

Review of L. Illetterati and F. Michelini (eds.), *Purposiveness: Teleology Between Nature and Mind*, Frankfurt: Ontos Verlag, 2008

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Recent years have seen a remarkable rise of interest in discussions of teleology. The question of how to make sense of the concept of purposiveness in accounts of nature and, in particular, in the study of living nature is receiving ever-growing attention. Luca Illetterati and Francesca Michelini's collection of papers forms part of this revived interest in natural teleology. The guiding question of the volume is a fundamental one: has modern science made teleological notions of nature obsolete? Or do we need to retain some kind of teleological conception for an adequate understanding of nature? Insofar as teleological thinking entails either a type of anthropomorphism or the threat of backward causation, Illetterati and Michelini point out, the rejection of teleology presents part of the very basis of modern science. And yet, as the editors argue, 'things are not so simple' (3), for teleological terminology still plays a considerable role in the biological sciences. It is against this background that the book raises the important question of whether we can make sense of teleology as a legitimate component of our thinking about the natural world.

The ten papers included in the collection propose different answers to this question, and yet they all share the assumption that natural teleology is left unexplained by reference to intelligent design. The idea that the apparent purposiveness of nature could be elucidated by the existence of an intelligent being that has designed nature according to a plan is unanimously rejected. The question of the book can consequently be summarised more pointedly: has modern science made teleological notions of nature obsolete, or can we retain a conception of nature as purposively organised and striving towards some end without making sense of that end as one set by an intelligent designer? Can we, in other words, defend a notion of teleology that provides an alternative to its complete rejection by a purely naturalistic account, on the one hand, and the apparently illegitimate assumption of a mind that has intentionally designed nature, on the other? The discussions included in the volume aim to provide alternatives to the two poles of this contrast in an attempt to find a stable position of 'teleology between nature and mind'.

Notable about the way the volume addresses this question is its broad combination of historical and systematic interests. Out of the ten papers included in the book, the first five deal with some of the historical background to contemporary discussions on teleology. While the Kantian position plays centre stage (with two papers by Predrag Šustar and Cord Friebe focusing exclusively on Kant), other contributions discuss the historical development predating Kant's account (Antonio Nunziante on Leibniz) and later attempts at going beyond the Kantian position (Michellini on Hegel and Nicoletta De Cian on Schopenhauer). The five papers included in the second half of the volume turn their focus to questions about the compatibility of teleology with contemporary science (contributions by Illetterati, Georg Toepfer, Paolo Costa, and Andreas Weber and Francisco Varela) and the role of teleological thinking in relation to the Foucauldian notion of 'biopolitics' (Tristana Dini, 113). It is note-worthy, however, that although the contributions can be divided into those that are more historically focused and those that are guided primarily by systematic questions, the collection manages to combine these two perspectives effectively. Critical discussions of Kant's and Kantian conceptions of teleology, for example, can be found not only in the papers by Šustar and Friebe, but also in the contributions by Illetterati and Toepfer. More generally, whether they do so from a more historical or systematically focussed perspective, the papers aim to spell out a coherent account of the apparent purposiveness of living nature.

The book begins with a paper by Nunziante who discusses Leibniz's development of the 'paradigm of "life"' from the 'paradigm of "machines"' (29). It is only by starting with, and reflecting on, the Cartesian idea that living beings are machines, Nunziante argues, that Leibniz differentiates the particular character of organic beings from inorganic objects as living rather than non-living machines. Leibniz thus begins with the idea of a purposively organised artefact whose parts, while interacting with one another according to mechanistic laws, are organised in such a way as to carry out an end. Organisms are defined, on this account, according to a functional relationship between the whole and its parts. It is precisely this relationship of parts and whole, however, that leads Leibniz to go beyond the purely mechanistic paradigm in order to capture the particular character of living beings. What is special about living machines, Leibniz realises, is their capacity for plasticity and self-maintenance. This capacity is dependent, according to Leibniz, on the perceptive activity of organisms, on their ability to perceive the world. Once reference

to perception (or, as Nunziante suggests, 'intentionality', 28) has been allowed into the picture, however, we have moved quite far on from the mechanistic paradigm. We have introduced the idea that the character of organisms is not only explicable by means of the relationship between parts and whole but must refer also to an organising capacity that makes the unity of the whole possible from within. It is the introduction of this idea, Nunziante argues, which can be understood as a move 'increasingly towards "mental" results' (28).

