Life after Kant: Natural purposes and the autopoietic foundations of biological individuality

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Abstract. This paper proposes a basic revision of the understanding of teleology in biological sciences. Since Kant, it has become customary to view purposiveness in organisms as a bias added by the observer; the recent notion of teleonomy expresses well this asif character of natural purposes. In recent developments in science, however, notions such as selforganization (or complex systems) and the autopoiesis viewpoint, have displaced emergence and circular selfproduction as central features of life. Contrary to an often superficial reading, Kant gives a multifaceted account of the living, and anticipates this modern reading of the organism, even introducing the term selforganization for the first time. Our rereading of Kant in this light is strengthened by a group of philosophers of biology, with Hans Jonas as the central figure, who put back on center stage an organismcentered view of the living, an autonomous center of concern capable of providing an interior perspective. Thus, what is present in nuce in Kant, finds a convergent development from this current of philosophy of biology and the scientific ideas around autopoeisis, two independent but parallel developments culminating in the 1970s. Instead of viewing meaning or value as artifacts or illusions, both agree on a new understanding of a form of immanent teleology as truly biological features, inevitably intertwined with the selfestablishment of an identity which is the living process.

A clash of doctrines is not a disaster, it is an opportunity.

A.N. Whitehead

1. Introduction

1.1. The Kantian heritage

This article is an immodest reformulation of a central issue in the philosophy of biology: the topic of natural purposes or teleology. The motivation for this attempt is that we perceive a great need to bring to the fore a remarkable and recent convergence between the reawakening of the philosophical discussion concerning natural purposes (with Hans Jonas as the central figure), and an independent but convergent stream of thought concerning biological individu

ality and the organism (with the autopoiesis school as the central figure).1 These two streams reinforce and extend each other to such an extent that we boldly advance the conclusion that, after two centuries, we can move beyond the unstable position set out by Kant in the Critique of Judgement, and therefore provide a fresh reunderstanding of natural purpose and living individuality. It has become a common place in modern biology to shun teleological thinking or to reduce it to mere methodological fiction, then called teleonomy (Pittendrigh 1958). The overwhelming preference is to explain biological facts as the statistical results of natural selection which post factum give the semblance of goaldirectedness (Dawkins 1987). Purposedirected structures or events are only allowed in an asif mode; a teleological explanation can always be substituted by a (teleonomic) factual description (Nagel 1977). Nevertheless, talk about purpose or function, even though regarded as as if descriptions, is pervasive and persistent in Biology. The least that one can say is that there is a certain paradoxality concerning the role of teleology in biological matters a paradoxality, whose solution is central to the understanding of biological science. In spite of being shunned, Natures purposes is arguably the most important foundational issue in the philosophy of biology (Allen et al. 1998, p. 2). The answer to the question of what status teleology should have in biology decides about the character of our whole theory of

animate nature.

The subject has, of course, a long history. The Greeks experienced nature as an everpresent horizon, most clearly set in Aristotles dictum: the final cause is a necessary precondition for the mechanical cause. But in medieval times the idea of finality radically shifted to divine will and design, the source of all meaning and purpose. The enlightenment opposed to that the even more radical position of human mind as the measure of things, where nature is only seen as mere object for the human subject. Recent times have shifted to postmodern views on nature as a purely historical locus, contingent and relative. However, as we will argue in this paper, in sharp contrast to such views, there is a live current in modern thinking that advances a rediscovery of teleological thinking, aligning with the marginal but steady need for many biologists to take teleology seriously, that is persistent from the XIXth century on up to the present.2

Now, any discussion about teleology in science and western thinking altogether is inescapably grounded on the prodigious basis provided by Immanuel Kant. The fundamental twist in Kants analysis is to postulate that the laws governing organic reality were a bias added by the limitation of our intellect. He insisted that

the innate reasoning categories of mechanistic causality that humans appropriately bring to their analysis of nonliving reality were incapable of doing justice to the activities of the living realm. To make sense of life as a phenomenon, human judgement was forced to postulate . . . an additional principle of teleological causality. (Harrington 1996, p. 5).

