

THE CONDITIONALITY OF LIFE AND THE TELEOLOGICAL CONSEQUENCES

THE SCIENCE OF PHILOSOPHY studies fundamental aspects of (objective) reality. Since living organisms and human beings are part of reality, and since we who study reality are among those beings, the study of living things must be of importance to the science of philosophy.

My goal with this paper is to present, explicate, and elaborate upon essential characteristics of the phenomenon of life. First, I will discuss what the essentials are that distinguish the living from the non-living. Secondly, I will explain one peculiar distinguishing characteristic of living organisms – their characteristic type of directedness, i.e. their goal-directedness. Finally, I will indicate some of the consequences of this for the study of biology (in particular for the study of evolution) and the study of ethics.

1. The Phenomenon of Life

Man has been aware of the phenomenon of life long before there were any philosophers around. Generally, all motion that could be detected were associated with life: life and motion (actions, events, processes, etc.) were more or less regarded as the same phenomenon. No one could see the supposed agents that made the rain fall, who made the flowers grow, and who made the planets move. Thus, they believed in gods as the ultimate causal agents in the universe.

This animistic view of natural processes was a result of people taking their consciously caused actions – their purposeful actions – as typical actions by reference to which other actions and processes should be understood and explained.

What made men able to distinguish the living and the inanimate was Thales' (565 b.c.) claim that there existed a physical and natural cause of things and actions – water. No recourse to conscious purposes was now needed to explain the falling of rain and growing of flowers.¹ During modern times conscious purposes have been more or less substituted (in explanation) by physical factors as the sole causal factors of all kinds of processes. Behaviorists

¹ Animistic conceptions of the world still survives among people in less developed countries, but also in "less naive" forms like "panpsychism" among philosophers like Lotze, Whitehead, and others.

and other materialists have even tried to explain away the phenomenon of consciousness itself.

Mechanists since Descartes (at least) have seen the distinction between the conscious and the non-conscious as the fundamental distinction between types of processes in the world. There is, however, another tradition that goes back to Aristotle (at least) that sees the distinction between the living and the inanimate as the fundamental distinction between processes in the world. Adherents to this view are called *teleologists*.

This teleological view has been obscured partly because of religious doctrines about the universe as being teleological in itself and partly due to the success associated with the mechanistic outlook on the world manifested through the brilliant achievements of the industrial revolution.

Before we venture into a discussion of teleology an explanation of the distinction between the living and the non-living is necessary if we want to fully understand the basis for the teleologists view and thereby the validity and profundity of the view.

2. The Living and the Non-Living

What in nature gives rise to the distinction between the living and the non-living? There is a lot of distinguishing characteristics one could single out, but which of these are essential?

2.1. Scientific vs. Philosophic Questions

Is the chemical composition of living bodies of importance? Perhaps the great amount of carbon in living bodies is to be considered an essential and distinguishing characteristic of life?² How about deoxyribonucleic acid (DNA)? Isn't this – the carrier of hereditary information – a really essential property of life?

Carbon, to begin with, isn't an essential property of life, since carbon is all around us and exists in greater concentration in some inanimate entities like diamonds. Thus, the abundance of carbon in living bodies isn't one of the proper distinguishing characteristics that we seek.

But, DNA isn't found all around us in the non-living world. And, it is present in almost every entity that we would call "living". We could thus have a proper biochemical definition of life stated in these more "inclusive" terms: "... living systems [are] systems that contain reproducible hereditary

² On "chemical composition" see: Theodosius Dobzhansky, *Genetics of the Evolutionary Process* (New York: Columbia U Press, 1970), p. 6.

information coded in nucleic acid molecules and that metabolize by controlling the rate of chemical reactions using ... enzymes.”³ If there happen to be some viruses (as it is supposed) that don't have any DNA, then we simply refuse to call them "living". In fact, there is no great problem with a definition of this kind. Only when this definition is taken to be a valid *philosophical* definition of "life" do we face a problem. It is a problem that is likewise emerging if a philosopher is to consider a physiological, metabolic, genetic, or thermodynamic definition of "life". However valid and appropriate these definitions might be in relation to specific sciences (or branches thereof), the problem is one of logical order: "hierarchy".

In special sciences like biology, physics, and chemistry, certain *philosophical* knowledge⁴ is taken as a foundation for new knowledge and theories in those sciences (even when special sciences develop, as they usually do, without any explicit reference to established philosophical truths, certain philosophical premises are always accepted implicitly). If DNA is the distinguishing characteristic of life, then we are left to wonder what makes us look for differences between living and non-living things in the first place. Somehow we already know how to distinguish the animate from the inanimate. (Even the mentioning of two separate phenomena – the living and the non-living – makes us committed to a belief in distinguishing characteristics between them.)

The distinguishing characteristics we are searching for qua philosophers are more fundamental (logically) than those peculiar characteristics found in biochemical research and elsewhere. The philosophers job consists in (among other things) building a solid groundwork for all the other sciences. (One may even claim that only philosophy makes other sciences possible.) This requires of the philosopher that he only (at least primarily) builds on knowledge that was "in principle" available to – let's say – the learned philosophers and other men in ancient Greece in his development of theories and definitions.⁵

Circular reasoning is a serious threat to a scientific philosophy, and the threat will be magnified by going into advanced theories in modern sciences to justify philosophical doctrines. For evidence of this one only has to mention materialists who bring behavioristic research into philosophical explanations of conscious phenomena, since consciousness is alleged to be nothing but an illusion according to behavioristic theories. The facts of consciousness and life are independent of modern science. If modern science

³ The New Encyclopaedia Britannica, *Macropaedia*, Vol. 22, p. 985.

⁴ Implicitly it is regarded as "knowledge" even when it might be false. Even if you are involved in establishing a new scientific theory and it might be rather "hypothetical" in nature, you are still counting on some philosophical premises to be correct.

⁵ Alternatively one could proceed from the knowledge of an adult today that doesn't possess any advanced knowledge within any science.

is supposed to contradict those facts it's not philosophical doctrines that have to be revised.