Nunziante's account of Leibniz may raise many questions about what a satisfactory understanding of natural teleology should consist in. It nevertheless, or precisely thereby, provides a helpful background to the subsequent discussion by turning attention to two concerns that lie at the centre of Illetterati and Michelinì's volume. First, in analysing how Leibniz attempts to make sense of organisms on the paradigm of machines, Nunziante considers the question of whether we can understand organisms according to the artefact model or whether we need to presuppose an internal organising principle. If the purposiveness of nature cannot be understood by reference to the intentionality of an external agent, who sets ends and designs nature according to those ends, then nature's ends may more plausibly be regarded as internal to nature itself. Nunziante's account of Leibniz thus provides an initial account of the Kantian distinction between external and internal teleology. Second, if, as Leibniz suggests, the paradigm of machines needs to be modified in order to account for an internal principle of purposiveness, then this raises the further question of how to find a coherent conception of such a principle. Can we really make sense of a purposively organising principle as internal to a machine? Or does reference to an internal principle, as Nunziante puts it, have 'purely heuristic valence' (24)? Both these questions, one about the correct interpretation of natural teleology as either internal or external to the organism, the other about the status of teleological accounts as providing either objective claims or merely heuristic considerations about nature, lie at the centre of discussions in this volume.

In the second article, Šustar shows that Kant's answer to the first question goes via an answer to the second question. On Kant's account, as Šustar sets out, organisms cannot simply be defined as organised, functionally integrated wholes; this would not adequately distinguish them from machines. Instead, they must be defined as natural ends, that is, as organised beings that are both cause and effect of themselves. The Kantian account of organisms, as Šustar spells out, are characterised by internal

purposiveness, they are not only purposively organised but they also organise themselves. The problem that this raises, however, is precisely the problem at the heart of our second question: how can we understand this account as providing a coherent conception of living nature? In what sense can something be both cause and effect of itself? For Kant, this prompts what Šustar calls the 'contradiction issue' (35), the problem of making sense of a teleological principle as part of nature which, at the same time, is taken to be thoroughly causally determined. As Šustar sets out with admirable clarity, Kant's solution to this 'issue' is a 'methodological turn', a move away from the attempt to give an 'essentialist' analysis of the organism concept to providing a 'methodological' analysis (33ff.). Rather than spelling out that the very nature of organisms is characterised by purposiveness, Kant's aim, according to Šustar, is to show that a teleological conception of living nature 'relates to some of the most important tasks in scientific practice' (35). On Kant's account, Šustar points out, teleology presents a heuristic device for the study of living nature. It is not an aspect of the character of nature itself. Similarly, as Friebe argues in the next chapter, it is Kant's epistemological characterisation of the purposiveness of organisms that is ultimately defensible in the light of current biology. On this account, we must consider living nature teleologically because of the peculiar constitution of the human understanding rather than the internal causal structure of living beings themselves.

One may wonder, however, whether Šustar, and to some extent also Friebe, are not brushing over some difficulties when they assume that the methodological, and epistemological, turn to a heuristic understanding of natural teleology lets Kant avoid the contradiction between teleology and efficient causality with which he struggled in the Antinomy of Teleological Judgment. The large, and growing, literature on this antinomy testifies that most commentators are by no means convinced by the sufficiency of this heuristic reading of the principle of teleology as a solution to the antinomy. Moreover, one may question Šustar's further claim to the superiority of his own methodological interpretation of natural teleology over Hannah Ginsborg's normative account. According to the normative account, to consider a living being teleologically is to assume that it ought to be a certain way. Šustar objects, however, that to think of the apparent purposiveness of living beings in this way, does not account for 'the explanatory and predictive import of function-ascribing statements in biology' (49). It does not show how thinking that something *ought to be* such and such can explain why it *is* such and such or even predict that it *will be* such and such. And

yet, while this objection seems correct, I believe that it does not by itself show that the methodological reading really is the superior alternative to the normative reading. The two readings may, instead, present accounts that perform different but complementary functions. Thus, the methodological reading could account for the use to which explicitly teleological concepts are put in the study of organisms. Reflecting about their apparent purposiveness would advance attempts at explaining and making predictions about living nature. The normative reading, by contrast, could still be taken to account for the special character of our experiential awareness of organisms. Independently of the heuristic use of teleological concepts in science, one could argue that our very experience of living nature is characterised by a normative element. The normative account could thus be argued to be compatible with Šustar's methodological reading insofar as it spells out the particular character of our experience as based on regulative reflection about the purposive organisation and directedness of nature.

