

Roots of Dialectical Materialism*

In the 1960s the American historian of biology Mark Adams came to St. Petersburg in order to interview K. M. Zavadsky. In the course of their discussion

Zavadsky asked: "Do you know Ernst Mayr?"

Adams: "Yes, very well."

Zavadsky: "Is he a Marxist?"

Adams: "He is not, so far as I know."

Zavadsky: "This is very curious because his writings are pure dialectical materialism."

I have been as puzzled about this comment as Zavadsky was about my writings. What I was puzzled about was, which of my ideas or concepts were considered by Zavadsky to be so close to those of the dialectical materialists. I have been wondering about this for the past 30 years and I think I have gradually come close to an answer. In this I have been helped by a number of publications, particularly those of Engels (1), Levins and Lewontin (2), and Loren Graham (3, 4). I eventually discovered that I had at least six beliefs more or less shared by most dialectical materialists (See below). I particularly benefited from the *Selsam-Martel Reader*, which provides lengthy excerpts from the writings of Engels and other Marxist theoreticians.

In order to understand dialectical materialism, one must study its history. It was developed by Engels and Marx, but mostly by Engels, by accepting the historical approach of Hegel but rejecting Hegel's essentialism and physicalism. Indeed Engels states this quite concretely when he says, "we comprehended the concepts in our heads once more materialistically—as images of real things instead of regarding the real things as images of this or that stage of development of the absolute concept." (1). In spite of his historical approach Hegel's thinking was in most respects strongly Cartesian (physicalist) and this was the part rejected by Marx and Engels. How evolutionary their thinking was they probably

* Dedicated to the memory of the great thinker and teacher Zavadsky

did not fully realize until they read Darwin's *Origin*. This is why Marx wrote such an enthusiastic letter to Engels "... this is the book which contains the basis in natural history for our view." There was a second point in the natural history literature that greatly impressed Engels. It was the strongly empirical approach. Engels criticizes Hegel for his explanation of the laws of dialectics, his "mistake lies in the fact that these laws are foisted on nature and history as laws of thought, and not deduced from them." Incidentally, as L. Graham has pointed out to me, Engels never used the combination dialectical materialism, but rather "modern" or "new" materialism.

At the time when Engels and Marx developed their concepts of dialectical materialism Cartesianism was dominant in philosophy but it was not acceptable to Marx and Engels. Hence, their need to develop their dialectical materialism, in part as a result of their own thinking and in part based on the analogous thinking of the contemporary naturalists.

Darwin is traditionally cited as the source of such evolutionary thinking, as particularly well presented by Allen (5). However, such thinking was widespread among naturalists, at least as far back as the early 19th century. For the last 200 years one could distinguish two groups of biologists. One consisted of the experimentalists, usually driven by "physics envy", who more or less adhered to the Cartesian ideals. The other, the naturalists, who had an understanding of the historical and holistic aspects of living nature, but were often also vitalists (6). Darwin's thinking that appealed so much to the dialectic materialists, was actually rather widespread among 19th century naturalists.

When I scrutinized the literature on dialectical materialism, particularly the work of Levins and Lewontin (2), of Loren Graham (3, 4), of Selsam and Martel (7) and others, I encountered a long list of principles of dialectical materialism with which I, since my youth, had been familiar as principles of natural history. Let me here enumerate six of them.

1). The universe is in state of perpetual evolution. This, of course, had been an axiom for every naturalist at least as far back as Darwin but as a general thought going back to the age of Buffon.

2). Inevitably all phenomena in the inanimate as well as the living world have a historical component.

3). Typological thinking (essentialism) fails to appreciate the variability of all natural phenomena including the frequency of plu-

ralism and the widespread occurrence of heterogeneity.

4). All processes and phenomena including the components of natural systems are interconnected and act in many situations as wholes. Such holism or organicism has been supported by naturalists since the middle of the 19th century.

5). Reductionism, therefore, is a misleading approach because it fails to represent the ordered cohesion of interacting phenomena, particularly of parts of larger systems. Feeling this way about reductionism I have for many years called attention to the frequency of epistatic interactions among genes and to the general cohesion of the genotype.

Dialectical materialism emphasizes that there is a hierarchy of levels of organization, at each of which a different set of dialectical processes may be at work. This is the reason why reduction is often so unsuccessful.

6). The importance of quality. The qualitative approach, for instance, is the only meaningful way to deal with uniqueness.

It is not known how many, perhaps most, of these principles were arrived at independently by natural history and dialectical materialism. This much, however, can be easily demonstrated that the acceptance of this kind of thinking by naturalists goes way back into the 19th century. And it is highly probable that it had an impact on the development of dialectical materialistic thought.

The discovery of the similarity between dialectical materialism and the thinking of the naturalists is not new. Several authors have called attention to it, particularly Allen (5). He starts quite rightly: "The process of natural selection is as dialectical a process one could find in nature." Allen thought that the dialectic viewpoint of the naturalists had been lost between 1890 and 1950, but actually he investigated only experimental genetics where this was indeed true. Zavadsky's comment on my dialectical thinking was based to a large part on my 1942 book, but other evolutionists of this period were equally dialectic.

