

Biological Reductionism - Limitations and Liabilities:

Recalling Michael Polanyi

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What is biological reductionism? In these reflections, the phrase is invoked less to reference a singular or definitive position, but a tendency to view the human being, and, for that matter, living being in general as simply the outcome of physical process. It is a tendency which finds exemplification in a textbook which would prove definitive - E.O. Wilson's 1975 *Sociobiology*. E.O. Wilson opens that book with a contemptuous dismissal of Albert Camus' reflections in *The Myth of Sisyphus*. The central problem of philosophy is not, according to Wilson, suicide or existence, but the discernment of how the hypothalamus and limbic systems operate to produce such considerations in order to facilitate the transmission of genetic material...and it is that transmission which he designates as the point of life. Thus in commenting on Camus' own negative response to the question of whether the absurd dictates death, Wilson replies,

...This arid judgement is probably correct, but it makes little sense except when closely examined in the light of evolutionary theory. The hypothalamic-limbic complex of a highly social species, such as man, "knows", or more precisely, it has been programmed to perform as if it knows, that its underlying genes will be proliferated maximally only if it orchestrates behavioral responses that bring into play an efficient mixture of personal survival, reproduction, and altruism...Love joins hate; aggression, fear; expansiveness, withdrawal, and so on; in blends designed not to promote the happiness and survival of the individual, but to favor the maximum transmission of the controlling genes.(Wilson 3)

Immersed as we are in atmosphere of discourse which has long advanced from the presumptions implicit in this statement of Wilson, we are at first struck by its plausibility. Indeed, this underlying logic has been invoked widely by such authors as Avi Tuschman (*Our Political Nature*) or Jonathan Haidt (*The Righteous Mind*) to the end of construing political differences themselves as the outcome of biological processes, the content or relative rectitude of varying political positions being almost a matter of indifference to their narrative. Similarly, this reductivism also receives currency with the explanations of evolutionary psychology being frequently bandied about, for instance, in the domain of "behavioural economics," recently celebrated by the granting of the 2017 Nobel Prize in Economics to Richard Thaler. A more popular index of that celebration can be found in the success of such books as Stephen Dubner's and Steven Levitt's *Freakonomics*. Additionally, the basic perspective sketched by Wilson is broadly endorsed by the often termed New Atheists (Richard Dawkins, Daniel Dennett, Sam Harris, et al.), with whom humanitarian secularism is often associated.

The theme which runs through these thinkers, their differences in focus and position notwithstanding, is the characterization of human being as predominantly non-deliberative, as overwhelmingly instinctual and reflexive. Now, while the force of habit is difficult to exaggerate, and something which has been widely recognized for sometime (a somewhat marginal ancient Greek thinker by the name of Aristotle gave it some weight), the emphasis upon it in current discourses directs in a way that not only minimizes, but negates what I would offer as even more fundamental, namely, freedom. But that is to put the cart a bit before the horse.

To return to the apparent plausibility of the sociobiological or evolutionary psychological narrative, closer examination reveals it to be predicated on the kind of category error noted by Michael Polanyi in his analysis of objectivist epistemology, and it is for this reason that I would like to bring Polanyi to bear. Now we can gloss this error in various ways, as either a confusion or a conflation or an inversion of priority between two distinct orders of being. To which of these glosses we are most drawn will likely depend on the degree of charity that we extend to our reading of *Sociobiology*, or more widely, to the discipline of sociobiology.

In fact, Wilson himself acknowledges this very conceptual challenge in the opening chapter of his textbook. "Samuel Butler's famous the aphorism, that the chicken is only an egg's way of making another egg, has been modernized: the organism is only DNA's way of making more DNA." (ibid.). In yet other words, we are confronted with the ancient question of whether it was the egg or the chicken which came first. But put thus, we are invited to conflate or confuse two different kinds of priority... temporal and ontological. Moreover, by the lights of Wilson, it is the former of these terms which is granted primacy. It is this latter decision which constitutes not mere conflation or confusion, but inversion.

For the being of a given comprehensive entity is not amenable to reduction to its constituent parts whose assembly yields not simply a mere sum, but a condition of a *Gestalt*. This principle is explained by Polanyi through appeal to the domain of language:

The conception of hierarchical levels and boundary conditions, so far introduced in a simple, two-level example, can be elaborated by noticing the complex hierarchical character of speaking or composing. In this case there is an example of a multiple level hierarchy. The lowest level is voice production, sounds which leave open all kinds of uses to which the voice may be put. The next lowest levels are vocabulary and phonetics which restrict the manner in which the voice is used while leaving open the many forms of order which are supplied by the next level, the rules of grammar and syntax. Grammar and syntax restrict the use of vocabulary by making sentences while leaving the content of sentences open. The highest level in this hierarchy is the level of content or meaning. Meaning

or content exercises control over the construction of sentences and the relations among them.

