

Uniting Biology and the Social Sciences

A Rhetorical Comparison of E. O. Wilson's *Consilience* and Theodosius Dobzhansky's *Mankind Evolving*

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Poroi, 1, 1, January, 2001



- 1 E. O. Wilson's 1998 book *Consilience: The Unity of Knowledge* seeks to persuade readers to integrate knowledge "from the natural sciences with that of the social sciences and humanities."¹ Wilson's stated intent is to offer the "strongest appeal" for the linkage of the natural sciences with the social sciences and humanities, an appeal based on "the prospect of intellectual adventure and, given even modest success, the value of understanding the human condition with a higher degree of certainty" (*WC*, 9). He believes that the biological sciences have much to say about the human condition, and that only by breaching "the boundary that separates the natural sciences on one side from the humanities and humanistic social sciences on the other" can we begin to truly understand human social behavior (*WC*, 125). In short, the connection that links the "deep, mostly genetic history of the species as a whole to the more recent cultural histories of its far-flung societies" is something that should be further explored by scientists willing to cross disciplinary boundaries (*WC*, 126).
- 2 However, Wilson is the first to admit that his book's promotion of consilience across the great branches of learning has been something less than fully persuasive to his audience. Commenting on the negative reception his book received, he says, "Frankly I'm rather surprised that this idea – or shall we say prophecy or projection – has met so much resistance."² Most who have responded to Wilson's book have been unimpressed with his arguments, judging the book harshly for what they see as the arrogant, unapologetic, and uncompromising way that Wilson promotes his agenda. They have rejected many of his claims as "fatally weak" and "indefensible," they are outraged by the "contempt" with which he treats the social sciences and the humanities, they proclaim the book "a martyr to its own hyperbole," and they remain "unconvinced" by his vision.³ While

it is true that some readers like the book, a great many more reject it, forcing Wilson to admit that the book was not as persuasive as he had hoped, and to wonder why it did not appeal to his audience in the way he planned.

- 3 I have traced this reception elsewhere, and have produced a close reading of the text that offers a rhetorical explanation for the many negative responses it received. The nub of the matter is that the pervasive metaphors of disciplinary conquest that Wilson used in *Consilience* to promote boundary crossing were perfectly designed to anger readers who were not already converts to his cause, and the unambiguous reductionism he embraced was unacceptable even to his most ardent supporters.⁴ But I have also indicated that some readers sensed a “softer Wilson” hiding behind the brash overstatements, a more balanced voice that had the potential to be persuasive if it had not been drowned out by the rhetoric of the rest of book.⁵
- 4 In this paper, I will push at that “softer” voice to reveal how even the most cautious passages of Wilson’s *Consilience* are written in a way that is more likely to increase the division between people from different domains of knowledge than to bring them together. I critique this book not to urge the rejection of genetic explanations for human social behavior as hopelessly oversimplified and ideologically suspect. After all, I think that the goal of Wilson’s book is admirable; the boundary between the two cultures should be breached, and genetic explanation should be explored in the social sciences and humanities. Instead I offer this rhetorical critique so that Wilson and his supporters might no longer be surprised by strong resistance to his claims. With a better understanding of the rhetorical structure of his book, Wilson and his allies could adopt a style of scholarly debate more well designed to persuade than to aggravate. I believe that if Wilson and his supporters were to more fully recognize the rhetorical resources that are available, they would find it easier to build support for their research and recruit colleagues to their cause.
- 5 The assumption under which I am working is that the “softer” voice of Wilson is not a sham to be exposed or a cunning lie to be made more effective, nor is the “harder” voice of Wilson a more truthful representation of his beliefs. Instead each are attempts by Wilson to achieve his persuasive goal – to inspire readers to apply genetics to the study of human social behavior. I suspect that Wilson’s argument is restricted by the limits of his rhetorical

invention, and that he might achieve his stated goals more adequately if he recognizes other means of persuasion that are available to him.