Allen asserts that the "holistic materialism" of the naturalists had failed to incorporate two important dialectical views. First "the notion that the internal change within a system is the result specifically of the interaction of opposing forces or tendencies within the system itself." Actually the evolutionary, behavioral, and ecological literature is full of discussions of such interactions. Competition is a typical example so is any instance of so-called struggle for existence, all coevolution, so-called

arms races, etc. Again and again it was stated by authors that any given phenotype was the compromise between opposing selection pressures. Territory systems and social hierarchies are the result of the interaction of opposing forces. Neither can I see any validity in a second distinction of dialectic materialism versus the views of the naturalists, that "quantitative changes lead to qualitative changes." In all of his examples all of his supposedly quantitative changes are already qualitative. A chromosomal inversion is a qualitative change and so is any mutation that results in a new isolating mechanism. In others words, I fail to see any thinking among the holistic naturalists that is not compatible with dialectical materialism.

The next question we ought to ask is, "Are there any principles of dialectics not shared by the naturalists?" For instance, do naturalists support Engels's famous three laws of dialectics:

- (1) "The law of the transformation of quantity into quality and vice versa."
- (2) "The law of the inter-penetration of opposites."
- (3) "The law of the negation of the negation."

Engels's principle of negation has been referred to also as the principle of contradiction. The word contradiction is liable to be somewhat misleading. Opposites sometimes can be constructive. The best phenotype very often is a balance of several opposing selection pressures. This has often been pointed out by Darwinians.

Translated into modern dialectical terms, these three laws express the following thoughts.

The first law is simply seen as a principle of non-reductionism.

The second law is considered as an explanation for the presence of energy in nature, that is for its intrinsic nature and not as something bestowed from the outside (e. g., by God).

The third law, negation of the negation is a somewhat curious wording of the assertion of continuous change in nature, e. g., no entity remains constant but is gradually replaced by another.

It is quite obvious that the naturalists would entirely agree.

Would Engels have supported all the views held by modern Marxists? The case of Lysenko clearly demonstrates that Engels would not have done so. Actually Lysenko's pseudo-science had nothing to do with dialectic materialism. That he had so much government support was due

to his political influence and the scientific ignorance of Stalin and Khrushchev. It would be a mistake to hold Lysenko's ideas as a black mark against dialectic materialism.

Another component of modern Marxist thinking which I have trouble to derive from dialectical materialism is the opposition of some leading Marxist biologists to adaptationist thinking. I feel that this opposition is based on the erroneous notion that adaptation is a teleological process. According to Levins and Lewontin, "organisms adapt to a changing external world." But this does not correctly describe the process of becoming adapted. What actually happens is that each member of a population is somewhat differently adapted to the environment of the moment. Those that are most optimally adapted will have the best chance not to be eliminated by natural selection. I cannot see that there is any conflict between this statement and the principles of dialectical materialism. This statement certainly is not in any way an expression of Cartesianism because Descartes would have never allowed such an extent of variation in a population. The word adaptation, of course, is somewhat ambiguous because it describes both a process and the result of this process. This is why most modern evolutionists say that the end of the process is not adaptation but adaptedness. There is no foresight in this process, no teleological component, it is not something organisms do. It is simply a description of the daily observed process of the elimination of the less-well adapted individuals.

If I understand it correctly, but I may well be mistaken, some Marxists are also in opposition to the Darwinian principle of the uniqueness of the individual. No two individuals are the same, no two individuals have the same genotype, no two individuals have exactly the same propensities. This is an almost inevitable consequence of the rejection of essentialism. It is this property of populations which makes natural selection possible. By a curious misunderstanding of this principle, a misunderstanding not shared by J. B. S. Haldane, this principle is decried by many Marxists, seemingly including Levins and Lewontin, as being in conflict with the principle of equality.

In opposition to this way of thinking I hold that genetic uniqueness and civic equality are two entirely different things. Haldane, who came to the same conclusion, insisted, therefore, that in order to provide equal opportunities as far as possible to individuals with highly diverse abili-

ties, it was necessary to provide diverse opportunities (8). To insist that all individuals are identical would be a falling back to classical essentialism. Haldane for one clearly saw that human heterogeneity was not in any conflict whatsoever with dialectical materialism. Indeed, Engels also consistently emphasized the ubiquity of heterogeneity.

It would seem legitimate to claim that dialectical materialism in its opposition to Cartesianism, reductionism, essentialism, and other aspects of physicalist thinking has not inhibited anywhere the advance of biological thought and where such inhibition is seemingly found, it is due to incorrect Marxist interpretations that are actually not part of the principles of dialectical materialism.

To repeat what I have said already above and what so startled Zavadsky, what is amazing is the similarity in the thinking of naturalists and dialectical materialists. The so-called dialectical world view is by and large also the world view of the naturalists, as opposed to that of the physicalists. Naturalists have always been opposed to reductionism and to the other physicalist interpretations of the Cartesians. I would not be surprised to learn that Engels got this world view in part from reading the writings of Darwin and of other naturalists.

Dialectical materialism was for Engels and Marx a general philosophy of nature. It was achieved primarily by an elimination of physicalism and Cartesianism. Would that be a philosophy of science that fully accounts for the autonomous characteristics of biology? The viewpoint I have presented in my recent book *"This is Biology"* is that it is necessary to develop the characteristics and principles of the various "provincial" sciences, such as physics and biology, in order to construct eventually a comprehensive Philosophy of Nature, which does equal justice to all sciences (6).

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