We hereby leave modern scientific (non-philosophical) explanations aside and turn our attention to a genuine philosophical exploration of the issue at hand.

2.2. The Essence of Life

"Locomotion", "motion", "process" are concepts that have been and still are associated with life, while "stillness" is associated with death and the lifeless. There is thus a striking difference between *the animate* and *the inanimate* that is denoted by these concepts. This difference is essential, but it is clearly not specific enough for philosophical concerns. The planets are moving, but are seen to be very different from the living entities we usually refer to as animate – like cats, plants, and men. If even the planets are animate entities, then what entities are inanimate? If everything in the universe is in motion, how could there be stillness? Stillness and the inanimate would only be *relatively* still and inanimate, and nothing could be said to be totally lifeless by our distinction alone. Hence, our notion of "motion" must be properly qualified if a clear-cut distinction is to be available to us.

What is apparent in living organisms is their capacity for *self-produced* movement. Your wrist-watch doesn't start to move its hands by itself: the watch has to be wound up or in the case of a quartz-watch you will have to supply energy for the watch's movements with a battery. Inanimate entities need to be supplied with energy from *external* sources (that is, external to the entity⁶), while living organisms can appropriate energy from their environments by themselves. This energy is stored in living organisms and is used for producing movement, which is thus *self-produced*. These self-produced or *self-generated*⁷ movements – whether conscious or vegetative – are henceforth referred to as "actions".

This nature of living organisms – to generate, by themselves, actions – were recognized by both Plato and Aristotle: "... when the thing moves itself, we speak of it as *alive*"⁸ and for an entity to have life (psyche) means "... having

⁶ You obviously wouldn't say that a quartz-watch isn't a "watch" if there's no battery in it. What you would say is that it wouldn't *function* without a battery. (If we, for example, have a watch that uses solar cells for its functioning, then it is not the watch that appropriates energy from the sun, but the solar cells that passively are charged with energy when activated by light. Nor are the solar cells using the energy to make the watch function; a man (a being capable of self-generated action) makes the watch function by supplying it with solar cells that could be charged with energy, in which case the watch might work.)

⁷ The concept comes from Ayn Rand: *Atlas Shrugged* (New York: Random House, 1957), p. 1013.

⁸ Plato, *Laws*, trans. by A. E. Taylor, in *Plato: The Collected Dialogues*, ed. by E. Hamilton and H. Cairns (New York: Princeton U Press, 1961), p. 1451, 895c.

in itself the power of setting itself in action [kinesis] and arresting itself”(translator’s emphasis).⁹

In living organisms the (immediate) energy source is integral to its own body and is used for a range of alternative actions for the organism as a whole. This function of living organisms is made possible by “directive mechanisms”. “In man, for instance, it is the nervous system (and/or consciousness) that is the directive mechanism which controls the operation of all the muscles and many of the glands of man’s body. ... on the cellular level, many biochemical directive mechanisms exist in a hierarchy terminating in the DNA molecule.”¹⁰

The actions of a living organism is generated by its “self” in the sense of being initiated by its directive mechanism. An entity that doesn’t have any alternative uses of energy have no use for a directive mechanism, and if an entity doesn’t have any directive mechanism there wouldn’t be any “actions”, that is, there wouldn’t be any *self*-generated motions of the entity. This entity would be missing an important characteristic of life.

There may be inanimate objects that could be shown to be capable of self-generated action (though I doubt it), but my point is that self-generation is a strikingly clear and an important distinguishing characteristic that marks off the living entities from the non-living entities. It is *so* clear because of the difference that one recognize between the actions of a man jumping, throwing a stone, a flower turning its leaves toward the sun, and the “actions” of rain falling, or raindrops splashing on your umbrella, or leaves flying in the autumn winds.

The observable fact that the *immediate* source of energy for action is *internal* to living organisms, while the *immediate* source of energy for motion is *external* to the inanimate entities, makes it possible to distinguish the animate and the inanimate *fundamentally*.¹¹

If living organisms are able to direct their use of energy for taking one action rather than another, are some actions more important than others *for*

⁹ Aristotle, *De Anima*, Book II, I, 412b18, trans. by J. A. Smith, in *The Basic Works of Aristotle*, ed. by Richard McKeon (New York: Random House, 1941). This citation as well as the above one from Plato are cited to support the same argument in Harry Binswanger, *The Biological Basis of Teleological Concepts* (Los Angeles: The Ayn Rand Institute Press, 1990), p. 46. The translation of “kinesis” as “action” were made by Dr. Binswanger. For a further reference that strongly support the distinguishing characteristic of living things in terms of being capable of self-generated action, read Aristotle’s *Physics*, Book VIII, 4, 255a5-8 (trans. by R. P. Hardie and R. K. Gaye).

¹⁰ H. Binswanger, *The Biological Basis of Teleological Concepts*, p.49. This book made me think of writing this essay and it constitutes the main background to what I am writing in this paper.

¹¹ The distinction between the inanimate and the animate made here isn’t exhaustive or final (hence section 3), but it is *fundamental*. “Fundamental” means “that upon which everything in a given context depends.” (Leonard Peikoff, *Objectivism: The Philosophy of Ayn Rand* (New York: Dutton, 1991), p. 209.)

the organisms? Is there any recognizable pattern that could be detected in how living organisms take action? Is there something that could explain the seemingly purposeful nature of the plant turning its leaves toward the sun?

3. The Conditionality of Life

Biochemist Albert Lehninger begins an article on the energy transformation of the cell with these words: "A living cell is inherently an unstable and improbable organization; it maintains the beautifully complex and specific orderliness of its fragile structure only by the constant use of energy. When the supply of energy is cut off, the complex structure of the cell tends to degrade to a random and disorganized state."¹² Whether one study cells or living organisms in general, the energy of the living thing is channeled to cope with the task of keeping its specific structure in order. For this end, processes for attaining energy from the environment (ultimately from the activity of the sun) and storing the energy, as well as controlling and putting to use the stored energy, is needed by the living organism itself. Life to be kept, must be maintained by self-sustaining action, made possible by the capacity of living organisms for self-generated action.

