

What Are the Philosophical Presuppositions of Policy, and Do They Contradict Those Current in the Life Sciences?

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I. Introduction.--Policy presupposes knowledge of two kinds : of possibility and of purpose; of means and of ends. Possibility reflects how the world works. In addition to keeping us from wasting time and treasure on impossibilities, this kind of knowledge gives us information about tradeoffs among real alternatives. Purpose reflects desirability, our ranking of ends, our criteria for distinguishing better from worse states of the world. It does not help much to know how the world works if we cannot distinguish better from worse states of the world. Nor is it useful to pursue a better state of the world that happens to be impossible. Without both kinds of knowledge policy discussion is meaningless.

The plan of this essay is to raise two basic questions, suggest a broad answer to each, and consider objections to each answer. First, in the realm of possibility the question is, of what does our ultimate means consist? Is there a common denominator of possibility or usefulness that we can only use up and not produce, for which we are totally dependent on the natural environment? Second, what ultimately is the end or purpose in whose service we should employ these means? The question of purpose is the more difficult and will receive most emphasis. But the means question is considered first for completeness of context, and because means are frequently confused with ends. Finally, I offer some thoughts on how contradictory premises at the basis of modern thought about the life sciences and about policy, have both enfeebled policy and misled science.

II. Means and Possibility.--Ultimate means, the common denominator of all usefulness, consist of low entropy matter-energy. Low-entropy matter-energy is the physical coordinate of usefulness; the basic necessity that humans must use up but cannot create, and for which the human economy is totally dependent on nature's services. Entropy is the qualitative difference that distinguishes useful resources from an equal quantity of useless waste. We do not use up matter and energy *per se* (first law of thermodynamics), but we do irrevocably use up the quality of usefulness as we transform matter and energy to achieve our purposes (second law of thermodynamics). All technological transformations require a before and after, a gradient or metabolic flow from concentrated source to dispersed sink, from high to low temperature.¹ The capacity for entropic transformations of matter-energy to be useful are reduced both by the depletion of finite sources and by the pollution of finite sinks. If there were no entropic gradient between source and sink the environment would be incapable of serving our purposes or even of sustaining life. Technical Knowledge helps us to use low entropy more efficiently--it does not allow us to eliminate or reverse the metabolic flow.

Matter can of course be recycled from sink back to source by using more energy (and more material implements to channel the energy). Energy can only be recycled by

¹ For a scholarly development of this theme the reader is referred to Nicholas Georgescu-Roegen , The Entropy Law and the Economic Process, Harvard University Press, Cambridge MA, 1971.

expending more energy to carry out the recycle than the amount recycled, so it is never economic to recycle energy--regardless of prices. Recycling also requires material implements for collection, concentration, and transportation. The entropic dissipation of these material instruments requires still more recycling. Nature's biogeochemical cycles powered by the sun can recycle matter to a high degree, some think a hundred percent. But this only underlines our dependence on nature's services, since in the human economy we have no source equivalent to the sun, and our finite sinks fill up because we are incapable of one hundred percent recycling.

There is a strong tendency to deny our "humiliating" dependence on nature for the basic capacity to effect our purposes in the world. Among the more explicit denials is that from George Gilder² :

"Gone is the view of a thermodynamic world economy, dominated by 'natural resources' being turned to entropy and waste by human extraction and use....The key fact of knowledge is that it is anti-entropic: it accumulates and compounds as it is used....Conquering the microcosm, the mind transcends every entropic trap and overthrows matter itself."

