

# Biosemiotics

## Joining Forces Against Neo-Darwinism: Linking Organicism and Biosemiotics

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<b>Abstract:</b>	<p>Waddington (1975, 16ff.) drew attention to the damage to scientific progress by COWDUNG – the Conventional Wisdom of the Dominant Group. Despite Popper's (1979, 341ff.) attack on what he called 'the bucket theory of science', that scientific knowledge accumulates incrementally, adding one fact after another, this is now conventional wisdom among biologists. Noble is challenging not only the Neo-Darwinist orthodoxy dominating biology, but revealing the distortions of science produced by this bucket theory of science. The latter is central to understanding the importance of his argument and for seeing the relevance of his work for biosemiotics.</p>

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## 11     Keywords:

12     Denis Noble; Neo-Darwinism; COWDUNG; Bucket Image of Scientific Knowledge; Barbara McClintock;  
13     Biosemiotic Qualitative Organicism.

## 14     Background:

15     Examining the Neo-Darwinist “Modern Synthesis” as this had been formulated and developed  
16     between 1940 and 2000, and still dominates, Noble concluded “all parts of the discourse encourage  
17     the use and acceptance of the other parts which is why it is difficult to break out from the  
18     compelling model that it forms of the world.” The resultant COWDUNG is that Darwin made a  
19     huge breakthrough in identifying the mechanism of evolution: reproduction by organisms with  
20     slight variations and different survival rates of offspring. This reconciled our understanding of life  
21     with a reductionist materialist cosmology according to which everything that exists is and has to  
22     be explained as effects of purposeless behaviour of matter operating according to immutable,  
23     mathematically describable principles, explaining away everything else, including purposeful  
24     agency, as mere appearances. Unfortunately Darwin was still encumbered by teleological notions  
25     inherited from the evolutionary theory of Lamarck, assuming that acquired characteristics of  
26     organisms, developed through their efforts to adapt, could be passed on to their offspring.  
27     Weissmann advanced Darwinism by postulating that inheritance only takes place through germ cells  
28     which determine how organisms develop but cannot be cannot be influenced by other cells. New  
29     information in the germ cells is only possible through random mutations. Mendel’s work postulating  
30     recessive and dominant “factors” in organisms (now referred to as “genes”) determining the traits of  
31     an organism, was used by Darwinists to strengthen the model of variation and selection as the sole  
32     driver of evolution, explaining how beneficial mutations are not eliminated by blending of the  
33     characteristic of offspring. All that matters is that through differential selection of organisms with  
34     different genes, genes evolve better means for their reproduction. With these modifications,  
35     Darwin’s residual Lamarckianism, his postulation of gemmules which enable successful  
36     adaptations to be passed on to their offspring, could be sloughed off, justifying the Social  
37     Darwinist view that evolutionary progress is dependent upon the elimination of organisms with  
38     inferior genes. The problem then was to explain how genes are preserved and control the

39 development of the organism. Biochemistry and molecular biology succeeded in this, explaining  
40 both reproduction and variation of genes through the chemistry of DNA and RNA. From then on  
41 it has become only a matter of filling in the details though further work in molecular biology,  
42 allowing organisms to be conceived as blindly constructed survival machines of DNA, with DNA  
43 largely determining not only the form of adult organisms but their behaviour. Noble's project "The  
44 Illusions of the Modern Synthesis" is to dispose of this COWDUNG.

## 45 Main Text

46 The apparent coherence of Neo-Darwinism and steady advance of biological knowledge means  
47 that Darwin's original formulation of his theory of evolution is regarded by its proponents as  
48 naïve, characterized by "quaint anthropomorphic descriptions", with Darwin failing to appreciate  
49 the profundity of his basic notion that evolution is explained through natural selection (which in  
50 fact was not original to him, as Darwin acknowledged). The work of biologists whose ideas  
51 contravened this COWDUNG, such as Waddington's theories of epigenesis which gave a place to  
52 agency and allowed for a form of Lamarckian evolution, and the even more radical claims of  
53 McClintock showing how the functioning of the DNA is altered by the whole organism in response  
54 to its needs, were not taken seriously. Drawing on work in molecular biology on how DNA and  
55 RNA functions within organisms, Noble punches one hole after another through this COWDUNG,  
56 although he admits that when he wrote *Dance to the Tune of Life* published in 2016 he still  
57 believed that "[t]he Modern Synthesis also fitted extremely well with the early discoveries of  
58 molecular biology."

59 Noble's main argument is that molecular biology does not support the modern synthesis, but  
60 undermines it, and biologists have not faced up to this. McClintock was right in rejecting The  
61 Central Dogma of the Modern Synthesis as formulated by Crick, that "DNA sequences can be  
62 translated into RNA sequences which can specify proteins, but the system cannot work in any way  
63 at all in the reverse direction." Even allowing that RNA can also be translated into DNA, as Crick  
64 later did, this dogma is wrong. The organism as a whole not only controls gene expression but  
65 generates useful mutations in the DNA when needed. And yet the vast majority of biologists still  
66 remain committed to COWDUNG.

67 McClintock's work and those who have built on it indicates that Darwin's postulation of  
68 gemmules, whereby organisms influence their genomes, is correct after all, as was his ascription  
69 of agency to organisms (as in mating choices) and granting a role to such agency in evolution.  
70 Examining all the work that upholds this conclusion, including very recent research, Noble  
71 examines the various metaphors used in biology, noting that even when they had some heuristic  
72 value, they are prone to becoming dead metaphors, taken for granted, and in doing so, misleading  
73 researchers who simply cannot see what does not accord with these metaphors. It is noteworthy  
74 that these metaphors accorded with the conjecture that life can be understood entirely in terms  
75 of physical processes devoid of purpose. This is the case with Erwin Schrödinger's suggestion that  
76 replication of genes could take place in the same way as crystals can replicate by forming a  
77 template of further molecules of the same kind. Noble points out that while stimulating research,  
78 this model of reproduction could not account for the accuracy of reproduction of DNA. Shaking  
79 loose from these dead metaphors, he argues that it is necessary to reject the assumption that  
80 there is one fundamental level of reality in terms of which everything else must be explained. He  
81 defends "biological relativity", that is, that we should avoid privileging any one perspective and

82 examine what is being investigated from the perspective of different levels of organization. The  
83 higher levels are not simply caused by lower level processes and there can be downward  
84 causation as well as upward causation.