Similarly, with machines, and, in turn, with living organisms, there is a nesting determination of boundary conditions: merely physio-chemical or lower tiers are constrained by operational principles derived from structural or teleological “higher” ones leading, in turn, to the emergence of that comprehensive entity which is the object of reflection or knowing. That the latter are not reducible to the former is demonstrable enough: for they cannot be inferred from the “letters” or “syntax” of the lower levels alone. Just as one cannot derive English or French or Latin vocabulary from the Latin Alphabet alone, one cannot derive from the happenstances of genomic constitution what drives morphogenesis, let alone actions of an individual, or, for that matter, evolutionary processes.

Why is that the case? Polanyi’s discussion of DNA, for instance in his 1968 essay, “Life’s Irreducible Structures,” is helpful here. Following upon a reflection on how the plastic nature of the DNA molecule serves to facilitate its functionality as that of a code, he continues to remark on the implications of this circumstance for the individual organism more broadly:

...We have seen that physiology interprets the organism as a complex network of mechanisms, and that an organism is - like a machine - a system under dual control. Its structure is that of a boundary condition harnessing the physical-chemical substances within the organism in the service of physiological functions. Thus, in generating an organism, DNA initiates and controls the growth of a mechanism that will work as a boundary condition within a system under dual control.

And I may add that DNA itself, is such a system, since every system conveying information is under dual control, for every such system restricts and orders, in the service of conveying its information, extensive resources of particulars that would otherwise be left at random, and thereby acts as a boundary condition. In the case of DNA this boundary condition is a blueprint of the growing organism...

We can conclude that in each embryonic cell there is present the duplicate of a DNA molecule having a linear arrangement of its bases - an arrangement which, being independent of the chemical forces within the DNA molecules, conveys a rich amount of meaningful information. And we see that when this information is shaping the growing embryo, it produces in it boundary conditions which, themselves being independent of the physical chemical forces in which they are rooted, control the mechanism of life in the developed organism.

What become apparent from this treatment? That DNA can be construed as a code, or matrix of stored information. This rendering, however, leads to a surprising revelation: DNA as a code is quite literally mere syntax, semantically void: its import can only be gleaned in light of some set of interpretive principles. The organism must “read”, that is “interpret” the DNA after a manner that not only defies a reductive or mechanistic account for even unicellular life forms in that such interpretation involves a mode of non-specific construal or judgement incommensurate with such an account. One might challenge though whether such incommensurability is evident, however. As this claim has a key role in much of Polanyi’s argumentation, it will merit some exploration.

To proceed by analogy, we may consider the difference between the human and the machine play of games, such as Chess, or Go. What is occurring when one or the other selects a particular move? In the human case, is that decision the outcome of deliberate and extended calculation? Even in the case where extensive rumination is entertained before making a final decision, for the human being, the person, that decision rather is the reflection of a kind of “insight”, which may tacitly incorporate elements of ratiocination, but which, in my view, may be more truly characterized as a disclosure of “the move” by a contact with reality. By contrast, the machine never actually “makes a decision”: this way of speaking, while providing a kind of linguistic convenience, is profoundly misleading. However, sophisticated, the machine which is “running the program” is not different in essence from a kind of abacus made of electrons rather than beads. The significance of its determinations derives from the manner in which the human being elects to construe or interpret them. Those registrations are the outcome of systematically deployed algorithms. But again, they are semantically void. Claude Shannon, the founder of information theory had a deep understanding of this point, and conveyed with an arid humor in a remark at the outset of his landmark “A Mathematical Theory of Communication.”

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have meaning; that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem. The significant aspect is that the actual message is one selected from a set of possible messages. The system must be designed to operate for each possible selection, not just the one which will actually be chosen since this is unknown at the time of design.

However irrelevant may be the semantic aspects of communication maybe to the engineering of communication, and subsequently all information processing technologies, they are of paramount import for grasping the *meaning* of meaning, of communication. With regard to the contrast between machine and human decision in gameplay, we see the former is *essentially* adjunct to and dependent upon the latter. This is so both because the former are semantically void, and

because only the latter, human beings, or conscious entities like them, are actually in “contact with reality” after a fashion which enables the discernment of its relevant particulars even amid indeterminacy. So again, that the operation of DNA is the operation of a code implies that the structure of life itself indicates the presence of guiding if not outrightly teleological principles in tension with standard readings of evolutionary process.

This point also finds voice in *Life's Irreducible Structures* with Polanyi remarking upon the increasing complexity of organisms over time. He relays the following:

...This evolutionary progression is usually described as an increasing complexity and increasing capacity for keeping the state of the body independent of its surroundings. But if we accept, as I do, the view that living beings form a hierarchy in which each higher level represents a distinctive principle that harnesses the level below it (while being itself irreducible to its lower principles), then the evolutionary sequence gains a new and deeper significance. We can recognize then a strictly defined progression, rising from the inanimate level to ever higher additional principles of life.

This is not to say that the higher levels of life are altogether absent in earlier stages of evolution. They may be present in traces long before they become prominent. Evolution may be seen, then, as a progressive intensification of the higher principles of life. This is what we witness in the development of the embryo and of the growing child - processes akin to evolution.