Subsequent chapters, however, raise a more general criticism of what Šustar presents as Kant's methodological turn. As Illetterati puts it, the methodological reading fails to supply a satisfactory account of the organism insofar as it leaves living nature ultimately 'incomprehensible' (160). If all that we can say about the apparent teleological character of organisms has the status of a purely methodological tool for science and if, furthermore, there is no adequate non-teleological conception of organisms, then we have no means of actually comprehending the nature of living beings. Other papers included in the collection thus present different attempts to go beyond the purely heuristic reading of natural teleology. Francesca Micheli and Nicoletta De Cian, for example, discuss different versions of an ontological conception of natural teleology to be found in the work of Hegel and Schopenhauer.

Thus, De Cian shows how Schopenhauer asks for the 'more primitive root' (109) of our regulative teleological judgments. He finds it in the original, universal but unconscious will of which the human intellect is only a secondary product. Once we agree with Schopenhauer's metaphysical claim that everything in nature is the result of the 'unfolding' (106) of this universal will, including our own minds and their capacity for teleological judgment, the teleological conception of organisms, De Cian argues, can be given an ontological grounding. It is this conception of a non-intentional root of natural purposiveness that, according to De Cian, could be fruitfully combined with evolutionary conceptions of biological functions. For doing so, she argues, would help to avoid explaining biological purposes and functions by reference to the theological

model of an intentional intellect. De Cian remains rather suggestive, however, about how the non-intentional 'primitive root' of teleology should be understood in positive terms. It is thus left open how we should conceive of this more fundamental principle that underlies, for instance, an organism's instinct of survival if we do not want to retain Schopenhauer's notion of a non-intentional all-pervading will.

As Michelini argues in her paper, for Hegel, too, the teleological principle of living nature is no longer regulative but becomes 'the inner constitutive law of life' (85). On the Hegelian account, while the Kantian understanding of natural teleology is transformed into a constitutive principle, it remains a principle of purposiveness internal to the organism itself. What is important in this conception of the character of the living, as Michelini stresses, is that life is not construed as an additional element, a force or entity, over and above the physical and chemical properties of the parts of an organism but something that emerges from the relational organisation of those parts within a system. This conception of life as a systemic and relational property could, of course, be understood in a number of different ways, including not only 'organicist' (76) but also physicalist conceptions of the relations between parts of a system. Interestingly, however, Michelini argues that we can conceive of the Hegelian conception of the internal purposiveness of organisms in the context of modern conceptions of 'autopoiesis', that is, the autonomous self-production of organisms.¹ This conception is spelt out in a previously published but revised paper by Weber and Varela that is included in this volume. According to the authors, what distinguishes the autopoietic approach from other accounts of self-organising systems is the idea, inspired by Hans Jonas among others, that life can only be understood in connection with subjectivity.² Thus, the authors argue that living beings are systems that reproduce themselves and, indeed, have their 'existence by on-going self-organization as their goal' (204). In this way, they claim, organisms must be understood as having subjectivity, or a 'point of view' (212).

It is precisely this idea, however, that seems to present the key difficulty with the autopoietic understanding of living systems. For how can we make sense of the thought that we should understand all organisms as having subjectivity and as being, in Weber and Varela's terms, 'active agents' (209) without also ascribing to them some

¹ Michelini here relies on the conception of autopoiesis as introduced in H. R. Maturana and F. J. Varela (1980) *Autopoiesis and Cognition: The Realization of the Living*, Dordrecht: D. Reidel.