A living thing constantly faces an alternative: either it acts so as to prolong its own life or else it will disintegrate, go out of existence, die. The inanimate thing is not dependent on any specific course of action for its existence, and couldn't be since it has no means for certain "actions" rather than others – it has no capacity for self-generated and self-directed action. This "dependence" of living organisms upon certain actions (rather than others) gives rise to the phenomenon of *need*. (It also underlies the phenomenon of *desire* among the organisms equipped with that faculty.) This "need" in turn gives rise to the phenomenon of *value-significance*¹³ (for individual organisms). Specifically the organism's life is what actions have value-significance for or not. "The organism's life is the implicit ultimate value by reference to which the value-significance of all other states is determined. As George G. Simpson states, 'The over-all and universal goal is a posteriori at the given moment and is simply survival, which involves comparative success in reproduction.'"¹⁴

This conditionality of life here outlined is dependent on, and made possible by, an alternative that faces the organism (as described above). This is the

¹² Albert Lehninger, 'How Cells Transform Energy', *Scientific American*, CCV, No. 3 (1961), p. 62.

¹³ The concept will be explained in these pages, but see also Binswanger, *Biological Basis*, p. 58 ff, for more information about the concept.

¹⁴ Binswanger, *Biological Basis*, pp. 61-62. Binswanger is citing George Gaylord Simpson, *This View of Life* (New York: Harcourt, Brace & World, 1964), p. 173.

other main feature of life that sets it apart from the inanimate. However, my argument need further elaboration if the fact described here is to be fully understood.

First, I want to summarize my argument by citing a highly important passage from novelist/philosopher Ayn Rand explaining the conditionality of life (in a very *condensed* fashion as always):

“Where there are no alternatives, no values are possible. There is only one fundamental alternative in the universe: existence or non-existence – and it pertains to a single class of entities: to living organisms. The existence of inanimate matter is unconditional, the existence of life is not: it depends on a specific course of action. Matter is indestructible, it changes its forms, but it cannot cease to exist. It is only a living organism that faces a constant alternative: the issue of life or death. Life is a process of self-sustaining and self-generated action. If an organism fails in that action, it dies; its chemical elements remain, but its life goes out of existence. It is only the concept of “Life” that makes the concept of “Value” possible.”¹⁵

Leaving aside the issue of “values”, there is one thing that the critical-minded individual at once will question in this citation – are not inanimate entities *destructible*? Surely, just like a flower could be destroyed by a stone falling on it, a window could be destroyed by someone throwing a stone through it? Yes this is true, but these objects could not do a thing in order to avoid destruction. The stone is not even *capable* of doing something that either furthers its own existence or destroys it – its existence is *unconditional*. Thus, existence or non-existence is not a true alternative facing these objects under the given circumstances, since their existence or not is not depending upon any processes that these objects could perform. What happened to the objects had to happen given the certain circumstances involved – there was no alternative open to them. One could say that what they were confronted with was only one thing: their destruction.

It is true that one can *think* of an icicle “facing” the alternative of hanging on to the edge of a roof and remain an “icicle” or falling to the ground and loosing its icicle-structure, viz. the icicle “faces” the alternative of existence or non-existence qua “icicle”. Hence, the cases are seemingly similar: life may go out of existence or not, but so may inanimate entities qua certain entities do as well. *A distinction that one must bear in mind here is the distinction between internal and external forces which causes the entities to lose their existence.* While it is true that a man may be put to death by someone pushing him off a roof, and that an icicle may go to pieces by someone pulling the icicle off the roof – an icicle is not capable of causing its own destruction or loss of existence in the way that a human being is. More importantly, a living organism is able

¹⁵ Ayn Rand, *For the New Intellectual* (New York: New American Library, 1961), p. 121.

to either counteract existence-threatening external forces or at least to take action so as to further its own existence. An icicle does not have this capacity. The icicle can do nothing that either further its own existence or goes against it; it is incapable of self-repair, self-maintenance, self-reproduction, it cannot transform energy from its environment to store and use for existence-needs; it cannot *do* anything and therefore cannot *need* anything. (Nor does an inanimate object *need* to be saved from destruction by external forces, since it couldn't use its prolonged existence to do anything.) Further, while an inanimate entity constantly faces destruction by external forces, the living entity constantly faces destruction by both external and internal forces (passive forces like starvation and/or active forces like suicide (in the case of man)). The two cases are therefore dissimilar. We can speak of an inanimate entity as "being faced by an alternative" only by analogy from what it means to be faced with an alternative of life or death qua living beings. Since living organisms primarily acts to counteract internal forces that threatens their improbable and fragile structures¹⁶ and thus their lives, internal forces have to be the paradigm cases of alternative-generation.

Even if one could say that a stone faces an alternative of existence or non-existence by analogy, this alternative wouldn't be a value-generating alternative, since the stone's existence is unconditional (viz. it is not dependent for its existence upon any specific action at all). The stone will eventually erode and it can do nothing to sway the direction of this process.

One feature of life that is of crucial importance is that the lifeprocess not only counteract existence-threats, but that it also provides the organism, and thus the organism's life, with *positive benefits*. This feature of living organisms is another feature that exclusively belongs to these entities.

In trying to drive this point home to our satisfaction, let us examine a human-looking robot that is designed to avoid destruction by performing certain processes. Let us imagine that the robot is equipped with a capacity for scanning its environment. The robot is able to detect potential obstacles in its way and able to avoid them by performing one process rather than another. This will definitely save the robot's existence qua robot. So, isn't the robot a living thing?