For Kant, the organism could not be understood in purely mechanistic terms. But this did not imply that it would definitely not work in those terms: Kant thought that a judgement was simply not possible for the human mind (Plessner 1982). It is this latter point that still provokes a misunderstanding by many readers: Kant neither ruled out mechanism, nor did he declare it to be the real reality beneath the phenomena. He was only completely pessimistic about the possibility that organic life could be explained in purely mechanistic terms

and hence did not believe in the possibility that once a Newton of the Grassblade could deliver a reductionist and complete account of the organic world (Cornell 1986, p. 408). Kant thus makes

. . . both the mechanical and teleological principles with respect to organism mere maxims of inquiry of comparable, but not total, explanatory power. We simply do not know what, if anything, is behind life, causing its basic purposive quality in some ultimate sense (Plessner 1982, p. 247).3

In brief, Kant introduced an unstable middle position which is a central concern of this paper as an attempt for resolution. Being an adherent to Newtonstyle physics, he nonetheless reserved for the organism another kind of thinking: the living was to be conceived in terms of natural purposes. This notion explicitly touches the selforganizing properties of living matter: it can be argued that Kant himself introduced the term selforganization in its modern sense into biological theory. Nonetheless the received view (in NeoKantism, but especially also in the AngloSaxon philosophical tradition) is a strong reductionism that allowed discourse about organisms as if they behave teleologically, but sees them in reality as strictly mechanistic. It is this reading that has been most influential today, which enthrones Kant as a father of reductionist biology. In this paper we will argue, along with a number of modern writers, that Kant in his Critique of Judgement (referred to as KdU hereinafter) developed the possibility of a third way between a strong teleology and a brute materialism. Our main contribution here is to advance a resolution of this unstable position into a fully mature reunderstanding on the basis of modern developments of biological research and thinking, to which we now will turn.

1.2. Teleology and organism in current biology

The term teleology has remained quite ambiguous in biological science since Kants time, and has become even more so after Darwin. Many current problems stem from a mixing up of two main understandings of the term. Broadly, we can discern an external seemingly purposeful design, which was Darwins main concern (Lennox 1993), and which he conceptualized as the result of contingency and natural selection (Lw 1980; Zumbach 1984).4 Intrinsic teleology on the contrary is concerned with the (Aristotelian) internal purposes immanent to the living which was Kants main concern (Ayala 1970). It is also that kind of purposefulness and goaldirectness that can account for everybodys naive intuition: we strive to go on, to develop, to keep ourselves in a dynamical balance (Spaemann and Lw 1981). For Aristotle, the ego ago propter finem, the structure of ones own movement according to a telos, can be understood from the paradigmatic case of the organism. Because of this original nature, the experienced telos is the paradigm of an immediate experience as such. For Aristotle, the causal, mechanical world is an abstraction drawn from the most important causa finalis (Lw 1980).

In our present scientific world, following a received and narrow interpretation of Kant, it is just the opposite: the teleological behavior of living beings is an illusion, an appearance hiding the underlying mechanism. In current biology, the situation is quite ambivalent: On the one hand for many biologists any notion of teleology appears as in blunt opposition to the central dogma of Darwinism. On the other hand, recent work has developed an account for biological form and the living in terms of selforganization and morphological laws in frank opposition to the adaptationist program.5 Here we will be concerned with the paradigm of selforganization of the living as autopoiesis which is part and parcel of modern criticism of the strictly adaptationist tradition wherein there cannot be any place for teleology except in its teleonomic sense. In the following we will exploit this tension within modern biology to surmount the main difficulties concerning the role of teleological explanations in biology.

The role of teleology not only has to be evaluated anew because of the obviously persistent practice in biology to invoke teleological explanations while at the same time denying their consequences. Hidden in this lack of clarity lie central philosophical problems of biology that have shown to be hardly solvable in the still dominant style of antiteleological, neoDarwinist conceptions. In spite of all technical success of reductionist biological thinking the central question of biology remains an open problem (Mathews 1992)