- 6 To reveal the factors that diminish the persuasive potential of even the most balanced passages of Wilson's *Consilience*, and to sketch the outline of a more promising rhetorical approach available to Wilson and his supporters, I will contrast Wilson's rhetoric with that of another biologist who, long ago, wrote a book with a very similar goal. In 1962, Theodosius Dobzhansky's *Mankind Evolving: The Evolution of the Human Species* sought "to explore the possibilities of understanding mankind as a product of evolution . . . to explore how far the evolution of man can be understood from the vantage point of modern genetics and of the biological theory of evolution."⁶ Like Wilson, Dobzhansky bemoaned the trend of the social sciences "to favor the view that biological sciences are utterly useless in attempting to understand human societies" (*DME*, 15). Because Dobzhansky believed genetics and evolutionary theory would tell us a great deal about human social behavior, he wrote a book to overcome the estrangement of the biological and social sciences (*DME*, 287, 330).
- 7 A close look at the substance of Wilson's and Dobzhansky's books reveals that, although Wilson wrote with the advantage of the more advanced state of knowledge in genetics available to a scientist in the late 1990s, the two authors were really not all that far apart in their substantive understanding of the evolution of behavior. Both recognize that environment and heredity collaborate to create particular human behavioral traits (e.g., compare *WC*, 138-41 and *DME*, 44-46, 88-90); both understand that genes shape culture and that cultures shape genepools (e.g., see *WC*, 165 and *DME*, 19-20); and both believe that biology should unite with the social sciences and the humanities to help explain human behavior (e.g., see *WC*, 267 and *DME*, 287). In fact, the two authors use some of the same paradigmatic examples from the discipline of genetics to establish these points. For example, both describe "norms of reaction" by discussing plants that have different phenotypes in different environments, and by pointing out that different people gain weight to different degrees when eating similar amounts of food (see *WC*, 137-38 and *DME*, 45, 81).
- 8 But unlike Wilson's book, Dobzhansky's calls for increased study of the genetic basis of human behavior was received positively by almost all who read it.⁷ Significantly a great many of those who

read Dobzhansky's book used the word "balance" when extolling its virtues; they praised his book for charting a judicious middle path between the "Scylla of hereditarianism" that usually crushed geneticists and the "Charybdis of environmentalism" that often sucked in sociologists.⁸ Somehow, Dobzhansky was able to steer a course between the two extremes, drawing both unconverted biologists and social scientists into the new study, while Wilson only angered those who were not already converts to his cause. I propose that the rhetorical structure of their books contributed to the different receptions they received.

- 9 I do not mean to suggest that Dobzhansky was simply a better rhetor than Wilson. Because Dobzhansky was writing in the 1960s, when the institutional power of genetics and sociology put these two branches of knowledge on a more level playing field, he may have had easy access to a set of rhetorical resources for balancing audience interests that Wilson, writing in an age of massive advances in the genetic sciences, was not as likely to have. After discussing the differences in the rhetorical construction of the two books, and the way in which the rhetorical designs of the books contributed to their effects, I will further explore why Dobzhansky may have employed a more effective set of rhetorical resources for the particular speech purpose that he and Wilson shared.

A First Look at the Rhetorical Styles of the Two Books

- 10 A comparison of the thesis statements of the two books gives us the first hint of how the rhetorical style of Dobzhansky and Wilson differed. Consider the passage that encapsulated Dobzhansky's argument, a passage cited or paraphrased by five of his reviewers.⁹

The thesis to be set forth in the present book is that man has both a nature and a "history." Human evolution has two components, the biological or organic, and the cultural or superorganic. These components are neither mutually exclusive nor independent, but interrelated and interdependent. Human evolution cannot be understood as a purely biological process, nor can it be adequately described as a history of culture. It is the interaction of biology and culture. There exists a feedback between

biological and cultural processes. (*DME*, 18)

The structure of this passage is circular, with the main point made at the very beginning, then repeated and elaborated in the sentences that follow. The first sentence establishes the terms that will be united: “nature” and “history.” Then the second sentence repeats the idea by offering two synonyms for each of those terms (biological or organic, and cultural or superorganic); and once again, the opposing concepts are connected with the joining conjunction “and.” The third sentence repeats the idea of interconnection, doing so in two ways: first through a double negation (they are neither mutually exclusive nor independent) then through a double affirmation (they are interrelated and interdependent). The fourth sentence repeats and elaborates the negation, while the fifth and sixth sentence repeat and elaborate the affirmation. All but the third sentence directly name the two things that are being drawn together (usually repeating the words “biology” and “culture”), and even that sentence manages to center around those two things without naming them (referring to them as “these components”). The overall feeling of the passage is of a repetitive weaving between the two concepts. Dobzhansky carefully balances opposites while ensuring that they became tightly entwined with each other.