To begin with, the robot's source of energy for its actions is provided for it by man. A living organism acts to gain energy for future actions, while a robot only perform processes of loading up energy if it is so made to function by man. The robot's processes are "purposeful" by design and thus only in a derivative sense. The extent to which a robot acts *as if* it was engaged in goal-directed action, is the extent to which man has made it appear goal-directed,

¹⁶ See citation of A. Lehninger in section 3.2. *infra* for better understanding the critical importance to living organisms of constantly using energy for the maintenance of their lives.

living. A robot or any other artefact (a spoon, a chimney, a golf-course) is not goal-directed by *per se*, but only in virtue of being part of a goal pursued by a goal-directed organism. (As we will see later, the actions of a flower or a man are not goal-directed in a derivative sense, since what gave rise to these organisms – evolution by natural selection – do not have any goals.)

Also, the robot doesn't gain any positive benefits to its own existence by processes made possible to it due to successful avoidance of destruction. The robot's existence is therefore not conditional in the way that a living organism's existence is conditional.

In attempts to come up with counterexamples to the distinction between the living and the inanimate some people tend to take examples of man-made machines with more and more features in common with living things. One might wonder what this comes to ultimately – to a rejection of the distinction or to the idea that life in principle could be created by man. If it is possible to create an entity with a capacity for self-generated action with the qualifications made above, then would not that entity invalidate the distinction argued for here? The answer is emphatically NO. This fact would only imply that man is able to create life. If one suppose that vitalism is an untenable theory or at least that it is not necessarily true, then the possibility that man eventually would be able to create life out of non-living materials couldn't be ruled out a priori. Borderline cases may be found that could be hard to place in one group rather than in another group of entities, but borderline cases are not the defining cases and neither could they ever invalidate this fundamental distinction – the distinction between the animate and the inanimate.

The conditional nature of living organisms makes these organisms creatures of *need*. End-states which meet those (natural) needs will have value-significance for the individual organism. It is end-states' survival-significance to the organism that makes them *beneficial* to the organism. To stay alive is to live: goal-directed action both have survival-significance and at the same time constitutes the life of an organism (or rather: constitutes part of the life of an organism – since an organism's self-generated actions need not always and necessarily be goal-directed). Most actions are not directed immediately at sustaining the life of the acting organism, to take an example: a man walks down to the grocery shop *in order to* buy food – not to survive or enhance his life. However, this man may be eating the food he bought *in order to* further his own life. There is thus an apparent hierarchy of goals implying the existence of an ultimate goal.

Life is a goal that is an "end in itself" in the sense described in the previous paragraph, and moreover "Metaphysically, *life* is the only phenomenon that

is an end in itself: a value gained and kept by a constant process of action."¹⁷ And, as the evolutionary biologist Theodosius Dobzhansky writes: "Almost everything which an organism does, physiologically and behaviorally, serves to enable this organism to stay alive and to resist destruction."¹⁸ "Death" could not be a "goal" because of the fact that it is unconditional: you don't have to take any action at all to die. What you do when you commit suicide is not acting in order to gain death, but acting in order to avoid something that you no longer regard as a value – your life. The *benefit* you receive thereby is the cessation of something you can't live with. (Probably your life is such a misery in this situation that you could not hope to gain anything by remaining alive ever – especially not happiness.) Suicide might be a goal-directed action, but only then because your ultimate goal is life. If life is not your ultimate goal, then no actions taken to avoid something may qualify as directed to any *goals*. (This doesn't hold true only for men, but for all living organisms.) *Goals* and *values* are not possible apart from an ultimate goal, since there could be nothing that benefited from attaining these "values" and "goals" without a goal that is an end in itself. There are, of course, other "ends in themselves" like "happiness", but these goals are all of a derivative nature and are ultimately dependent upon a metaphysical end in itself of which there are only one – life. Happiness depend for its reality on the phenomenon of life, but life doesn't depend on happiness, even though a happy life may be an enhanced and a prolonged life. Happiness is not a metaphysically given fact; happiness is dependent on the consciousness of a living being (specifically on a conceptual consciousness). "Metaphysical" here means "pertaining to nature". (A materialist/behaviorist may quarrel with this account, but introspection invalidates his position.) Another possible ultimate goal is reproduction, but reproduction is not an end itself – it is rather part of an end in itself – life.

Could there be any other metaphysical ultimate end than life? First, an ultimate end is something that is conditional upon action and essentially conditional upon itself, being that action itself and having itself as a goal and beneficiary. There are other processes in nature apart from life, but there simply isn't any process in nature, apart from life, that takes place *because* the

¹⁷ Ayn Rand, *The Virtue of Selfishness* (New York: Signet, 1964), p. 17. When I say that life is an end in itself and the ultimate goal, I mean the life proper to the kind of organism in question. "Proper" is in turn to be defined on the basis of the nature of the organisms in questions. Applied to man this would mean: "... the two essentials of the method of survival proper to a rational being are: thinking and productive work ... 'Man's survival *qua* man' ... does not mean a *momentary* or a merely *physical* survival ... 'Man's survival *qua* man' means the terms, methods, conditions and goals required for the survival of a rational being through the whole of his lifespan – in all those aspects of existence which are open to his choice." (Ibid., p. 23-4.)

¹⁸ Th. Dobzhansky, *The Biology of Ultimate Concern* (New York: New American Library, 1967), p. 21.

process itself faces an alternative (like life or death) that generates alternatives – possible future actualizations that differ in value-significance for the process itself. If you have a thermostat that regulates the temperature in your house so as to hold it constant, this mechanism would qualify as being *directed*. But the house doesn't have any *need* of having a certain temperature (kept constant). In man there is a *non-arbitrary* temperature (37°C) that has to be kept (relatively) constant in order for an individual to survive. In man the goal is *natural* (not set by man) and it requires a specific course of action. The thermostat may be regarded as performing directed actions, but not as performing goal-directed actions, since there is no value-significance at stake.



It is important to understand living actions as being both parts of, and at the same time being initiated for the benefit of the life of the acting organism. The actions of living organisms are only possible to understand as being valuable and goal-directed if there exists an ultimate end. With reference to this end, the field of living actions will be open to scientific philosophical investigations. In this way we will understand that actions will have different objective potential value-significance in relation to the objective needs of living things. (The issue becomes somewhat more complex in regard to human beings, where *desire* is substituted for *need*. This desire is "programmed" by volitional acts of consciousness and is not determined by natural processes in the way that need is.)

