Filosofija

Teleology: Hindrance Rather than Help

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This paper is a critical analysis of several attempts to revive nonintentional teleology in biology. My main goal is to show various shortcomings of the attempts. The cases under investigation are as follows: firstly, Driesch's neovitalism discussed in the context of Driesch-positivists' debates; secondly, Nussbaum's neo-Aristotelian ideas; thirdly, Ayala's internal teleology offered in the context of evolutionary biology. All the teleological explanations discussed have essential shortcomings which show that the modes of teleological thinking in biology can produce nothing but pseudoexplanations.

Key words: teleology, biology, neovitalism, evolution, function

1. The aim of this paper* is to discuss a few attempts to bring nonintentional teleology back into biology. I would like to point out beforehand that I am very dubious as regards the success of the teleological innovations. So preliminary and briefly speaking, the main idea of this paper is as follows: the authors under discussion has not managed to offer anything scientifically significant in terms of teleological reasoning.

The plan of this paper is as follows: I will first discuss Driesch's neovitalism in the light of Driesch-positivists' debates. Then I will turn to neo-Aristotelian attempts to revive teleology – Nussbaum's essays will be the main exemplar of the attempts. At last I will turn to modern biology.

2. I would like to open my discussion with the case of the teleological factor 'entelechy' introduced by biologist Hans Driesch. I will discuss it in the light of Carnap's critique of the factor in his "Philosophical Foundations of Physics" [4: 12–17] where he recalls debates between positivists and Hans Driesch. Carnap refers to the problem in the context of his account of laws and explanation. His remarks are illuminating but also misleading in a way. Before turning to the question of explanation, in my opinion, conceptual clarity should be addressed first.

Hans Driesch was a biologist famous for his work on regeneration and embryology. In philosophy he is known as an advocate of neovitalist account of living organisms. The term 'entelechy' is central in his philosophical reasoning. This is an Aristotelian term, but for Driesch the link with the ancient thinker is not important – "Am Namen liegt nichts", as he puts it [7: 416].

Generally speaking, entelechy is a causal factor responsible for the integrity and the development (including regeneration) of living organisms: "ein ganzmachender *Kausal*faktor ist Entelechie" [7: 416] (his italics). Entelechy is not the only causal factor: entelechy and the forces of matter act in organisms. In the spatial development of organic processes, there are non-spatial links – entelechian links. As Driesch puts it, "the chain of cause and effect is unbroken – but part of it unspatial" [12: 62]. Entelechy is not spatially located – the whole organism is the object of its action. Driesch introduced this non-physical link, because he thought that physical factors could not account for the specific character

* This paper was written while I was studying in the Department of Philosophy at the University of South Carolina. I should like to express my deepest gratitude to Professor Ina Roy for valuable discussions in her philosophy of biology classes. I learned a lot there not only in the area of philosophy of biology but also in the area of biology itself.

of biological phenomena. Entelechy does the decisive explanatory job for the organic world.

Carnap and his colleagues expressed scepticism: if entelechy is not a physical force, what could that be then? Driesch insisted that his innovation was a legitimate scientific move. He refers to the example of magnetism in physics: has anyone seen magnetism? – no, but magnetism has been introduced to explain certain phenomena. According to Driesch, since physical forces are not sufficient to explain the organic world, so it is perfectly legitimate to introduce something like force that is not a physical force in the end. Neopositivists' reply is that it is laws (both quantitative and qualitative) that give the legitimacy to the explanations *à la* magnetism in physics. Carnap argues that Driesch cannot formulate any new laws with the help of 'entelechy'. So this term is not fruitful in contrast, for instance, to the idea of energy which proved to be very useful in formulating more general laws. Therefore the introduction of 'entelechy' is just a pseudoexplanation.

I agree that Driesch's neovitalist explanation is empty – it is a pseudoexplanation. I think, however, that the Carnapian elucidations are far from being a complete diagnosis. It is even in a way misleading, because conceptual clarity should be discussed first before embarking on laws. Why is the Dreschian explanation empty in the first place? My answer is very simple – one might even think that it is too simple to be true, but I will try to defend it. So my main point is that the term 'entelechy' is too obscure to be employed in a knowledge-seeking discourse. No laws can save vague terms simply because one cannot formulate anything epistemic (law or just a descriptive sentence) with such a term. So I will argue that the introduction of 'entelechy' was a conceptually regressive step. The scientific community was right in not accepting the innovation.