According to The Economist (March 25, 2000, p. 73), George Gilder is "America's foremost technology prophet" whose recommendation can cause the share price of a company to increase by fifty percent the next day. If Gilder is really that influential then the recent stock market boom, like most perpetual motion machines, is based on a denial of the second law of thermodynamics! To cast further doubt on Gilder's Gnostic prophecy one need only recall the aphorisms of Nobel chemist, Frederick Soddy, "No phosphorous, no thought", and of Loren Eiseley, "The human mind....burns by the power of a leaf." And as Kenneth Boulding pointed out, knowledge has to be imprinted on physical structures in the form of improbable arrangements before it is effective in the economy. And only low entropy matter-energy is capable of receiving and holding for significant time periods the improbable imprint of human knowledge. Furthermore, as important as knowledge is, it is misleading to say, as many do, that it grows by compounding accumulation. New dollars from compound interest paid into a bank account are not offset by any decline in the principal. Yet new knowledge often renders old knowledge obsolete. Do scientific theories of phlogiston and the ether still count as knowledge? As E. J. Mishan noted, technological knowledge often unrolls the carpet of increased choice before us by the foot, while simultaneously rolling it up behind us by the yard. Yes, knowledge develops and improves, but it does not grow exponentially like money compounding in the bank. Furthermore, new knowledge need not always reveal new possibilities for growth; it can also reveal new limitations. The new knowledge of the fire-resisting properties of asbestos increased its usefulness; subsequent new knowledge of its carcinogenic properties reduced its usefulness. New knowledge can cut both ways. Finally, and most obviously, knowledge has to be actively learned and taught every generation--it cannot be passively bequeathed like an accumulating stock portfolio. When society invests little in the intergenerational transfer of knowledge, some of it is lost and its distribution becomes more concentrated, contributing to the growing inequality in the distribution of income.

² Microcosm : The Quantum Revolution in Economics and Technology, New York, Simon and Schuster, 1989, p.378. Similar views are expressed by the late Julian Simon in The Ultimate Resource, Princeton University Press, Princeton NJ, 1981. Recently Peter Huber has continued the tradition in Hard Green: Saving the Environment from the Environmentalists, Basic Books, New York, 2000.

The common view among economists and many others is that waste is just a resource we have not yet learned to use, that nature supplies only the indestructible building blocks of elemental atoms, and all the rest either is, or can be, done by humans. What counts to economists is value added by human labor and capital--that to which value is added is thought to be totally passive stuff, not even worthy of the name natural resources as evidenced by Gilder's putting the term in quotation marks. Natural processes, in this view, do not add value to the elemental building blocks--and even if they did, manmade capital could substitute for such natural services.

The brute fact remains, however, that we cannot burn the same lump of coal twice (sources are depleted), and that the resulting ashes and heat scattered into nature's sinks really are polluting wastes and not just matter-energy of equally useful potential, if only we had the technology to use it. Eroded topsoil washed to the sea, and chlorofluorocarbons in the ozone layer, are also polluting wastes on a human time scale, not just "resources out of place". No one denies the enormous importance of knowledge. But this denigration of the importance of the physical world, and exclusive emphasis on the salvific efficacy of knowledge is a modern version of Gnosticism. It appears to be motivated by a denial of our creaturehood as part of the material world, by the faith that we have, or soon will have, transcended the world of material creation and entered an unlimited realm of esoteric knowledge, albeit technical now rather than spiritual. In the area of means modern thought surprisingly sides with an ancient Christian heresy in declaring our imminent independence from the limitations of the physical world. Yet, as we will see, in the discussion of ends there seems to be a retreat back to restrictions of the physical world in the form materialism and determinism.

III. Ends and Desirability.--It was argued above that there is such a thing as ultimate means, and that it the entropic transformation of matter-energy. Is there such a thing as an ultimate end, and if so, what is it? Following Aristotle, I think there are good reasons to believe that there must be an ultimate end, but it is very difficult to say what it is. In fact it will be argued that, while we must be dogmatic about the existence of the ultimate end, we must be very tolerant about our differing perceptions of it.

In an age of pluralism the first objection to the idea of ultimate end is that it is singular. Do we not have many "ultimate ends"? Clearly we have many ends, but just as clearly they conflict and we must choose among them. Furthermore, syntactically "ultimate" requires the singular. We rank ends. We prioritize. In setting priorities, in ranking things, something--only one thing-- has to go in first place. That is our practical approximation to the ultimate end. What goes in second place is determined by how close it came to first place, etc. Ethics is the problem of ranking plural ends or values. The ranking criterion, the holder of first place, is the ultimate end (or its operational approximation), which grounds our understanding of objective value--better and worse as real states of the world, not just subjective opinions.

I do not claim that the ethical ranking of plural ends is necessarily done abstractly, *a priori*. Often the struggle with concrete problems and policy dilemmas forces decisions, and the discipline of the concrete decision helps us to rank ends whose ordering would have been too obscure in the abstract. Sometimes we have regrets and discover that our ranking really was not in accordance with a subsequently improved understanding of the ultimate end.

