfurt 2016.

[3]See also the remarks on the relationship between nature and technology in: Elisabeth Gräb-Schmidt, Art. Umweltethik, in: Handbuch der Evangelischen Ethik (HEE), ed. by Wolfgang Huber, Torsten Meireis and Hans-Richard Reuter, Munich 2015.

[4]Böhme, Gernot/Böhme, Hartmut: Das Andere der Vernunft. Zur Entwicklung von Rationalitätsstrukturen am Beispiel Kant, Frankfurt/Main (^{2}1992) 1983.

dimension that is important for defining the character or even the existence of human freedom.

However, this normative boundary and background function of nature is threatened by those newer technologies which imply a hybrid form of nature and technology. Such hybridisation, for example in biofacts, is then referred to as "enabling technologies" or "converging technologies"[5]. At this point, the question arises as to whether the claim of nature as the other to be the background and boundary dimension of our actions and conceptions is attacked or even dissolved by such a mixture. Does nature lose its previous normative power with such a hybridisation of nature and technology?

In any case, if biofacts lead to a hybridisation of technical and biological components in humans, it is already apparent that the traditionally taken for granted Aristotelian distinction between nature as that which has become natural and technology as that which has been artificially made is beginning to waver, and with it the distinction between two aspects of nature: (a) as material for technical shaping, (b) as a background dimension for ethical norms.

This also has consequences for the understanding of the possibility of normativity, because freedom is affected. It becomes a mixture of its instrumental function, as it is given within technology, and the ethical dimension of freedom, as it is given within the function of self-determination and world domination of human beings, which is granted by the fact that the possibility is embedded in a background dimension. Both aspects of freedom, that of the technical shaping of nature and that of the ethical responsibility for the shaping of the word, including through technology, must be considered. But since both dimensions are related to nature in different ways, the normative status of nature becomes problematic. It disappears in the hybridisation of nature and technology. Nature is now objectified as a whole, i.e., nature as such is subordinated to the feasibility of technology and loses its unavailable background dimension.

With the blurring of the two dimensions of nature, the object and the background dimension, the different functions of freedom are leveled out: freedom as creativity in craft and art, i.e., in technology, on the one hand, and freedom as self-management of human openness to the world ("Weltoffenheit"[6], i.e., as the given in nature, on the other. It is this de-differentiation of freedom, however, that endangers the possibility of a normative dimension at all. For this mixture draws ethical freedom into technical freedom, so to speak, in that nature as such in its givenness, i.e., in its unavailability, is "made", technically "made", and is thus subordinated to human controllabil-

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[5]Mihail C. Roco, William Sims Bainbridge (eds.), Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science, Dordrecht/Boston/London, 2003.

[6]Cf. Arnold Gehlen, op.cit., footnote 2.

ity. This means that the previous conception of nature as not made, but as that which has become and as such determines the background of our creative actions, now itself becomes an object and thus something that is "made". Precisely the former, fundamentally uncontrollable, because unavailable, which is conventionally symbolised in "nature" as a background dimension, now, in the newer technologies, seems to be subjected to technology itself.

In this way, however, all that is left is technology. Technical freedom is then identified with freedom as such. This can be illustrated in its radical consequences in the new technologies of artificial intelligence. These radical consequences are that fantasies of dominating and optimising nature through technical processes can also be directed at human nature as feasible, as is promised, for example, in transhumanism, where the limits of life itself are to be pushed out or even abolished. In the immortality visions of Google engineer Ray Kurzweil[7], human nature itself appears as technically feasible and extendable. But as a threatening scenario, as Peter Sloterdijk has already shown in his "Rules for the Human Park"[8].

These scenarios of modern technologies in the field of artificial intelligence have drastic consequences for the relationship between technology and nature or for the understanding of human freedom. One could even speak of a paradigm shift. For the cultural distinctions between nature and technology that have so far determined the normative model can no longer be clearly defined when what is technically made and what is natural become intertwined, when the boundaries between nature and technology become blurred, for example, as already mentioned, in the biologisation of technology, in biofact.[9]

Up to now, nature has been an object of technology, but at the same time a boundary concept of technology. The new technologies now threaten not only to determine the extent to which nature is penetrated by technology, but also threaten the creative space of human freedom itself. For the space of freedom has always been linked to nature as the ground and counterpart of freedom. By symbolising the given and thus, in a certain sense, the unavailable, nature has always represented the enabling space of freedom. But freedom atrophies when it is no longer understood in relation to nature or to a horizon that provides criteria for definition, but rather as a mania for feasibility that believes it can exploit or usurp this relation itself.