Permit me a little digression before going into details. My general worry is that it is becoming fashionable to think that obscurity might be somehow fruitful. For instance, Yehuda Elkana has chosen the following H. A. Kramer's quotation as the motto to his book "The Discovery of the Conservation of Energy" (and requoted several times in the text): "In the world of human thought generally and in physical science particularly, the most fruitful concepts are those to which it is impossible to attach a well-defined meaning" [8]. I think this is deeply wrong. There were thousands of terms "without well-defined meaning" which were introduced and then forgotten without any positive impact. We can sometimes trace our well-defined terms back in the history of science. For example, while discussing the idea of momentum, it is customary to refer as back as to Philoponus who introduced rather vaguely a kind of impetus to improve the Aristotelian theory of motion. Now the **acceptance** of Philoponus' innovation does not constitute a progressive step. I agree that his thoughts could be a guiding idea to something more precise. So a certain number of initially obscure ideas in the history of science were employed successfully after some precision work. What we must bear in mind is the difference between a substantial hypothesis and a hunch which has no epistemic value without elaboration.

Let us look now at the idea of entelechy closer. Driesch thinks that living organisms are very specific and this fact deserves an explanation. We may readily agree to the claim. Then he introduces **something** to account for the specific character of organic creatures. We can say 'entelechy' instead of 'something', but we still have to establish the meaning of the term. Driesch says that all organisms have an entelechy. There is still no explanation – just a rephrased description: the expression 'to have an entelechy' is just synonymous to 'to be an organism' ('to have a lion's entelechy' synonymous to 'to be a lion', etc. for that matter). Is there any difference between the introduction of entelechy and magnetism then? What do we mean by 'magnetism'? We can introduce the term 'magnetism' to single out certain phenomena in a descriptive manner. Since we already have descriptive organic terms, 'entelechy' cannot add anything new.

Driesch would insist that this is an explanatory term similar to "the invisible force of magnetism" [4: 15]. Carnap is right in insisting that physicists have laws of magnetism. But it is more important to see that the laws which Carnap has in mind are not explanations Driesch is looking for – they are quantitative descriptions without any 'invisible force'. Driesch is looking for a causal agent: in our example the analogical place would have structural microparticles causing macromagnetic phenomena. What if Driesch formulated the 'law' that entelechy is directly proportional to the complexity of an organism? I am pointing to the fact that 'entelechy' is too obscure to do any job (explanatory or any). Carnap, however, insists that 'entelechy' would be as fruitful as 'energy' if it led to biological laws. This is not a correct comparison: terms for various kinds of energy have a precise meaning. Of course, conceptual clarity is not a sufficient condition – but it is a necessary condition to start the discussion about fruitfulness.

One reason why Carnap reduced all the analysis of entelechy to laws is a general positivistic mistrust in so-called theoretical entities. He explicitly says that why-questions are scientific only if answers involve empirical laws [4: 12]. I do not think that positivists got it right. Let us recall the atomistic

theory of matter. It was a conceptually clear explanatory theory even in Democritus' time. The term 'atom' had a well-defined meaning constructed on the analogy of structural parts in sensible things – atoms were causal agents. Before the nineteenth century the problem was that it lacked justification, and without empirical macroregularities any justification is impossible.

Back to biology, it is conceptually legitimate to introduce the term 'gene' to refer to **any structural** part responsible for inheritance, no matter how ignorant we are what the part really looks like. This is because we use a commonsensical 'to be composed of' analogy to refer to a microagent causing inheritance. It is instructive to recall here that at the dawn of genetics Johannsen introduced the term 'gene' in this way: "[t]he word 'gene' is completely free from any hypotheses; it expresses only the evident fact that, in any case, many characteristics of the organism are specified in the gametes by means of special conditions, foundations, and determiners which are present in unique, separate, and thereby independent ways – in short, precisely what we wish to call genes" [5: 21–22]*. The trivial background evidence supports the innovation: men beget men (as Aristotle was constantly reminding us), squirrels beget squirrels, etc. 'Entelechy' would be conceptually much better if Driesch tried to refer to physical structural parts. Then we could raise such questions as to whether the innovation allows us to capture interesting regularities.

So my current point is just a conceptual clarity. Since Driesch wanted to step beyond physical agents, he lost the firm ground to keep his account conceptually valid. It is not so easy, if at all, to proceed without a handy commonsensical analogy (such as 'a constituent as a causal agent').