My point is that we must have a dogmatic belief in objective value, an objective hierarchy of ends ordered with reference to some concept of the ultimate end, however

dimly we may perceive the latter. This sounds rather absolutist and intolerant to modern devotees of pluralism, but in fact it is the very basis for tolerance. If you and I disagree regarding our hierarchy of values, and we believe that objective value does not exist, then there is nothing for either of us to appeal to in an effort to persuade the other. It is simply your subjective values versus mine. I can vigorously assert my preferences and try to intimidate you into going along, but you will soon get wise to that. We are left to resort to physical combat or political manipulation, with no possibility of truly reasoning together in search of a clearer shared vision of objective value because by assumption the latter does not exist. We each know our own subjective preferences better than the other, so no clarification is needed. If the source of value is in my own subjective preferences, then I don't really care about yours, except as they may serve as a means to satisfying my own. Tolerance becomes a sham, a mere strategy of manipulation, with no real openness to persuasion.³

In spite of this simple rationale the concept of objective value is rejected by the modern intelligentsia. Often it is explicitly rejected. Sometimes it is rejected implicitly by affirming determinism--if there are no real alternatives to choose among, then there is no need for a criterion by which to choose, so objective value becomes a fifth wheel, even though not explicitly rejected. Yet those who reject the concept of objective value have to have some alternative philosophy of value. I will argue that the incoherence of the alternatives provides indirect but strong additional support for the idea of objective value. There are, I believe, four basic alternative positions, outlined below.

(1) The perennial Judeo-Christian worldview as discussed above--real alternatives from which to choose by reference to an objective criterion of value.

(2) Criterionless choice-- alternatives are real options, but there is no objective criterion for choosing among them.

(3) Providential determinism--there are no real options, but there is an objective criterion of value by which to choose, if we had a choice. Fortunately providence has chosen for us according to the objective criterion which we would not be wise or good enough to have followed on our own.

(4) Criterionless determinism--there are no real alternatives to choose from, and even if there were there is no objective criterion of value by which to choose. All is random variation and natural selection as claimed by the neodarwinists.⁴

³ For a fuller exposition of this argument see C.S. Lewis, The Abolition of Man, Macmillan Publishing Co., New York, 1947.

⁴ The term "neodarwinist" refers most narrowly to the union of Darwin's theory of evolution and modern genetics, a union that characterizes mainstream biology. More broadly, in nearly all expositions, the underlying philosophy of neodarwinism is reductionistic materialism, which I include in my usage of the term. I recognize, however, that some biologists who unite Darwin with genetics do not accept the worldview of reductionistic materialism. I hope that someday they will be a majority, but for now the correlation between reductionistic materialism and narrowly defined neodarwinism is so high that I believe the more inclusive usage would be more misleading than the narrower usage here adopted.

For policy to make sense we must have real alternative possibilities before us and a criterion for choosing among them. Position (4), neodarwinism, fails on both counts--choice is an illusion and even if we had real options we have no criterion for choosing among them. Natural selection does it for us, even though it may, for presumed survival reasons, delude us with the illusion of choice. Position (3), providential determinism, tells us that objective value exists and we are tied to it by providence. Fortunately for us we have no freedom because if we did we would likely choose wrongly. Position (2), criterionless choice, extols our existential freedom and the reality of alternatives, but denies that we have any criterion by which to choose one thing over another except arbitrary individual preferences. Position (1) affirms both the reality of our options, and the objectivity of the criterion by which we should choose among them. Only in (1) do we have both the real alternatives and the objective criterion required for responsible rational choice--for policy to make sense. It follows therefore that people engaged in policy, yet holding to positions (2), (3), or (4) are in the grip of a severe and debilitating inconsistency.