Thus, although at first sight technology seems to increase freedom as an extension of man's technical possibilities, in the end, in its mania for feasibility, it turns out to be its abolition. It erases the background dimension

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[7]Cf. Ray Kurzweil, The Singularity is Near, When Humans Transcends Biology. 2005.

[8]Cf. Peter Sloterdijk, Regeln für den Menschenpark. Ein Antwortschreiben zu Heideggers Brief über den Humanismus, Frankfurt a. M., 1999.

[9]Cf. Nicole Karafyllis (ed.), Biofakte. Versuch über den Menschen zwischen Artefakt und Lebewesen, Paderborn 2003.

of nature, which could be seen—symbolically—as a condition of freedom and normativity. If this background function of nature is dissolved by technology, then in a sense freedom also disappears, although technology itself is an aspect of freedom.

Together with the change in the concept of nature, technology or technical intentionality usurps the traditional place of freedom. However, if this de-differentiation is to be stopped, a new model of nature is needed that can preserve and value human freedom in its two dimensions, the technical and the normative. However, a return to traditional models of nature is impossible if we do not want to fall back into pre-modern metaphysical and ontological patterns.

If we look at what characterises freedom, human freedom not only in its technical quality of creative power, but also in its ethical capacity of responsibility, it is clear that freedom is not exhausted in technical operations, in technical progress. Freedom is then also seen in its power of judgement—also as a counterpoint to a merely reduced, technical ability. And this power is the decisive factor in preserving freedom in its ethical character of responsibility.[10]

The precondition for such a capacity to judge is that freedom remains related to its enabling condition, which in the philosophical tradition was symbolised by nature and which also held the potential for normative orientation. In this respect, Jürgen Habermas rightly points out that we must hold on to a natural basis, to a "naturalness" of our humanity, if we want to preserve our autonomy, namely our capacity to judge.

But it is precisely here that we come to the problem of understanding nature in the light of modern technologies and the change in the model of the concept of nature. The concept of "naturalness", as Habermas uses it[11], can lead to misunderstandings here, because it is now inaccurate. For we have seen: With the biologisation of technology and the objectification of nature, the boundaries between technology and nature become blurred. The problem then lies in the concept of the natural. The natural is no longer given as "natural", as in the ancient and medieval understanding of nature. Rather, as we have seen, the further technology develops and the more nature becomes the object of technology, up to and including human nature as such, the less technology can be defined simply as the opposite of the natural, since it is human nature that expresses itself in this technical way. Insofar as technical feasibility no longer recognises biological nature as a boundary, nature as a biological or cosmological basis has (rightly) lost the function of determining boundaries and backgrounds.

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[10]Cf. Philip Clayton, In Quest of Freedom, The emergence of Spirit in the Natural World, Göttingen 2006.

[11]Cf. J. Habermas, The Future of Human Nature. On the Way to a Liberal Eugenics? Frankfurt a.M. 2005.

In order to escape this misconception or misunderstanding, nature must be perceived not as biological or cosmological, but in its symbolic dimension as background determination. Even if nature as a biological basis has lost its normative function, this does not apply to the "unavailable" that nature symbolises, the unavoidable of its boundary determination. But this is misleadingly called "natural growth" in the Habermasian sense. Indeed, the understanding of naturalness runs the risk of a biologistic narrowing of the understanding of nature or of nature as a normative criterion. If nature now becomes the designation of a symbolic place of the unavailable, of a space of human freedom, then nature can continue to symbolise the unavailable and thus preserve a space of primordial freedom. This given freedom as a space of possibility now corresponds to nature as a given background dimension that can form the normative criteriology of ethical action.

The criterion itself is and must be an orientation towards the preservation of freedom. In a sense, then, it's a formal criterion that is open to various material contents. But this also makes it clear that our task of preserving freedom is now made more difficult: for we now have to decide for ourselves what we must or want to preserve as "nature" or as unavailable in relation to technology. This is a question that cannot be answered once and for all, but it is the task of ethics, which must be oriented towards the preservation of human freedom as the ability to judge and to choose a goal. To do this, it needs a symbolic model of nature, which is not available. Then we see: Not only the ancient model of nature, but also such a model of a symbolic space of the (possible) conditions of freedom offers a limit for technical action. But this limit is not naturally given, it is not without a criterion. The criterion is thus given where the space of freedom, in its unavailability, does not dare to be attacked, i.e., when the root of freedom, which is expressed in the reflection and judgement of the self-experience of the individual, is itself technically appropriated, then we have to stop, at least to observe our technical goals.