3. Driesch's neovitalism had some Aristotelian flavor. Let us turn now to biological neo-Aristotelianism proper. As a representative text, I will use interpretive essays written by Martha Nussbaum [17]. I think that the essays perfectly represent the enthusiasm concerning Aristotle's heritage shared by many Aristotelian scholars. Besides, the essays are straightforwardly clear which is not so usual in the Aristotelian tradition. Some vague neo-Aristotelian texts seem to avoid criticism just because they are too obscure to be criticized.

According to Nussbaum, Aristotle's position is "both moderate and interesting", "sound and fruitful one, invoking no mysterious non-empirical entities, no efficient causal gaps" [17: 60]. My goal here is **not** to clarify the historical question what Aristotle really had in mind. My aim is rather to argue that the teleological way of thinking is not so good in scientific terms. I agree that most probably Aristotle did not invoke any external (supernatural) agents guiding things toward ends. The Aristotelian account is an objective teleological account. In other words, it is internal, built-in teleology, as it were.

There is much controversy as for what Aristotle thought about universal teleology. In my discussion I assume that at least modern teleologists do not want to apply teleological principles to non-living natural bodies. So for my non-historical purposes, I will equate Aristotle with Nussbaum's Aristotle. To reduce the scope of my discussion still more, I am not going to talk about subjective (intentional) teleology: "O did x for the sake of y" [17: 75]. I have no doubts that this account can be applied at least to humans probably even without introducing any deep mind structures as intentions.

So I am interested here in the epistemic value of the objective teleological account. I will argue that despite the semifact that Aristotelian and neo-Aristotelian position is moderate in not invoking any mysterious external entities, it is neither interesting, nor fruitful, nor sound. My critical remarks will move along the lines of the previous criticism of neovitalism.

According to the objective teleological account, x happens (is) for the sake of y, for example, "growth takes place in O in such-and-such a way because O is a lion (*i.e.* for-the-sake-of realizing a lion-form)" [17: 75]. After such a lengthy preparation, the reader might expect lengthy criticism. In fact, my main point is that the account is totally empty. Why? Let us look at the lion's example above. It in effect says "growth takes place in the lion O in such-and-such a way because O is a lion". That is, we observe a growing lion and wonder why it is growing this way quite different from the elephant over there. We are told that this is because the creature is a lion or because it is realizing a lion-form. Notice that the lion-form is not a constituent as in a compound; it is rather the arrangement of the constituents [17: 73]. What could all this mean other than that the lion grows just because it is arranged to grow this way? I cannot see any explanation here, none whatsoever – it looks totally vacuous. We describe a natural process and then claim that the process goes on because it has to go on this way, we might add, to go on because of final causality. But the expression 'final causality' does not help, because it is described entirely in terms of the observed process. As in the famous story about acorns, we reason this way: since this is an acorn, it develops into an oak

* It is interesting to note that as we know more we can introduce new definitions – let us look at the typical modern textbook: "[e]very sequence of nucleotides that functions as a unit serves as a **gene**" [2: 217].

tree (if there is no impediment, as Aristotle used to say); if it were not an acorn, it would not develop into an oak tree. Where is an explanation here? We have not left the realm of trivial description as yet. I would like to add that everything is perfectly all right with the statement "acorns develop into oak trees". This a useful commonsensical **descriptive** statement which belongs to science as a starting point.

Let us try the 'capacity' talk. Acorns have the capacity to develop into oak trees. Aspirins have the capacity to relieve headaches. Nancy Cartwright says that this is not a report of regularities: it does not say that aspirins "relieve headaches most of the time, or more often than not". A capacity can reveal a regularity, but one good single case is enough: "[t]he best sign that aspirins can relieve headaches is that on occasion some of them do" [6: 3]. Have we won anything? Unlikely. Can we proceed without regularities? Unlikely. Let us note first that Cartwright speaks about "a relatively enduring and stable capacity" [6: 3]. What would we do if only 3% of aspirin or acorns revealed the capacities mentioned above? We would look for regularities by means of controlled experiments: maybe aspirin is not pure or acorns are too dry, etc. I readily agree that "one good single case" may be enough, but, notice, enough to see a regularity. This is because we have a lot of commonsensical experience about orderly things in our pre-scientific days. The introduction of the 'capacity' talk does not help us circumvent regularities. Acorns develop and aspirins relieve – they just do that. We have perfectly good descriptive statements. There is no need for a metaphysical paraphrase to do the descriptions. The next interesting question would be why they do that. Maybe they have certain special constituent parts?