85 The implications of acknowledging this are enormous. It is not just a rejection of a number of  
86 ideas that seemed to support each other, but the rejection of very fundamental assumptions that  
87 have prevailed in biology about what is a scientific explanation, what kinds of beings there are in  
88 the world and how are they causally related, and then what is science. As Popper argued, science  
89 does not advance through the incremental addition of new knowledge, and their goal should have  
90 been to try to falsify the bold conjecture or conjectures that had guided their work. If they had  
91 done so, they might have appreciated the possibility of a scientific revolution. However, their  
92 failure in this regard was also a failure to appreciate, as Feyerabend (1993, 24ff.) argued, that  
93 without recognizing rival bold conjectures, scientists are almost bound to be blind to the  
94 limitations of prevailing conjectures, or to even recognize that that their work is guided by such  
95 conjectures. The reductionist physicalist thesis had proved eminently successful. Alternatives  
96 involved incoherent *ad hoc* additions to physical theories, such as vital forces or entelechies. Why  
97 shouldn't proponents of physicalism regard these postulates as challenges to their physicalism  
98 that would eventually be explained in purely reductionist terms?

99 That Noble should have broken free of the illusions of coherence of COWDUNG can be  
100 explained (and was explained by him) by his involvement in an alternative bold conjecture about  
101 the basic nature of the cosmos, that evolution involves creative emergence. As originally  
102 formulated, emergence identified a problem rather than offered a solution. Work on emergence  
103 has changed this, and although originally a committed reductionist, Noble contributed to this  
104 change. He is not a traditional biologist or molecular biologist but a biophysicist and  
105 biomathematician, using computers to create models to explain how functions of organisms  
106 emerge. With colleagues he constructed the first satisfactory virtual model of a functioning heart,  
107 showing that it is not a singular oscillator that controls heartbeat, but that regulation is an  
108 emergent property of the feedback loops in the various ion channels. This is similar to the  
109 entrainment of individual alternating-current generators in a national electrical power grid. A virtual  
110 governor emerges which controls the entire system, even though it has no palpable or locatable  
111 physical existence. Such mutual entrainment of oscillations and their effects have been used to  
112 develop much more complex control systems designed to achieve 'generalized optimal-superadaptive  
113 control' (Dewan, 1976, 179). As non-localized forms of downward causation, such control provides a  
114 model not only of the functions of organisms, but how the mind emerges and how it functions.

115 Allowing such downward causation is more radical than it seems. Complexity theorists sometimes  
116 show how interacting components generate interesting patterns, but in most cases these are  
117 interesting only for viewers and have no causal efficacy unless they are recognized and responded to.  
118 Allowing downward causation involves more than this, and it became evident to one the proponents  
119 of the emergent theory of mind, Bickhard (2000), that it requires a rejection of a substance ontology  
120 and its replacement by an ontology of processes. Noble does not argue this, but his reflections on  
121 what led him to reject The Central Dogma lead in this direction. Mathematical models to provide  
122 solutions require the specification of initial and boundary conditions. The components characterized  
123 in such modelling are constrained. These constraints are the basis of emergence, and act as downward  
124 causes. This echoes Anaximander's theory of cosmogenesis according to which the cosmos emerged  
125 through the limiting of the unlimited, an idea that almost certainly influenced Schelling in his effort to  
126 develop a post-Newtonian physics that could make intelligible the emergence and evolution of life. As

127 I have argued elsewhere (2011), Schelling was the progenitor of process metaphysics in its modern  
128 form and anticipated the notion of emergence through new constraints, and as Richards (2002, 514ff.)  
129 has shown, it was this tradition of thought that inspired Darwin, and it inspired Peirce.

## 130 Conclusion

131 Noble's attack on reductionism is used to defend the reality of conscious decisions as a factor in  
132 evolution, and as befitting an article in *Biosemiotics*, he aligns his work with biosemiotics, relating it  
133 to *Umwelt* theory as expounded by M. Tønnessen. This is only a beginning, but it is an important  
134 alignment to make. If Neo-Darwinism prevails because a range of ideas appear to support each other,  
135 showing that in fact they don't is important; but it is also important to show that the ideas opposed  
136 to orthodoxy hold together to be taken as real alternatives. Noble performs both tasks, and in doing  
137 so, provides strong support for a "biosemiotic qualitative organicism", integrating semiotics into the  
138 organicist position he is defending. So long as biosemiotics was seen as a research tradition in  
139 opposition to molecular biology, its chances of success were limited. Noble provides biosemioticians  
140 with an overview of recent developments in molecular biology pertaining to how DNA and RNA  
141 function within organisms and shows how these support Darwin's postulation of gemmules, and  
142 biosemiotics. This aligns both molecular biology and biosemiotics with a holistic Darwinism truer to  
143 the spirit of Darwin's own formulation of his evolutionary theory, with a different research agenda. It  
144 advances the evolutionary cosmology proposed by Schelling and developed by Peirce to replace  
145 Newtonian cosmology, supporting Popper's and Feyerabend's arguments for the central role of bold  
146 conjectures in science, for a "searchlight theory of science" rather than the bucket theory of science.

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