But this hierarchy of principles raises once more a serious difficulty. It seems impossible to imagine that the sequence of higher principles, transcending further at each stage the laws of inanimate nature, is incipiently present in DNA and ready to be transmitted by it to the offspring. The conception of a blueprint fails to account for the transmission of faculties, like consciousness, which no mechanical device can possess. It is as if the faculty of vision were to be made intelligible to a person born blind by a chapter of sense physiology. It appears, then, that DNA evokes the ontogenesis of higher levels, rather than determining these levels. And it would follow that the emergence of the kind of hierarchy I have defined here can be only evoked, and not determined, by atomic or molecular accidents.

To return now to Wilson's accounting, one which construes the process of evolution as directed by the imperative of the transmission of genetic material, we are now in a position to identify more precisely the flaw in its reasoning. Namely, it fails to grasp that DNA, as a bearer of information implies its own subordinate status to principles of

ontogenesis and phylogenesis, principles themselves inexplicable in merely mechanistic or stochastic terms. That is, it identifies what is a lower boundary condition, the constraining mechanism of cellular reproduction, as a higher boundary condition... namely the emergence of a life of individuals and societies... both non-human and human. Put more markedly, Wilson's account identifies the impersonal as of greater existential moment than the personal. Yet this is in fact untenable as the impersonal only enters into significance in the light of a knowing which outstrips the confines of the simple objectivism which is its ideal. To recapitulate in terms of the dilemma posed by the primacy of the chicken or the egg, we can see that the egg, and its subsequent *temporal* development into a chicken is drawing upon principles that *ontologically* transcend demarcation in strictly material terms.

But now, I have inserted with a kind of abruptness into the conversation a distinction that requires elaboration. Namely, the notion of the personal as opposed to the impersonal. What is intended by this distinction? It is the designation by the personal of a kind of being both different from the merely physical-chemical, and within which the locus of three terms excluded from the physical-chemical can find expression: freedom, intelligence and awareness. Jointly, through these three, what Polanyi calls "active centers" engage with their broader and distinct environments from which they are set off in a kind of provisional autonomy. These active centers are the organisms populating the unfolding of evolution, and, by his lights, are the source of that process' meaning. This comes to be in various ways. Among these is to be noted the subjection of what, in the conventional account, is a mechanical or stochastic process, to a higher order or logic of decision. That is, evolution is no longer simply an outcome of molecular interaction, but an achievement of free, intelligent and aware beings moving towards a fulfilling end. We may recall here this passage from *Personal Knowledge*.

While the first rise of living individuals overcame the meaninglessness of the universe by establishing in it centres of subjective interests, the rise of human thought in its turn overcame these subjective interests by its universal intent. The first revolution was incomplete, for a self-centered life ending in death has little meaning. The second revolution aspires to eternal meaning but owing to the finitude of man's condition it too remains blatantly incomplete. Yet the precarious foothold gained by man in the realm of ideas lends sufficient meaning to his brief existence; the inherent stability of man seems to me adequately supported and certified by his submission to ideals which I believe to be universal (389)

To draw us back to the outset of this reflection, what I have identified as the culturally dominant, of, if one likes, hegemonic narrative of biological reductionism - epitomized by the essentially determinist account of Neo-Darwinism - suffers from the deficit of invoking a flat, and thus conceptually inadequate framework to account for the phenomena of life and conscious life. This amounts to a twofold indictment. On hand, it is indicative of an explanatory deficit which renders the framework of but limited utility,

and ultimately in need dramatic revision by the canons of science itself. On the other hand, the moral liability of the framework is also indicated as tied up with its underlying epistemology. For that epistemology itself excludes the predicate entities of a moral world...persons. Absent the awareness, intelligence, and freedom they bring into the universe, it seems a barren landscape indeed. There is another element though, which is also excluded by the reductionist narrative... the element of an irreducible mystery. In acknowledgement of that hidden dimension, let us then close our remarks by allowing Camus' this final word from *The Myth of Sisyphus*.

...[A]ll the knowledge on earth will give me nothing to assure me that this world is mine. You describe it to me and you teach me to classify it. You enumerate its laws and in my thirst for knowledge I admit that they are true. You take apart its mechanism and my hope increases. At the final stage you teach me that this wondrous and multicolored universe can be reduced to the atom and that the atom itself can be reduced to the electron. All this is good and I wait for you to continue. But you tell me of an invisible planetary system in which electrons gravitate around a nucleus. You explain this world to me with an image. I realize then that you have been reduced to poetry: I shall never know. Have I the time to become indignant? You have already changed theories. So that science that was to teach me everything ends up in a hypothesis, that lucidity founders in metaphor, that uncertainty is resolved in a work of art. What need had I of so many efforts? The soft lines of these hills and the hand of evening on this troubled heart teach me much more. I have returned to my beginning. I realize that if through science I can seize phenomena and enumerate them, I cannot, for all that, apprehend the world...

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