- 11 Contrast that passage with Wilson’s thesis statement, cited or paraphrased by eight of his reviewers.¹⁰ “The central idea of the consilience world view is that all tangible phenomena, from the birth of stars to the workings of social institutions, are based on material processes that are ultimately reducible, however long and tortuous the sequences, to the laws of physics.” (*WC*, 266) The directionality in Wilson’s passage is clear. While Dobzhansky tacks back and forth between nature and culture, Wilson plows straight ahead to the conclusion that everything can be reduced to nature, and more specifically, to that most stable part of nature, the “laws of physics.” Notice how the passage is designed to build to a point. There are two clauses inserted into the sentence to suspend meaning (one explaining what is meant by “all tangible phenomena,” the other explaining what is meant by “ultimately”), so that by the time the “laws of physics” appear at the end, there is a sense of climax, a feeling of understanding as the meaning of the complex sentence is revealed.
- 12 Like Dobzhansky, Wilson introduces a duality between nature and culture into his thesis statement. But while Dobzhansky balances and unites the terms of his duality, Wilson sets his in a continuum

– “from the birth of stars to the workings of social institutions.” Wilson then subsumes the continuum to a term more typically associated with one side than the other; the “laws of physics” are usually invoked to explain the birth of stars, but Wilson’s thesis extends them along the continuum to explain the workings of social institutions as well. Thus one side of the duality is reduced to the terms of the other, and the continuum becomes a hierarchy.

Metaphor Choice and Sentence Structure

- 13 This structure of directionality and hierarchy is used by Wilson throughout his book, even in the more subtle “soft” passages, where he otherwise balances nature and culture in an “interactionist” account similar to Dobzhansky’s own. For example, in one of the most even-handed appeals of his book, Wilson urges his readers “to unite the great branches of learning and end the culture wars” by viewing the boundary between the natural sciences and the humanities/social sciences “not as a territorial line but as a broad and mostly unexplored terrain awaiting cooperative entry from both sides” (*WC*, 126). To support this appeal, Wilson proposes that the two sides work together to understand the interaction of biology and culture:

We know that virtually all human behavior is transmitted by culture. We also know that biology has an important effect on the origin of culture and its transmission. The question remaining is how biology and culture interact, and in particular how they interact across all societies to create the commonalities of human nature. What, in the final analysis, joins the deep, mostly genetic history of the species as a whole to the more recent cultural histories of its far-flung societies? That, in my opinion, is the nub of the relationship between the two cultures. It can be stated as a problem to be solved, the central problem of the social sciences and the humanities, and simultaneously one of the great remaining problems of the natural sciences. (*WC*, 126)¹¹

Although this passage assumes a certain degree of balance between culture and biology by naming them both and asking how they interact, Wilson inserts directionality and hierarchy into the discussion by going on to reveal that he knows “the approximate form the answer will take” (*WC*, 126). Genes “prescribe”

epigenetic rules, which create patterns of behavior that gel into cultural universals; in short, a “genetic leash” determines how humans behave and how culture develops (*WC*, 127-28). There are places where the genetic leash is “short” and culture is very closely controlled by the genes, and there are places where the genes have a “looser” hold on culture, but even then, “the connection is never completely broken” (*WC*, 128). As the title of the chapter proclaims, this connection between genes and culture is not reciprocal: influence moves “From Genes to Culture” (*WC*, 125). The genes “prescribe” human nature, and culture is “its ultimate product” (*WC*, 164). So although Wilson proclaims that the great branches of learning should “unite,” an equal partnership is not what he actually describes; genetic explanation is the master, and disciplines that focus on the level of culture are urged to follow the lead of scientists studying the genes.

- 14 Contrast Wilson’s metaphor of the “genetic leash” with the metaphors Dobzhansky uses to describe the connection between biology and culture. Dobzhansky argues that the genetic endowments of human beings evolved “hand in hand” with the development of culture (*DME*, 75, 193). “In short, nature is not sovereign over some traits and potentialities and nurture over others; they share all traits in condominium” (*DME*, 97). Although some would say “that the genes determine the limits up to which, but not beyond which, a person’s development may advance,” Dobzhansky protests that “this confuses the issue,” for “there is no way to predict all the phenotypes that a given genotype might yield in every one of the infinity of possible environments” (*DME*, 76). Indeed, since man adapts “his environments to his genes more often than his genes to his environments,” in a sense, “it may be said that man has escaped from the clutches of his biological past and has become to some extent the master, rather than a slave, of his genes” (*DME*, 319). But this does not mean that “the evolution of culture has suspended and superseded biological evolution;” man lives in both the biological world and the cultural world, so “interdependence should be the watchword” (*DME*, 320). Examining Dobzhansky’s metaphors of hand-holding, rule by condominium, and interdependence, it is not hard to see how they give very different impressions than Wilson’s “leash” metaphor.
- 15 The balance Dobzhansky is careful to maintain between nature and culture appears not only in his choice of metaphors, but in his sentence structure as well. For example, consider the following passage:

Human evolution has biological and cultural components. Man's biological evolution changes his nature; cultural evolution changes his nurture. . . . A person is what he is because of his nature and his nurture. His genes are his nature, his upbringing is his nurture. The same is true of mankind as a whole: its nature is its gene pool, its nurture is its environment and its culture. (*DME*, 23)

As in the thesis statement discussed earlier, the repetition and conjunction of the two terms leaves the impression of careful balance. This contrasts with the structure Wilson employs in introducing the genetic leash; the passage from Wilson begins with apparent balance, but then ends with a question of which side is stronger, and answers that question with one side winning the battle. For readers being asked to unite the natural sciences (which focus on nature) with the social sciences and humanities (which study culture), the image of equal partnership that Dobzhansky invokes in metaphor and sentence structure has an appeal to it that Wilson's one-sided image of a genetic leash on culture does not.¹²

The Rhetorical Use of Binaries

- 16 It is interesting to note that both authors recognize the rhetorical importance of establishing binaries. Wilson admits as much when he speaks of the genetically influenced tendency of humans "to split continuously varying objects and processes into two discrete classes" (*WC*, 164), an inborn trait called the "binary instinct" (*WC*, 154). Dobzhansky also speaks of the "craving of the human mind for either-or categories," a "powerful" craving that is perhaps genetically influenced (*DME*, 319). Given this shared understanding, it is no surprise that both authors would attempt to use the impulse toward binaries when designing their arguments. But Wilson, while ostensibly pitting extremes against each other in order to support a middle ground, always favors one term over the other in each of his arguments; in contrast, Dobzhansky is careful not to favor either side of the binaries he creates.
- 17 For example, Wilson distinguishes nurturists, who "traditionally emphasize the contributions of the environment to behavior," from hereditarians, who "emphasize the genes" (*WC*, 142). In a seemingly even-handed move, he promises to "try to establish a common ground between them" that would help end the "endless

ideological bickering” between adversaries who talk past one another (*WC*, 142). But this “common ground” turns out to be located in the territory of one side and not the other: “Refined with the more precise concepts of genetics, nurturists can now be seen to believe that human behavioral genes have very broad norms of reaction, while hereditarians think the norms are relatively narrow” (*WC*, 142). According to Wilson, when we look at the issue from the superior perspective of genetics, we see that nurturists “think that culture is held on a very long genetic leash” while hereditarians “believe the leash is short” (*WC*, 143). The problem of determining which is true is “empirical in nature,” according to Wilson, and it can be solved, as he promises to reveal later in the book (*WC*, 143). The very fact that Wilson reframes the issue in terms of the “genetic leash” foreshadows the solution he will offer: “In general, the epigenetic rules are strong enough to be visibly constraining” (*WC*, 158).

- 18 In another ostensibly mediating passage, Wilson calls for the end to the “drawn-out Verdun and Somme” of the culture wars that pit social scientists against biologists in a “clash of antipodean views.” “Within the broad middle ground between the strong versions of the Standard Social Science Model and genetic determinism, the social sciences are intrinsically compatible with the natural sciences” (*WC*, 188). But directly before and after this call, Wilson once again suggests that his own sympathies are firmly located in the territory of one side rather than the other. He attacks sociology, which he says “remains today the stronghold of the Standard Social Science Model,” a belief that culture is “an independent phenomena irreducible to elements of biology and psychology” (*WC*, 188). According to Wilson, this view is wrong because it turns the “sequence of causation upside down” (*WC*, 188). Social scientists, stuck in the “early, natural-history” stage of their own development, “lack what can be called a truly scientific theory” (*WC*, 189). The antipodean view, “genetic determinism,” is the “belief that human behavior is fixed in the genes” (*WC*, 188). But Wilson never explains the problem with this other view; he does not name modern biology as its “stronghold,” nor does he dish out equally strong critiques against it. Although he calls for a middle ground, his own book does not stay on neutral territory; instead, he attacks one side of the controversy, and ignores the problems with the other side.
- 19 Dobzhansky describes a similar conflict between two views that are “polar opposites” in his own book (18). But unlike Wilson, he stands firmly on the ground between the two extremes, shooting