But let us follow Nussbaum in her reasoning. She says that organic systems are self-maintaining: "[t]his capacity – to maintain functional states through self nutrition and to propagate them through reproduction – is the mark that sets off the living from the lifeless" [17: 76]. A good description. Problems cripple in when we try to get a teleological explanation out of it. Icicles also grow, as Nussbaum says, but icicles cannot vary their behavior with changing circumstances. The rooting and branching change in plants, depending on the location of the sources of light and water. The material account cannot do the explanation. Nussbaum's Aristotle claims that the teleological law can help – the law that the behavior is whatever will promote the flourishing of the mature organism [17: 79].

First of all, it is premature to rule out the explanation through the efficient-causal chain. Nussbaum is not against it: in C_1, plant O does x_1, etc. But she insists that we have a simpler teleological law in terms of the flourishing of the mature organism or bringing about a component of its λογος [17: 80]. I am very dubious about the flourishing as an end-result. The trivial counterargument is that living organisms decay – there is no long flourishing in our world. Putting this aside, let us look at the rooting. Roots absorb water; suppose it is contaminated water; roots would absorb it and will not flourish. The point is that roots just do their own **regular** job and λογος is not realized in the end. The law of flourishing just will not do. Besides, all I have said earlier about the vacuity of the explanation through form is applicable to λογος as the end-state "which provides a unified account of adaptive behavior" [17: 80]. Adaptive behavior really deserves explanation, and I will come back to this later.

Another troublesome point for neo-Aristotelians is that their objective teleological account hardly distinguishes between living and non-living creatures. This is the famous characteristic of natural things from Aristotle's *Physics* (199b 15–18): "Things exist by nature if, starting from some internal starting-point, they arrive by a continuous process of change at some end-state. Each starting-point gives rise, not to the same thing in all cases, nor to just any chance thing, but always to something proceeding towards the same thing, if there is no impediment" (Nussbaum's translation) [17: 80]; [1]. This is a general description applicable to all natural processes including growing icicles and massive objects attracting each other. I suppose this is not what modern neo-Aristotelians intended to achieve by introducing the teleological account.

Permit me another digression. The teleological discourse can be found in highly unexpected places. Roger Jones argues that poor realists do not know what to be realists about even in the Newtonian world. Why? There are different formulations of Newtonian mechanics with different ontological and explanatory commitments. One of the version is based on minimum principles which says that the motion of a massive body "is determined by a property associated only with a complete path between two points in space". According to Jones, this approach "seems to have no connotations of causality" [13: 190]. In later discussions, Alan Musgrave seems to ascribe the teleological character to Jones' minimum example: the approach has "a teleological rather than a causal flavor" [16: 692].

Where is anything at least close to teleology in the minimum approach? I think that the approach should be seen as a regularity description: particles move in a way described in mathematical terms. If one insists that every law-like account is an explanation, let it be an explanation. Does the end-state direct (or precause) the path of a particle? This

torturing problem arises only if we use an anthropological picture of causal agents as acting in an intentional-like manner. No problem of this kind arises if we think about the natural world in terms of natural regularities occurring "always or for the most part", to use one of Aristotle's favorite phrases. Besides, *contra* Jones, the minimum description is compatible with other descriptions: natural systems might well have different things going on in a regular fashion inside.

Let us get back, however, to Nussbaum's Aristotle. He turns to functions which are said to be another way to describe the objective teleological order, for instance, "the function of eyes in lions is seeing" [17: 75]. Functional account is given with reference to the nature of a thing; in biology functions of parts are given with regard to organism's self-maintaining activity. She emphasizes that this is not a genetic account, that is, the main question is **not** how certain parts got there. The main thing is how systems and parts enable organisms to maintain themselves, which is related to the λογος of an organism. So the function of the heart in higher animals is to pump blood. Other things that the heart can do (a thumping noise, etc.) do not enter the animal's λογος [17: 83].

The heart both makes a thumping noise and pumps blood. These two things are related in a causal chain (*i. e.* regularity chain). It is true that animals need the blood (not the sound) to survive and it is the heart that forces the blood to circulate. Why then not to say simply "the heart just pumps the blood"? Or as a typical textbook puts it, "[t]he heart is a pump that forces the fluid blood from one part of the body to another" [9: 207]. We are in the natural world: hearts pump, massive bodies attract, etc. Our Aristotle would probably point out that I am not careful enough: the function is given with the reference to the λογος of each living thing and its self-maintaining activity. But we must bear in mind that the heart stops naturally at some point and the self-maintenance fails. Besides, the self-maintenance of a lion requires the destruction of a zebra. So we are brought back to simple descriptions of the natural world. Then we could ask a straightforward non-teleological question: what leads to the survival of organisms? Could the term 'function' without any teleological flavor show up in answers to this question? Let us discuss the question from the post-Darwinian perspective.