Real options and objective value (1) constitute the Judeo-Christian religious premises upon which most Western laws and customs depend. They are the foundation of past legislation and our current laws as well as the rationale for any future policy. Yet many intellectuals⁵ today reject the traditional position (1) in favor of Neodarwinism (4). Do they, as consistent criterionless determinists, forgo all advocacy of policy? Most do not. How then do they resolve the logical contradictions of their position? They do not! They seem to find it easier to denounce their critics as fundamentalist religious nuts than to straighten out the logic of their own position. This is not to deny the existence of real fundamentalist religious nuts, but even if all these nuts disappeared the problem stated here would remain. The real conflict between traditional religions and neodarwinism is that of criterionless determinism, not the evolutionary kinship of mankind with the rest of creation. Repeated replays of Wilberforce vs Huxley, and Darrow vs Bryan, however entertaining, do not meet the issue. People who assert (a) that choice is an illusion, and (b) that even if it were not illusory, the criteria by which one chooses are arbitrary--such people owe it to all concerned to remain silent about policy. In fact their participation in policy dialogue should be subject to "estoppel"--a legal injunction to restrain a witness from contradicting his own testimony.⁶

Although the contrast is most stark between the neodarwinists and traditional religion, the providential determinists and the criterionless choosers should also keep silent about policy. So a word about each is in order.

Providential determinism is partially rooted in the doctrine of predestination. We hear little about theological predestination today, but the idea that forces bigger than ourselves control our lives is very much with us. The faith that the inevitable advance of science, economic growth, and globalization will save us in spite of ourselves is alive and well. Technology can be trusted because it is an instrument of providence. Nobel laureate chemist R.A. Millikan⁷, disagreed with the early (1926) warnings about the danger of nuclear energy given by fellow Nobel chemist Frederick Soddy, and told his readers that

⁵ For example, Francis Crick, E. O. Wilson, Stephen Jay Gould, Carl Sagan, Daniel Dennett, Richard Dawkins, Douglas Futuyama,....

⁶ estoppel = a bar or impediment preventing a party from asserting a fact or claim inconsistent with a position that the the party previously took, either by conduct or words, esp. where a representation has been relied or acted upon by others. (Random House Dictionary of the English Language)

⁷ R. A. Millikan, 1930, "The Alleged Sins of Science" Scribner's Magazine, 827:119-30.

they could “...sleep in peace with the consciousness that the Creator has put some foolproof elements into his handiwork, and that man is powerless to do it any titanic physical damage”. Providence has placed toddling mankind in a playpen full of soft and colorful things that have no sharp edges or poisons, and that are tolerant of our technological probings. The dangerous choices have already been made for us by a wiser power and we can concentrate on safely developing our motor skills and technical inventions. Yes, we may bump our heads now and then, but we need not worry about what Millikan called “hobgoblins and bugaboos that crowd in on the mind of ignorance”--such as fears about atomic energy. In hindsight it is easy to see that Soddy was the true prophet and that Millikan was whistling in the dark. But Millikan’s trust in the providential goodness and irresistible power of technology, as well as his Gnostic faith in knowledge itself, is still with us. Millikan too should have remained silent, not just because he turned out to be wrong, but because there was never a real issue for him--just a hobgoblin which would disappear in the providential daylight of scientific progress, with or without his intervention.

Criterionless choice is thought by existentialists to be a heroic stance. Witness the famous concluding statement by biologist Jacques Monod, (*Chance and Necessity*, 1972)

‘The ancient covenant is in pieces; man knows at last that he is alone in the universe’s unfeeling immensity, out of which he emerged only by chance. His destiny is nowhere spelled out, nor is his duty. The kingdom above or the darkness below: it is for him to choose’.

Unfeeling chance, no destiny, no duty--but man must choose. Choose what? The “kingdom above or the darkness below” we are told. But where did such value-laden language come from? It sounds suspiciously like the the ancient covenant which Monod has just told us is in pieces. It certainly does not fit the context of random unfeeling immensity. But neither does it fit the neodarwinist denial of both real options and an objective criterion of value by which to choose. Monod, in spite of his neodarwinist views, affirms freedom to choose. But criterionless choice is a rather meaningless choice, like flipping a coin, which at least is consistent with our presumed random origin. Existentialists, however much they seem to enjoy the personal angst of criterionless choice, are ill-equipped to make public policy. They too owe it to the rest of us to remain silent in public policy debates.