² H. Jonas (1966) *The Phenomenon of Life*, New York: Harper & Row

form of mindedness or intentionality? This question is particularly pressing insofar as the authors want to include even the most minimal forms of life in the class of autopoietic systems. In his closely related paper, Paolo Costa refers to the 'irreducible phenomenological nature of our understanding of the living' (195). An understanding of what being alive means can only be gained, he argues, 'from the inside' (195), that is, from first-hand experience. This, however, raises the question of what exactly it is that we can come to know through such first-hand experience. Can this experience really teach us anything about the objective character of nature? Or are we, by relying on first-hand experience, merely reading something into our experience of other, perhaps very different, living beings? One may wonder whether, by understanding all organisms as active subjects, we are not projecting onto them the kind of intentional purposiveness that we know from ourselves and that, in accordance with the Kantian position, we can attribute to nature only by means of an analogy. These questions, it seems, raise doubts about the prospects that the autopoietic account of organisms will ultimately overcome the Kantian idea of teleology as a purely regulative principle.

The question of whether teleology should be understood according to the model of human agency and intentional purposiveness is discussed in more detail in the contributions by Luca Illetterati and Georg Toepfer. Their discussions make apparent the close connection between the two concerns about teleology identified at the start. For the second question of the status of teleological judgments is shown to be intimately linked to the first question of the particular content of teleological conceptions of living nature. Thus, as Illetterati argues, it is Kant's assumption that teleology is essentially tied to intentionality that leads him to ascribe to teleological judgments a purely regulative status. It is because Kant understands purposiveness always in the context of a purpose-setting intellect that leads him to conclude that we cannot know purposiveness in nature but can only reflect about nature as if it were purposive. To overcome Kant's heuristic conception of teleology, Illetterati maintains, we therefore need to replace it with a conception of teleology that avoids the link with intentionality. The purposive organisation and directedness of organisms, he claims, should be understood in terms of a circular causality. Similarly, Toepfer stresses the fundamental difference between natural and intentional teleology. According to him, the latter consists in the 'action directed towards an anticipated end state', while the former concerns processes that 'are part of cyclical systems' in which the parts are defined by their causal role within the system (176).

Both Illetterati and Toepfer thus present a direct inversion of the Kantian position on internal purposiveness, that is, a constitutive account of teleology that cuts the link with intentionality. But this alternative account, too, raises questions. First, one may worry that the conception of natural teleology according to circular causality and cyclical systematicity that both Illetterati and Toepfer refer to does not satisfactorily distinguish living systems from non-living ones. If natural teleology is nothing more than the causality of certain cyclical systems with feedback loops, then other inorganic systems in physics and chemistry may equally well be described as teleological. That they are not, however, suggests that teleology may include more than circular causality. While Toepfer is aware of this objection, he considers it to be unproblematic. Insofar as biology, in contrast with the other natural sciences, deals exclusively with systems of mutually dependent parts, he argues, it is an 'epistemic decision' (171) to think about these systems in teleological terms. Thus, although we may consider biological systems differently, it is methodologically useful to regard them in this way. This, of course, sounds very much as if teleology was, again, reduced to a merely methodological principle. And yet such a principle, according to Toepfer, does in fact refer to actual processes in nature. This, in turn, may raise a second question. For if natural teleology, in Toepfer's sense, has nothing to do with the purposiveness of intentional activity, then one may also wonder why we should call this type of causality 'teleology' at all. Should we not, instead, accept that teleology has been reduced to something else, that is, to a type of causality that has nothing to do with purposiveness and goal-directedness as we are familiar with from human agency?

These questions lead us back to the original concern of Illetterati and Michellini's volume, the question of whether or not we can retain a conception of natural teleology in the light of current science. The variety of answers proposed hint at the extent of the problem that this question raises: the problem of giving an adequate account of the apparent purposiveness and goal-directedness of living beings as something 'between nature and mind'. In the end, we may still wonder whether there really is a stable position in between a naturalistic reduction of teleology, on the one hand, and an account of purposiveness that makes reference to intentionality on the other. While the book does not give a unified answer to this question, the different perspectives it brings together nevertheless provide a helpful insight into current debates about teleology. It will be of value to those interested in accounts of purposiveness in the history of philosophy and the philosophy of biology alike.