equal reprobation at both sides. He admits that because “scientists are human, and they are tempted to think that their discoveries explain everything instead of something,” some of them have fancied the “genetic fallacy” which has “made biology an easy prey to social Darwinists, racists, and unscrupulous politicians” (*DME*, 18). Perhaps not unsurprisingly, “social scientists reacted to the exaggerated biologism by a converse exaggeration” that claims mankind evolves by culture only (*DME*, 18). In describing the conflict in this way, Dobzhansky attacks both sides, concluding that neither is correct. “Dichotomies are tempting; to dichotomize is one way to clarify an argument. But the dichotomy of biological and cultural evolution is misleading if pushed too far” (*DME*, 19).

- 20 Later in the book, in a chapter titled “Environmentalism Thesis and Hereditarian Antithesis,” Dobzhansky identifies anthropologist Leslie White as a believer in the “environmentalist” extreme that favors cultural evolution, and biologist C. D. Darlington as a believer in the “hereditarian” extreme that favors biological evolution; in doing so, Dobzhansky gives equal space to his critique of each, connecting variants of both to despicable figures – the former to Stalin and the latter to Hitler (*DME*, 54). In another part of the book, when discussing mental disorders, he contrasts the “psychoanalytic schools,” which have stressed experiences in the lives of patients and “concluded that the role of the genetic variables must therefore be negligible,” with those who take the discovery of genetic factors to mean “that environmental agencies are unimportant.” Attacking both, Dobzhansky proclaims: “the two misconceptions are, indeed, worthy of each other!” (*DME*, 309). In each case, Dobzhansky sets up a dichotomy in which both sides are awarded equal reproach. Wilson, consistent with his preference for hierarchy and directionality, uses the binary instinct to imply the superiority of one side over the other. In contrast, Dobzhansky uses the same binary instinct to encourage a balanced rejection of either extreme in favor of a synthesis that unites the two.

Other Rhetorical Differences Between the Two Texts

- 21 As suggested earlier, the substance and stated purpose of the two books is very similar. But one uses metaphors, sentence structures, and argument strategies that instill directionality and hierarchy in the relationship between biology and culture, while the other uses metaphors, sentence structures, and argument

strategies that invoke balance. As a result, most readers of one were left angrily opposed to connecting genetics and the social sciences in a new interdisciplinary study, while most readers of the other were left feeling good about such a study.

- 22 Of course, there are other reasons that Dobzhansky achieved assent from so many of his readers, while Wilson sparked controversy. As my other work on Wilson's text shows, his hostility toward workers in the social sciences and humanities is palpable in the most extreme passages of his book and turns off many of his readers. In addition, the fanatical reductionism he waves like a flag is not a banner that most readers are comfortable saluting.¹³ Dobzhansky made neither mistake.
- 23 Rather than promote an imperialistic conquest by natural scientists of territory being mishandled by backward social scientists and scholars of the humanities, Dobzhansky recognizes the contribution that social scientists and scholars of the humanities could make to a collaborative endeavor. According to Dobzhansky, we should not conclude that "evolution, biology, or science is irrelevant to wisdom" which is the source and validation of ethics, but neither should we assume that biology has all the answers: "Wisdom includes also other insights," and recognizing this fact is "not an apologia for ignorance or even for the irrational man" (*DME*, 344).
- 24 An example of the way the two authors treat the relationship between the disciplines can be seen in their contrasting discussions of Freud. Wilson treats Freud harshly, setting up a dichotomy between the successful biological sciences and the "mostly wrong" pseudoscience of psychoanalysis (*WC*, 74-81). In contrast, Dobzhansky insists that psychoanalysis and genetics are not necessarily incompatible, and that in spite of the fact that the former should adopt more reliable procedures for testing and verifying theories, "it would be shallow to reject the whole matter as 'unscientific.' . . . the discoveries of Freud and his successors are probably amenable to interpretation in agreement with the concepts of modern genetics" (*DME*, 64-66).
- 25 In addition to treating the social sciences and humanities with more respect than Wilson chooses to display, Dobzhansky recognizes something that Wilson does not: that unification of knowledge does not require a strong commitment to reductionism. Consider the appeal of the following passage from Dobzhansky's book:

Now, even though biological phenomena are specialized patterns of chemical and physical ones, biology is not simply a branch of chemistry or physics; biological laws and regularities must be studied as such, they cannot be deduced from chemistry and physics. The systematic and organized character of culture makes it legitimate, even necessary, to discover the regularities and laws that may exist in its structure and development. It does not follow however, that biology is irrelevant to the understanding of culture, even as chemistry is not irrelevant to biology (*DME*, 73).