To summarize: the argument has been made that the Judeo-Christian belief (perhaps shared with other religious traditions) in both objective value and real alternatives is a necessary condition for public policy to make any sense, as well as necessary for the virtue of tolerance. Additional indirect support for this position has been adduced by looking at the modern alternatives to it and pointing out their logical incoherence.

IV. Whitehead’s “Lurking Inconsistency”--If this is a correct view of the situation then it should not be surprising that our current public policies are feeble, halfhearted, and ineffective. Policy thought is enfeebled by what Alfred North Whitehead called the “lurking inconsistency”. An example is provided by one of our leading political scientists, L. K. Caldwell, a pioneer in environmental policy. Caldwell asks in the title of a recent address, discussed at length in this journal, “Is Humanity Destined to Self-Destruct?”⁸

⁸ Lynton Kieth Caldwell, “Is Humanity Destined to Self-Destruct?” plenary lecture delivered at the Eighteenth Annual Meeting of the Association for Politics and the Life Sciences, September 4, 1998, Boston. Quotes

I'd like to consider a shorter question, "Is Humanity Destined?" To be destined means to be "determined beforehand, preordained to an inevitable outcome." Whether the inevitable outcome is ecological destruction or salvation is a further question that arouses our curiosity, but, as long as either outcome is our destiny, no policy recommendations would be called for. Does Caldwell believe that humanity is destined, and is he merely curious about which outcome is preordained? He seems to me ambivalent--but let him speak for himself:

"At our present state of knowledge, it still seems rational, with some reservations, to believe that social choice is possible. But we do not know the extent to which meaningful choice is really possible. Human society may be driven by innate forces that, in effect, determine our destiny. Choice may be an illusion. The fate of Homo sapiens may be destined by evolutionary 'necessity' overriding all hypothetical rational choice. But until forced by evidence to this conclusion, it seems reasonable to assume that humans possess or may acquire the capacities to make the choices necessary to a sustainable future".

Elsewhere in the article Caldwell uses the conditional phrases, "If choice rather than necessity is an option available to humanity....", and, "To the extent that humans choose their future...". Such usage indicates that for Caldwell the idea that "Choice may be an illusion" is a very real possibility. Yet he does offer some policy proposals, which would be a silly thing to do if he really believed that choice is an illusion. From this and the last sentence quoted above, I will take it that his ambivalence is biased toward the view that humanity is not destined I will therefore confine myself to some thoughts about the consequences of a half-hearted belief that choice might be real. I believe this ambivalence is characteristic not just of Caldwell, but of most of us. Caldwell just expressed more clearly and honestly what is in the minds of many.

Caldwell, and most of the modern intelligentsia, halfway believe that Monod's nihilism is justified (Caldwell quoted the famous statement from Monod just discussed). But they want a bit more proof. So they say, let us assume that choice and purpose are real and act on them until the evidence proves us wrong. Only then will we give up on purpose and policy, and devote ourselves to simply analyzing and describing the inevitable process of self-destruction. But I wonder what "evidence" could possibly mean in a world in which choice were truly an illusion? If choice is an illusion then is not the idea of choosing according to evidence also an illusion? If evidence guides one's choice to conclude that choice an illusion, then has one not contradicted one's conclusion in the process of reaching it?

Such incoherence is an outcome of Whitehead's "lurking inconsistency", a contradiction among the most basic premises of the modern worldview. As Whitehead put it :

"A scientific realism, based on mechanism, is conjoined with an unwavering belief in the world of men and of the higher animals as being composed of self-determining organisms. This radical inconsistency at the basis of modern thought accounts for much that is half-hearted and wavering in our civilization.....It enfeebles [thought], by reason of the inconsistency lurking in the background.....For instance, the enterprises produced by the individualistic energy of the European peoples presuppose physical

are from the printed revised version, in Politics and the Life Sciences, September 1999, Vol.18, No.2, which also contains a symposium on Caldwell's address.

actions directed to final causes. But the science which is employed in their development is based on a philosophy which asserts that physical causation is supreme, and which disjoins the physical cause from the final end. It is not popular to dwell on the absolute contradiction here involved.” (Science and the Modern World, 1925, p. 76, Free Press, New York)

In other words, our scientific understanding of nature is based on mechanism and efficient causation, with no room for teleology or final causation. Yet we ourselves, and higher animals in general, directly experience purpose, and within limits, act in a self-determining manner. We respond to the persuasive lure of final causes (purposes), as well as to the push and pull of mechanical, efficient causes. If we are part of nature then so is purpose; if purpose is not part of nature then neither, in large part, are we.