3.1. Causation in Goal-Directed Action

If life is motion directed toward objects, states, motions, that have value-significance, then *what causes* the motion to be directed in the particular way it is? If, as I have tried to show, life is an ultimate end, then living action is directed to preserve the life of the living organism *because* living action is the end. "Life is the goal of life: the continuation of life in the future is the goal of all the actions which constitute the organism's life in the present."¹⁹

The cause of the living action is the fact of self-generated action; the effect of self-generated action is value-significance. Now, what I claim is that the *effect* somehow is the cause of what causes this effect. Obviously I couldn't mean that the actual object, state, motion in *the future* is the *direct* cause of action in *the present*. But, what then do I wish to suggest? That living action has a supervenient principle directing it – an *élan vital*? – Absolutely not!

¹⁹ Binswanger, *Biological Basis*, p. 65.

In the case of purposeful action this apparent contradiction could easily be avoided by the fact that something in the future could be something that only existed in one's mind, and that that something, that image could function as a cause of action directed to the attainment of an existing equivalent of the image at issue. If the distinction between the living and the inanimate is more fundamental²⁰ than the distinction between the purposeful and the non-purposeful, the similarity between purposeful action and living action must be fundamental. If end-states are directing most living actions (and no non-living processes), this would be a remarkable and essential characteristic of living action. Is this so? Most living actions, but not all of them, could perhaps be said to be directed in this way, since "a vegetative action that benefits an organism cannot be said to be directed toward the achievement of that benefit as a goal unless the benefit was in some sense a cause of the action, rather than occurring as a fortunate accident."²¹

If vegetative actions are directed in a way similar to purposeful actions, then what kind of efficient cause is taking the place of ideas and intentions?

In purposeful action an animal with this capacity associates past actions with pleasure or pain and thus it learns to direct its actions toward goals that tends to be associated with pleasure. In the case of man, who can envision "the future *as* the future", projections of goals are possible only on the basis of *earlier* perceptions and conceptions built upon those perceptions. Man does this by re-combining (imaginatively) earlier perceived characteristics of objects. "The cause of the goal-idea, and hence of the action, lies in the psychological effects of *past instances of the goal*. (In the case of novel goals conceived by human beings, the cause of the goal-idea is to be found in the psychological effects of the previously perceived constituents of the novel goal.)"²² The *similarity* of imagined future goals with earlier goals is the reason that extrapolation from earlier instances of a goal to future goals becomes possible.

Binswanger sums up this argument by introducing a distinction between a proximate and an ultimate cause – a distinction first suggested by John Herman Randall, Jr., and the subject of an influential article by Ernst Mayr²³:

"In purposeful action, the agent's desire for some anticipated result is the proximate cause. But since both that desire and the belief in the action's efficacy result in turn from experiences with similar previous objects reached by similar previous actions, a remote or ultimate cause is the value-significance of the *past* instances of the goal."²⁴

²⁰ See footnote 11 *supra* for how "fundamental" is used in this paper.

²¹ Binswanger, *Biological Basis*, pp. 73-4.

²² Binswanger, *Biological Basis*, pp. 79-80.

²³ See Ernst Mayr, 'Cause and Effect in Biology', *Science*, CXXIV, Nov. 1961, p. 1503.

²⁴ Binswanger, *Biological Basis*, p. 80.

Both these causes are efficient causes. "The difference between the ultimate cause and the proximate cause is one of immediacy, not a difference in the metaphysical status of the causation involved."²⁵ The goal₁ of a living being is the state of affairs that are causing (final, ultimate causation) a *goal-directed* action to take place which is causing (efficient causation) the attainment of the goal₂. When it is understood that goal₁ and goal₂ are not one and the same state of affairs (even if they are relevantly similar to each other), the process of goal-directed action will not be seen as *circular*, but as *spiral* in nature.

A flower, a heart, a cell, etc. does not extrapolate (from past instances of a goal to future goals). Also, in vegetative actions there are no desires that function as proximate causes of these actions. So, one might ask "Where is the supposed similarity between all living things when it comes to the causes of their directedness?"

The proximate causes of vegetative actions include an internal energy-supply that functions as a "fuel", but also the physical nature (i.e. a certain organ, structure) that makes the actions possible. The internal "fuel" is implied by the fact of self-generated action, but so is also a directive mechanism (like a nervous system). (A "triggering stimulus" is also an important proximate cause, but I leave out a discussion of it for the sake of brevity. However, a mechanism (an organ, structure) has certain "*terms of operation*" dictated by the nature of its directive mechanism(s)."²⁶ These "*terms of operation*" determines what could be triggering a behavior.)

The proximate causes of vegetative actions are in fact proximate causes of purposeful actions likewise, whereas in the latter case an element of conscious desire is also included. Also, the desire that causes purposeful action is often for something beneficial to the animal. Vegetative actions are not desired, but they are *needed* by the acting organism; vegetative actions are beneficial to the acting organism. (Why the proximate causes in vegetative action, as mentioned, in fact are proximate causes in purposeful action too (as claimed) will be discussed later in section 4.2.)

3.2. Consequences for Explanation in Biology

Explanations in terms of proximate causes may exhaustively answer the questions of a biochemist or a physiologist, but an evolutionary biologist is interested in explaining the fact that *these* proximate causes *exist*. The fact that living things exist is often referred to by biologists as being "improbable":

²⁵ Binswanger, *Biological Basis*, p. 116.

²⁶ Binswanger, *Biological Basis*, p. 81.