The orienting criterion of such a symbol or model of nature is therefore whether ethical freedom—and this is the power of judgement of the individual—is preserved, expanded, strengthened, or whether it is diminished, surrendered and lost in a technological imperative, i.e., where the original space of freedom is usurped by technology and freedom is in danger of being destroyed.

3   Model and reality: normativity as a heuristic variable

We can say: The philosophical change in the understanding of nature and technology is to be met by specifying the considerations of freedom, which

remain dependent on nature as a symbol, as a given background dimension that entails freedom as an ethical power.

It is true that already in modern times freedom and thus ethics were understood as the other of nature, but in a dichotomous sense. In Kant's case, this sharp separation was enforced to the extent that he kept the natural, such as human inclinations, out of ethics. But this was a problematic path to take. For in this way only a reduced understanding of nature—in the sense of the other of reason—became dominant. The dimension of nature as a normative background was abandoned in favour of its objectification and at the expense of its technical instrumentalisation.

As a result, nature came to be seen simply as raw material for technical manipulation, and freedom lost its dual role as both technical creativity and ethical reflection. This second dimension of freedom would correspond to nature as the normative background to the criterion of freedom—a dimension that cannot be technically dominated, but rather cultivates the capacity for judgement. Both dimensions can only be sustained by a symbolic understanding of nature that allows for normativity and thus an ethical framework. In this model, nature retains a normative function as a symbol of such normativity. What cannot be transcended here is not nature in a strictly biological or cosmic-ontological sense, but rather nature as an unavailable space that shapes our reflective, self-aware experience of freedom.[12] In this light, nature is neither opposed to reason nor, as in the modern tradition, to freedom or technology. For both reason and technology, nature remains the "other" that serves as the essential point of reference in humanity's creative endeavour. The boundaries of such a symbolic conception of nature may shift, but they can never be completely dissolved if human freedom and self-determination are to endure.

By treating nature as the "other"—not as an object, but as an elusive background—the normative dimension of a symbolic understanding of nature for freedom emerges. However, nature should not be reduced to a biological or metaphysical entity. Such a reduction would contradict its symbolic role, which allows for cultural shifts in the relationship between nature, technology

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[12]Precisely here, in this unavailability, the inwardness dimension of self-experience comes into play, which stands for a qualified concept of freedom, which symbolizes the unavailability dimension and ties it back to self-experience. We are thus led to the unavailable dimension of existence, when it comes to this freedom. But the place of unavailability is now no longer simply nature in a cosmic or biological sense as natural, but at the place of inner self-experience. Nature in this sense can therefore now be determined as the space of origin of freedom. This constellation of the relation of cognition to inner experience points us to precisely that epistemologically unusual category of trust as the category that can make plausible the unavailable. This is also the quintessence of Protagoras' Homo Mensura theorem, which by no means denotes human hybris, but on the contrary—quite modernly—anticipated the limitedness and perspectivity of human cognitive capacity.

and freedom, affirming humanity as a being capable of judgement and action, grounded in a space of freedom symbolized by nature, or by a nature made symbolic. In this model, nature serves as a realm of possibilities for the realisation of freedom. This perspective brings us back to the role of the individual. The relationship to reality is forged through the fluidity of the given and the adaptability of our individual self-understanding, which must ultimately be communicated within a pluralistic context.

Thus, the concept of nature as a model—a space for freedom—does not imply a diminished view of reality after the end of metaphysics. It does not represent less reality, but rather illustrates how we can engage meaningfully with reality. This model of nature offers a deeper and more appropriate understanding of the cognitive conditions of subjectivity under finite and embodied cognitive conditions. Here, cognition does not simply assert the existence of being, as in Kant's approach, but aims at genuine access to and recognition of being. In this sense, the importance of the individual and the particular is emphasised. All claims to truth and reality in modernity depend on the validation of individual access to reality, represented by models. These models do not aim to transcend themselves, but in their flexibility and adaptability allow us to continually test, verify or challenge our understanding, thus enhancing humanity's capacity for judgement.