4. One might think that my criticism of internal teleology is a suspect in the light of modern evolutionary biology. Really, philosophers of science defend functional account [14]. "Design language reigns triumphant in evolutionary biology", as Michael Ruse puts it [18: 16]. Geneticist and evolutionist Francisco J. Ayala claims that teleological explanations are essential in biology [3]. Others disagree: for instance, botanist Paul J. Kramer claims that the design language is not appropriate in the post-Darwinian age [15]. Let us look at the most straightforward Ayala's account.

Man-made objects are usually teleological. Ayala points out that features of organisms are also teleological: "bird's wings are *for* flying", etc. [3: 187]. What about the gravitational interaction being for keeping the solar system together? Hold on, the reader might say, don't you see the difference? I see the difference and the temptation, but from evolutionary biology we learn that organisms evolved without any design and purpose. Therefore I resist the temptation. Ayala's answer is obvious: the gravitational interaction contributes to the stability of the solar system, but the solar system is not the reason why the gravitational interaction is there. According to Ayala, the essential component of teleological explanations is that a feature's contribution "*must be the reason why the feature or behavior exists at all*" [3: 188]. Now we crucially depend on the term 'reason'. Does anyone reason the reason?

At this point the familiar distinction between external (intentional, artificial) teleology and internal (natural) teleology comes in. Ayala argues that teleology in biology is not purposeful (intentional), no need for "the conscious design of any agent". Then two types of internal teleology are distinguished: determinate and indeterminate. In the case of determinate teleology an end-state is reached in spite of environmental fluctuations, *e. g.* the development of an egg into a chicken. Indeterminate teleology means that the end-state is the outcome of selection from generally non-predictable alternatives, *e. g.* the adaptation of wings for flying [3: 190].

I do not have to say anything new about the determinate teleology. All the critical remarks concerning the Aristotelian teleology are relevant here. Specific end-states (meaning final-states) are reached in both the organic and the inorganic world. The end-states are not goal-states, though. One can speak metaphorically about the design in the development of the solar system or a chicken. Since there is no conscious goal, the simplest general description of the developments is that nature follows its regular causal routes. The end-states are not **the reason** why the development occurs.

The case of indeterminate teleology is more interesting. It is different from older versions of teleology because natural selection is behind it. It looks like we come up with a special teleological mechanism at last. In Kitcher's functionalism this is also crucial: functional attribution rests on certain presuppositions about "a pertinent source of design [14:

272]; two sources of design are possible – intentions of agents and natural selection [14: 259]. Ayala claims that adaptive traits are teleological in the indeterminate sense: the reason why the wings of birds came about is because they serve flying [3: 191]. Did the selective pressure force teleology back into biology? I do not think so.

First of all, we must not forget the possibility of exaptations [11]: what is useful for what might not be so straightforward. But let us put it aside, because the existence of exaptations leaves plenty of room for adaptations. What is more important, I readily agree that there is no problem with the statement "wings are for flying" meaning "wings are used for flying" (or "wings are useful for flying"), which is a rather modest claim. Ayala's crucial claim reads as follows: the reason why the wings of birds exist at all is that they serve flying. I claim that the statement should be taken at face value **only if** we ignore teleological connotations. Fortunately, we usually ignore them. Only in more reflective mood we start wondering: wait, we say 'reason', then 'mental cramp' can easily follow, to borrow Wittgenstein's phrase. Let me now clarify my contention.

The point is that there are no abstracted features without individual organisms. Why does **the** bird have **the** wings? No no, not because they serve flying. It inherited them from its parents. Looking backwards, generation by generation birds inherit their wings (sometimes with modifications) from their parents. Let us look forward now. The evolutionary theory tells us that selection pressure works in a population, which leads to changes in frequency of phenotypes. That is, under environmental pressure some individual birds die before reproduction, others with certain 'environmentally-friendly' features leave offspring. Again, the causal reason why the offspring have any features is the inheritance.