"From the standpoint of thermodynamics the very existence of living things, with their marvellous diversity and complexity of structure and function, is improbable. The laws of thermodynamics say that energy must run "downhill", as in a flame, and that all systems of atoms and molecules must ultimately and inevitably assume the most random configurations with the least energy-content. Continuous "uphill" work is necessary to create and maintain the structure of the cell. It is the capacity to extract energy from its surroundings and to use this energy in an orderly and directed manner that distinguishes the living human organism from the few dollars' ... worth of common chemical elements of which it is composed."²⁷

Evolutionary biologist George G. Simpson makes this point in regard to explanation in biology and he make it clear:

"The point about explanation in biology that I should like to stress is this: to understand organisms one must explain their organization. It is elementary that one should know what is organized and how it is organized; but that does not explain the fact of the nature of the organization itself. Such explanation requires knowledge of how an organism came to be organized and what functions the organization serves. Ultimate explanation in biology is therefore necessarily evolutionary."²⁸

Thus, the (scientific) context determines what is required for a complete and correct explanation of a certain phenomena.

4. Teleology in Biology and in Ethics

4.1. Natural Selection

What explains the fact of the organization of living things is evolution. The question is how evolution could explain the specific directedness of living actions, which ultimately also account for the specific organization of living things (which in turn determines the actions of them). If there is no cosmic designer, or other mystical powerful agent working in the world that directs living actions, then what does?

This is where Darwin enters the stage. It is not the case that Darwin abandons teleology, as some have claimed, or that he brought God into evolutionary theory as others have supposed.²⁹ Darwin made evolution comprehensive by his discovery of the mechanism of *natural selection*. "Darwin accepted the facts of adaptation, and then provided a natural

²⁷ Albert Lehninger, 'Energy Transformation in the Cell', in *Readings in the Life Sciences (Scientific American Resource Library)*, II (San Francisco, 1970), p. 558, as cited in Binswanger, *Biological Basis*, pp. 84-5.

²⁸ George G. Simpson, *This View of Life*, p. 113.

²⁹ For this, read: James G. Lennox, 'Darwin was a Teleologist', in *Biology and Philosophy*, Vol. 8, No. 4, Oct. 1993.

explanation for the facts. One of his greatest accomplishments was to bring the teleological aspects of nature into the realm of science. He substituted a scientific teleology for a theological one."³⁰

The conditional nature of life explains why certain actions are taken and thus why certain structures of living organisms have evolved and have been *adapted* the way they have to their evolutionary environments. Since mechanisms are adapted, the kind of actions (not necessarily any specific action) made possible by certain mechanisms are thus also adapted, and both will be referred to as "adaptations" throughout this paper (this is Francisco Ayala's terminology as used in the article cited above). Certain actions are successful in that they further life, which makes further actions possible, while other actions work against life. These latter actions tend to be unfavored and eliminated by nature, since unsuccessful actions (in principle) lead to the death of the acting organism. Successful actions could thus be said to be *naturally selected*. They are selected for their survival-significance.³¹

Some explanation of the above argument may be needed for those who have more advanced knowledge in biology. First, since my main focus in this paper is on processes of different kinds, selected actions rather than selected mechanisms are the ones relevant to emphasize on here. Evolutionary biologists usually only talk about genetic selection and not also the selection that occurs during the life of an individual organism, which may be called "ontogenetic selection". Both kinds of selection are based on the conditional nature of life and it is therefore not important to treat them separately in this paper. In genetic selection genotypes (the programming, the hereditary information which is carried in the DNA that make up genes which are organized in chromosomes within a fertilized egg cell – the zygote, from which the adult individual develops) evolve and the phenotypes (the individual organisms, the carriers of genotypes) are the ones that natural selection operates on. Thus certain genotypes are tested via the phenotypes and the successful genotypes are selected. In ontogenetic selection actions are selected that are successful in the maintenance of the mechanisms favored by genetic selection. Genetic selection explains the existence of organisms with

³⁰ Francisco J. Ayala, 'Teleological Explanations in Evolutionary Biology', in *Philosophy of Science*, March, 1970, p. 2. This essay is extraordinarily well-written and is recommended introductory reading for anyone interested in the issue of teleology in biology.

³¹ This is not the popular view among modern geneticists and biologists in general – who prefer to talk about "reproductive fitness" as the ultimate goal of living action. I write "prefer" since one could just as well talk about "life" (or "survival" (the continued life)) as the ultimate goal. Dobzhansky writes: "Living beings must survive to reproduce, and must reproduce to survive in the following generation." (Th. Dobzhansky, *Genetics of the Evolutionary Process*, p. 97.) For philosophical concerns it is better to adopt a survival-perspective on living action, since "reproduction" is a concept that is logically dependent upon the concept of "life". ("Life" need not be defined by reference to reproduction, while the reverse is not true.)

certain genotypes, which in turn make it possible to explain why certain mechanisms exist. Ontogenetic selection explains why these mechanisms are maintained. Thus, only genetic selection explains the process of evolutionary development. Now genetic selection is usually understood in terms of differential reproduction, which involves differential survival as a requirement. But (as I alluded to in footnote 31) it is possible to see even genetic selection as having survival as the ultimate goal rather than reproduction (see also footnote 14 *supra*). "If ... we include X's being conceived as a contribution to X's survival (or perhaps the better term would be X's *life*), the equivalence [of the two ultimate goals] becomes apparent."³² Binswanger then takes the classical problem of the egg and the hen and which of them that came first to illustrate this "equivalence". If we look at it from the standpoint of the egg, then the hen is nothing but the egg's way of producing a new egg. This would be the reproductive perspective. If we look at it from the hen's perspective, then the egg is nothing but the hen's way of producing a new hen, which would be the survival perspective on genetic selection. What genetic selection favors here is the whole chain of causation between egg – hen – new egg – new hen – etc., "i.e the perpetuation of organisms of a certain genetic type."³³ Reproduction could then be seen as caused by the survival-value to the organism of past instances of the goal.

Natural selection is a mechanistic process and is not teleological in itself – it does not have a specific direction – it is "opportunistic".³⁴

The use of teleological concepts in biology is thus appropriate. It is also *necessary* to explain biological phenomena in terms of "survival-value", "adaptation", "goal", "selection", etc. since the information condensed in these concepts are so large that always translating them into a purely mechanistic language would render the study of biology futile.³⁵ The necessity of teleological explanations in biology could thus never become superfluous, and there is no reason to wish that it would become so either, since teleological explanations are just as scientific as purely mechanistic explanations, given the spiral nature of causation in goal-directed action.