The purposeful nature of environmental policy is in total contradiction with the purposeless presuppositions of biological science, at least the current neodarwinian orthodoxy. Biology is unable to embrace purpose and cannot be relied on by itself to conserve the biosphere, since that is surely a purpose. So conservation must be asserted as a purpose that comes from elsewhere, even if it makes use of biological science as a means. The problem comes in the word "elsewhere", because neodarwinists do not accept "elsewhere", insisting that all is nature, nature is mechanism, and that what we call purpose is an illusion. This belief, even if it is only half believed, lurking as a possibility in the back of the mind of those who may not explicitly affirm mechanism, is nevertheless logically, emotionally, and politically enfeebling. Just as Whitehead recognized, the lurking inconsistency enfeebles thought and action by leading us to consider our direct conscious experience of purpose and choice as somehow less real than an abstract theory of mechanistic determinism that denies our concrete experience—an error that he called the “fallacy of misplaced concreteness”.

As noted, purpose or final cause must, in the view of mechanism, be an “epiphenomenon”---an illusion which itself was selected because of a presumed reproductive advantage that it chanced to confer on those under its influence. It is odd that the illusion of purpose should be thought to confer a selective advantage while purpose itself is held to be non causative. First we are asked to believe that our ancestors survived thanks to actions based on the illusion of purpose. Second we are told that purpose itself is non causative. What then, are we to believe that only illusory purposes are causative and adaptive? And, as Wendell Berry⁹ asks, what are we to think of a materialism that depend so heavily and selectively on illusions? The policy implication of the mechanistic dogma that purpose is not causative is *laissez faire* beyond the most libertarian economist’s wildest model. The only "policy" consistent with this view is, "let it happen as it will anyway".

Teleology has its limits, of course, and from the Enlightenment onward it is evident that mechanism has constituted an enormously successful research paradigm for science in general, including biology. Although mechanism has lost its hold on physics, it remains dominant in biology. The temptation to elevate a successful research paradigm to the level of a complete world view is perhaps irresistible. The biologists are not in a humble mood. But mechanism too has its limits. To deny (or even to doubt) the reality of our most immediate and universal experience (that of purpose) because it doesn't fit the research paradigm is radically anti-empirical. To refuse to recognize the socially devastating logical

⁹ Wendell Berry, Life is a Miracle: An Essay Against Modern Superstition, Washington, D.C., Counterpoint Press, 2000.

consequences that result from the denial of purpose is profoundly anti-rational. Yet environmentally minded economists and political scientists often take their cues from biologists and ecologists who, as adherents to the standard neodarwinist world view, are heirs to its blind spots as well as its insights.

Fortunately, the personal behavior of biologists often transcends the philosophical foundations of their science, and they advocate policies to conserve biodiversity. Naturally the public asks the biologists what purpose would be served by saving an obscure threatened species at the cost of other species, or at the cost of inconvenience to human beings? Since most leading biologists claim not to believe in purposes, ends, or final causes, this is not an easy question for them to answer. They reveal the inconsistency that Whitehead saw lurking in the background by the fecklessness and half-heartedness of their answers. They tell us conflicting stories about biodiversity and ecosystem stability and resilience, and about a presumed instinct of biophilia that we, who systematically drive other species to extinction, are nevertheless supposed to have encoded in our genes. But the biologists are too much in the thrall of their disciplinary premises to affirm any of these descriptive concepts as an abiding purpose, and thereby question the fundamental assumption of neodarwinism. For example, biophilia could be appealed to as a virtue, a persuasive value rather than a wishfully imagined part of the deterministic genetic code. But that would be to admit purpose. Instead the neodarwinists try to find some overlooked mechanistic cause that will make us do what they vaguely think we ought to do, but can't logically advocate without implicitly acknowledging the reality of purpose.