Ayala argues that "teleological explanations are fully compatible with causal explanations": causal accounts of biological processes are possible, at least in principle [3: 193]. But, he insists, teleological explanations are also necessary: biologists legitimately ask questions such as "what for?" ("what is the function of a particular structure?)". What I tried to show is that if one takes the evolutionary theory seriously, "what for" is just a quest either for a description or for a causal account in terms of selection (both Ayala and Kitcher take the theory of evolution very seriously).

To guard against possible misunderstandings, I do not argue for the change of the scientific vocabulary. The terms 'for' and 'function' are all right, provided we have a clear view what we want to do with the terms. We do not need to wander among our intuitions to make use of the term 'work' or 'energy' in physics because the meaning of it is clearly fixed. In Kitcher's account, selection pressure shows up in all of its explications of (non-intentional) 'the function of X is Y'. No doubt one could use 'function' as meaning 'inherited through the chains of natural selection'. Besides, Kitcher wants to retain the word 'design' for processes without background intentions: "design without a designer" [14: 259]. We can keep this nice phrase if we clearly see the natural selection story behind it.

My point can be further clarified by the Empedoclian-like version of evolution and viruses. Let us take the former case. Suppose the true natural-historical story is as follows: at one point in the past heads sprang up without necks, necks without heads, even more or less complete bodies showed up – all this happened without any natural reason or any intention. Of course, separate heads and separate necks died out right away and already in the second generation we have the population of quite perfect bodies. With respect to this story, we still could use 'for'-talk to describe the natural world, although there is no 'design' there: neither intentional, nor natural-selective (note that one cannot say that the parts of bodies were selected for, because in our fictional story selection pressure was not responsible for their emergence in the first generation).

While introducing viruses, Clyde R. Goodheart writes: "In all cases, during the reproductive cycle the genetic material of the virus becomes a **functional** part of the cell it has infected" [10: 1] (*my underline*). Did Goodheart commit himself to teleological and/or functional account? Unlikely: he simply wanted to point out that viruses take over the machinery of the cell. So what is the function of the cell? Is it to work for its host or to work for the guest and produce new viruses? **If** we fix any state of an organism (*e. g.* virus or human), then we can ask what contributes to the maintenance of the state. The answer would be a description of regularities. But it does not make much sense to claim "the function of the cell is A, period". Really, the health of viruses is the disease of humans and *vice versa*.

5. I have no illusions that it is an easy task to show the emptiness of the non-intentional teleology to its proponents. My suspicion (note: just a suspicion) is that the defenders of this kind of teleology are deceived by looking at the intentional teleology and the design-like properties of living organisms. As good naturalists, they want to keep teleology without any traces of the intentional part. But the point is that nothing epistemically substantial seems to be left after the removal of the intentional part.

I think it is useful to be aware of such mistakes – they are not so rare. An example of different sort

would be the analytic/synthetic **truth** distinction. One looks at the simplest cases of true synthetic sentences as for example "Edmundas is a bachelor", then removes the synthetic part and claims that "A bachelor is an unmarried man" is an analytic truth. This hardly works: with the removal of the synthetic part, the term 'truth' has lost its main application. 'Analytic truths' become a part of linguistic rules. We can keep using the word 'truth', but we should bear in mind that rules are not true in the same sense as statements are.

I would just like to call for conceptual clarity to keep fruitful scientific and metascientific debates going. The conceptual part of the knowledge-seeking enterprise is no less important than the substantial part. *Am Namen liegt nichts; vieles liegt aber am Sinn des Namen.*

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TEOLOGIJA: GREIČIAU KLIŪTIS NEGU PAGALBA

Santrauka

Šio straipsnio tikslas yra kritiškai patyrinėti kai kuriuos šiuolaikinius bandymus atgaivinti neintencionalią teleologiją biologijoje. Čia nagrinėjami trys tokių bandymų pavyzdžiai: pirma, tai entelechijos samprata Hanso Driescho neovitalizme, kuris nagrinėjamas pozityvistų ir Driescho ginčų kontekste; antra, tai Marthos Nussbaum neoaristotelinė teleologijos koncepcija; trečia, tai Francisco J. Ayalos vidinės teleologijos samprata, pateikiama evoliucinės biologijos kontekste. Straipsnyje nurodomi esminiai šių koncepcijų trūkumai, rodantys, kad minėti teleologiniai teiginiai tik pateikia biologinių reiškinių specifiškumo pseudopaaiškinimą. Tad biologijos jie niekaip negali praturtinti.