³² Binswanger, *Biological Basis*, p. 155.

³³ Binswanger, *Biological Basis*, p. 156. It may also be noted that genotypes doesn't evolve apart from living organisms, since they do not exist in isolation.

³⁴ This is, of course, the theme of Richard Dawkins' *The Blind Watchmaker* (London: Longman, 1986).

³⁵ For examples of how these concepts are necessary for the study of biology I refer the reader to: Binswanger, *Biological Basis*, pp. 193-202. (This issue is also well understood by Dobzhansky, Ayala, Simpson, and others.)

4.2. Ethics

What distinguishes man from other animals? The most fundamental answer to this question points to man's specific type of consciousness. Man's consciousness is volitional (and causally effective) and wholly natural. It is also a conceptual faculty, with capacity for forming and learning concepts. If one understands man's consciousness in the same manner as the faculties of other species – as an adaptation – then this will have consequences for theories of ethics, which will have to take that fact into account.

"The expansion of consciousness meant the increase in the organism's range of perception, discrimination, and response, hence selection favored it."³⁶ It is the obvious survival-value of man's consciousness that lead evolutionary biologists to conclude that man's consciousness is a product of natural selection. It is by no means easy to understand that a purely mechanistic process could be responsible for the development of man's highly complex form of consciousness, and you obviously don't have to, or even can, explain every phenomena in reality by reference to evolution by natural selection, but the adaptive value of man's consciousness makes it difficult to avoid the conclusion that it is an adaptation. Dobzhansky distinguishes between two general types of biological adaptation in evolution (this distinction was not generally accepted at the time Dobzhansky wrote this article; Dobzhansky's types of adaptation correspond to the two types of adaptations that I have mentioned earlier: mechanisms and the actions that they make possible): "One is genetic specialization and genetically controlled fixity of traits. The second consists in the ability to respond to a given range of environmental situations by evolving traits favorable in these situations; this presupposes genetically controlled plasticity of traits." To understand this distinction will make it easier for one to understand how man's consciousness could be the product of mechanistic processes operating by natural selection. Dobzhansky argues for the necessity of plasticity of mental traits in men:

"Success of the individual in most human societies has depended and continues to depend upon his ability rapidly to evolve behavior patterns which fit him to the kaleidoscope of the conditions he encounters. ... Suppleness, plasticity, and, most important of all, ability to profit by experience and education are required. No other species is comparable to man in its capacity to acquire new behavior patterns and discard old ones in consequence of training. Considered socially as well as biologically, man's outstanding capacity is his educability. The survival value of this capacity is manifest, and therefore the possibility of its development through natural selection is evident."³⁷

³⁶ Binswanger, *Biological Basis*, p. 129.

³⁷ Th. Dobzhansky, M. F. Ashley Montagu, 'Natural Selection and the Mental Capacities of Mankind', *Science*, June 6, 1947, p. 588.

Elsewhere Dobzhansky writes, "The adaptive value of forethought or foresight is too evident to need demonstration. It has raised man to the status of the lord of creation."³⁸

It is also very reasonable to suppose that the pleasure-pain mechanism is an adaptation that man (also) need for his survival.³⁹ Pleasure is a (physical) sensation (as against an intellectual emotion; a sensation is caused by physical factors, while an emotion is caused by intellectual factors) that normally arises when something is attained in action that promotes life. Pleasure is only attainable if one stays alive and acts in ways that promote ones life. Thus, that which has biological value-significance tends to have psychological value-significance as well. If, as claimed, consciousness is an adaptation, then desire has a biological function in conscious beings. Psychological value-significance is the form in which conscious organisms experience the fundamental value-significance of their actions. "Psychological value-significance and biological value-significance, then, are not *identical*, but they are fundamentally related. ... psychological value-significance is biological value-significance plus consciousness."⁴⁰

Hence, the proximate cause in vegetative and in purposeful goal-directed actions is, as claimed (in sec. 3.1), the same.

A definition of purposeful action that captures this similarity between living actions is provided by Binswanger:

"A purposeful action is a self-generated action caused by a mechanism [i.e., consciousness] whose existence, organization, fuel, and terms of operation result from the survival benefit that past instances of the goal [i.e., past adaptive purposes] have provided the organism in similar previous circumstances."⁴¹ (Parentheses are Binswanger's)

Change "purposeful" in the definition above to "goal-directed" and remove the parentheses, then you will have a generalized definition true of all goal-directed actions including purposeful actions. The case for the teleologist's taxonomic grouping of processes should now be clear. The differences between non-conscious and conscious actions are not as fundamental (in terms of similarities and differences) as the differences between inanimate and animate processes. Within the group of living actions (animate processes) those could be separated that are naturally selected from those that are not.

³⁸ Th. Dobzhansky, 'The Road Traversed and the Road Ahead', *Readings in Biological Science*, ed. by I. W. Knobloch (New York, 1967), p. 458. Cited in Binswanger, *Biological Basis*, p. 204.

³⁹ The reasonableness of this proposition is assessed in Binswanger, *Biological Basis*, pp. 126-137.

⁴⁰ Binswanger, *Biological Basis*, p. 136.

⁴¹ Binswanger, *Biological Basis*, pp. 136-7.

The distinction between non-conscious and conscious actions is a grouping of actions within the category of naturally selected, living actions.

What does this imply for ethics? Does this imply that purposeful actions themselves are adaptations?

If consciousness is an adaptation, then it doesn't follow that its specific way of functioning in a certain instance is adaptive as well. This doesn't follow, since biologists know that not all actions are adaptive; some actions are maladaptive. The volitional nature of consciousness necessitates the human capacity for self-defeating actions and the necessity to choose between alternative actions (mental and derivatively physical). What a man does is up to himself. This is the presupposition of all knowledge, ethics, and all other fields of study where the man-made as distinguished from the metaphysical is the object. "The metaphysically given is, was, will be, and had to be. Nothing made by man *had to be*: it was made by choice. ... Any natural phenomenon, i.e., any event which occurs without human participation, is the metaphysically given, and could not have occurred differently or failed to occur; any phenomenon involving human action is the man-made, and could have been different."⁴² It is important to keep the distinction between "the metaphysical" and "the man-made" in mind whenever one deals with men and their products (intellectual as well as existential).