Absent purpose, the biologists' appeals to the public are both logically and emotionally feeble. Is it too much to ask the neodarwinist to speculate about the possibility that the survival value of neodarwinism itself has become negative for the species that really believes it? Could this be a lethal consequence of the lurking inconsistency? By undermining the very belief in purpose the lurking inconsistency fosters a world in which choice becomes, if not an illusion, certainly a neglected possibility.

The economic determinism of Marx has now collapsed both intellectually and politically. The psycho/sexual determinism of Freud is increasingly considered pseudo science of the worst kind. The remaining member of the nineteenth century trinity of determinism, Darwin, is still riding high. However, the neodarwinist evolutionary determinism of chance and necessity with its total rejection of purpose and design, is undergoing serious reconsideration in many quarters, even though somewhat underground.¹⁰

¹⁰ For a critique of neodarwinist orthodoxy, see Michael Behe, Darwin's Black Box, The Free Press, New York, 1996 ; and Phillip M. Johnson, Reason in the Balance, InterVarsity Press, Downer's Grove, IL, 1995. For an orthodox biologist's reply to Behe, Johnson and others, see Kenneth R. Miller, Finding Darwin's God (A Scientist's Search for Common Ground Between God and Evolution), Harper Collins, New York, 1999. Miller is refreshingly critical of the atheistic evangelism of his more famous colleagues, such as E. O. Wilson, Stephen Jay Gould, Richard Dawkins, and the philosopher Daniel Dennett. Miller points out the self-reference fallacy committed with such abandon by Wilson and others (pp. 284-85) who argue that religious beliefs are merely survival mechanisms selected by evolution. By the same reasoning so is rational thought, including the present thought that rational thought is a mere survival mechanism. Miller's critique of Behe's thesis (that in the face of irreducible complexity design strains credulity less than randomness) is interesting, but to me a bit facile. Miller gets rid of Behe's "irreducible complexity" argument by substituting what might be called the "fortuitous multiple coincidence" argument (components of a complex organ were independently selected for separate functions that no longer exist and had nothing to do with the function that the complex organ assumed, once assembled). I am hard pressed to say which story seems *a priori*

more improbable and therefore more suggestive of either design or just-so speculation. John F. Haught has given us a cogent Whiteheadian synthesis in God After Darwin (A Theology of Evolution), Westview Press, Boulder, CO, 2000. Haught argues that too much focus on design (as in the works of Behe and Johnson) is as neglectful of Biblical faith (its emphasis on freedom) as too much emphasis on contingency and random. Evolution is the uncoerced response of Creation to God's lure from the future, the promise inherent in the Creator's self-limiting love, by which we are endowed with freedom. Haught, like Teilhard and Whitehead, strives to be respectful of good science while rejecting materialist metaphysics. But, like Teilhard and Whitehead, Haught is also likely to be dismissed by the neodarwinists. Haught criticizes Johnson for implying that neodarwinism is *in principle* indistinguishable from atheistic materialism, however much the two seem to be associated in practice. Johnson replies in The Wedge of Truth (Splitting the Foundations of Naturalism) (2000) that the neodarwinists built their church on scientific determinism and must fall with it, even though some other theory need not abandon all of neodarwinism--just its philosophical base. From a different angle Wendell Berry (Life is a Miracle: An Essay Against Modern Superstition) (2000) has taken E.O. Wilson's Consilience as a representative specific statement of materialist reductionism and subjected it to an autopsy, after first mercifully killing it with a lethal injection of common-sense. No doubt Wilson will rise from the dead in a future book. In any event the current philosophical discussion of neodarwinism is a very welcome end to the critical free ride that the neodarwinists have too long enjoyed. As an outside spectator I confess to no little pleasure at seeing a confrontation between worthy opponents!

As I write this, the news media are full of the story of Kansas having rejected the teaching of evolution in public schools. I hope it is clear that one may point to problems with neodarwinism without in the least advocating the excision of evolution from school curricula. By all means teach it, both its strengths and weaknesses. But can we please include a reference to Whitehead's lurking inconsistency as well? Seventy-five years later Whitehead's observation remains true: "*It is not popular to dwell on the absolute contradiction here involved.*" We pay a price for suppressing contradictions, however unpopular they may be. That price, in this instance, is at least feebleness of purpose and half-heartedness of policy. Is there also a price being paid in terms of limiting the open pursuit of truth in the life sciences?