Thus, if a sociobiologist claims that man's actions are necessitated by being caused by his genes, this claim could not be upheld as "rational" or "objective". "Rationality" and "objectivity" doesn't apply to non-volitional, non-conceptual beings.⁴³ Ayala also shares this view: "... eminent intellectual abilities ... make ethical behavior possible and necessary, and in particular free will, also give us the power to accept some moral norms and to reject others, independently of any natural inclinations."⁴⁴ Dobzhansky notes in this connection that, "Natural selection for educability and plasticity of behavior,

⁴² Ayn Rand, *Philosophy: Who Needs It*, 'The Metaphysical versus the Man-Made' (New York: Bobbs-Merrill, 1982), p. 33.

⁴³ For more on this basic contradiction of determinism I refer to: Joseph M. Boyle, Germain Grisez, Olaf Tollefsen, 'Determinism, Freedom, and Self-Referential Arguments', *Review of Metaphysics*, vol. XXVI (1), 1972, pp. 3-37.

⁴⁴ Francisco J. Ayala, 'The Biological Roots of Morality', *Biology and Philosophy*, vol. 2, 1987, pp. 249-250. His position is also very well stated in the 'Abstract' to his article: "Humans exhibit ethical behavior by nature because their biological makeup determines the presence of the three necessary, and jointly sufficient, conditions for ethical behavior: (i) the ability to anticipate the consequences of one's own actions; (ii) the ability to make value judgements; and (iii) the ability to choose between alternative courses of action. Ethical behavior came about in evolution not because it is adaptive in itself, but as a necessary consequence of man's eminent intellectual abilities, which are an attribute directly promoted by natural selection." (p.235) See also G. G. Simpson, *Biology and Man* (New York; Harcourt, Brace & World), 1969, p. 146.

rather than for genetically fixed egotism or altruism, has been the dominant directive agency in human evolution.”⁴⁵

While other animals are capable of self-produced and self-regulated action, man have this capacity too and more – he can control his own mental processes, which is the real meaning of saying that man has free will (or volition). To give the reader a chance to really grasp these fundamental characteristics of man I give one more citation on the subject:

“Man’s rational faculty includes not only the ability to conceptualize the world in which he must act, but also the ability to conceptualize his mental processes as such. This gives man an entirely new level of self-regulation: the ability to regulate, within limits, the actions of his consciousness, which in turn regulate his existential actions. It is this capacity for regulating the operations of his own mind that underlies much of what makes him distinctively human: the ability to act long-range against the pull of immediate pleasures and pains, to correct his thinking by means of logic, to correct even automatized, subconscious misvaluations (as in overcoming neurosis), and to forge his own character in the image of his self-ideal.”⁴⁶

Natural selection could not make an individual accept a certain “self-ideal”. Self-ideals and ethics are ultimately dependent, not only on biological facts, but also on the view of man that individuals hold. Could man succeed in this life, and can he achieve happiness? Or, is man doomed to failure; is man incapable of greatness, and of achieving happiness here on this earth?

If one holds a bleak view of man and his life here on earth, then one would probably go for an ethics that tells one not to act in accordance with ones nature. If, on the other hand, one holds that man has the capacity for heroism (intellectual as well as existential), then one will probably accept an ethics that tells man that one ought to exploit the capacities that makes man what he is to the utmost, that is: to follow reason, act rationally, and hold life as the standard of all of one’s values.

Conclusions

Life is the only conditional process that exists. Living action is usually goal-directed and this is the reason that the study of life in general and man’s life in particular on all levels has to proceed with teleological explanations of the living phenomena instead of only simple mechanistic explanations.

⁴⁵ Th. Dobzhansky, ‘Ethics and Values in Biological and Cultural Evolution’, *Zygon*, vol. 8, nos. 3-4, Sept.- Dec., 1973, p. 277.

⁴⁶ H. Binswanger, ‘Volition as Cognitive Self-regulation’, *Organizational Behavior and Human Decision Processes*, vol. 50, Dec. 1991, p. 156.

(Teleological explanations could be seen as *advanced* mechanistic explanations in contrast to other types of mechanistic explanations.)

In biology, evolution by natural selection ought to be treated as a teleological process. Teleological concepts in biology ought to be used when needed. One does not need to come up with terms like "teleonomy" to explain adaptive processes, since the use of the concept "teleology" doesn't commit one to a belief in a cosmic, supernatural "teleology". Life ought also be given more attention to in biology generally, though not necessarily at the expense of biochemistry and other valid sub-branches of biology.

In ethics, life ought to be adopted as the only scientific standard. How a morality ought to proceed from there will necessarily involve arguments based both upon one's view of man's life and on how one thinks man should use his capacities, i.e. his rationality to deal with life. "Morality" is thus not something that is "inborn" as many philosophers have claimed, but something that has to be learned and accepted by free will. Consciousness ought to be regarded as a product of evolution by natural selection, but certainly not the specific possible actions of it (i.e. specific thoughts and resulting existential actions). The capacities for reasoning, feeling, etc. which are based on our type of consciousness (which is capable of experiencing things and to conceptualize information provided to us by our senses) probably exist because of the survival-value provided by them to us. But to use these capacities and to use them correctly cannot be determined by evolutionary factors. It would be truly ridiculous of us to claim that our actions in a certain environment has been selected for, when taking into account that our environments and the things we have to deal with change constantly. Adaptations evolve over several generations. The only adaptive actions by man are the ones chosen by him that are directed to the maintenance of man's life *qua* man. How to act with life as the standard is what we have to figure out ourselves, and this is what philosophy may be able to help us with.

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