Adopting this view, Dobzhansky is able to show social scientists (and scholars of the humanities) that a biological study of human nature does not threaten the autonomy of their fields.¹⁴ At the same time, he is able to suggest the benefit of connecting the different forms of knowledge. This contrasts with Wilson's explicit reductionism that claims biological, cultural, and even ethical precepts *can be* deduced from the laws of chemistry and physics (*WC*, 67-68, 91, 266).

- 26 I have discussed the rampant disciplinary imperialism and explicit reductionism of Wilson's *Consilience* elsewhere, and will therefore not go into more detail about their negative effects or the ways in which he might have avoided them, beyond pointing out that Dobzhansky successfully persuaded his readers to look at the contributions of genetics to our understanding of social behavior without resorting to such appeals. In fact, Dobzhansky's readers were most likely persuaded *because* he avoided such severe "revolutionary" terms for describing the new relationship between disciplines that he was promoting.

Conclusions

- 27 In this paper, I have shown that even the most "soft" appeals of Wilson's book were subtly marked with the scars of directionality and hierarchy, reminders of the disciplinary imperialism and genetic reductionism that influenced the sentence structure, metaphors, and argument strategies of his book. Dobzhansky's theme of balance was in marked contrast to this rhetoric of directionality and hierarchy, and I believe it did much to persuade his readers to accept his call to action.

- 28 It is likely that Dobzhansky developed a more balanced rhetoric of disciplinary unification because he was writing in a time when the social power of the biological sciences was growing, but had not yet reached the proportions of today's genetic technoscience. It was not difficult for him to imagine a balance between the different domains of knowledge and to promote collaboration across the two cultures divide. Today the completion of the Human Genome Project is just one sign of the tremendous power that genetic research has gained in our culture. It is easy to get carried away with enthusiasm for the potential of genetic explanation. In an era when so many advances are being made in the field of genetics, it is difficult to *not* favor one side of the two cultures divide over the other when predicting future growth of knowledge fields. However, if the goal is to persuade people to eliminate the disciplinary boundaries that have so long defined their intellectual and professional lives, a decent respect for the historical conditions of those existing boundaries, and an understanding of the interests of those who live on the side that is in danger of losing its institutional power is necessary.
- 29 I believe that rhetors like Wilson who recognize the potential power of genetic explanation would do well to borrow from Dobzhansky's rhetorical toolbox. The success of Dobzhansky's text demonstrates that one can develop an excitement for a new kind of study without resorting to extremes; in fact, by adopting a stereoscopic approach that balances the potential of genetic explanation with an understanding of its limitations, one is more likely to persuade the undecided to recognize the value of this form of study and to offer the institutional and intellectual backing that will support its future. Such an approach would not require Wilson to abandon his position or to lie better and more deeply; instead it would require him to design his arguments to more fully correspond to what he says he really wants his book to do: to "unite the great branches of learning and end the culture wars . . . to view the boundary between the scientific and literary cultures not as a territorial line but as a broad and mostly unexplored terrain awaiting cooperative entry from both sides" (126).

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Notes

- ¹ E. O. Wilson, *Consilience: The Unity of Knowledge*, New York, Knopf, 1998, p. 13. Further references to this book will be made in the text itself with the abbreviation: *WC*.
- ² E. O. Wilson, "Divisive Ideas on 'Unification'," interview by Terence Monmaney, *Los Angeles Times*, July 9, 1998, B2.
- ³ Jerry Hirsch, "The Pitfalls of Heritability: Can All Tangible Phenomena Really Be Reduced to the Laws of Physics?" [review of *Consilience* by Edward O. Wilson], *Times Literary Supplement*, February 12, 1999, p. 33; Tzvetan Todorov, "The Surrender to Nature," [review of *Consilience* by Edward O. Wilson], *The New Republic*, Claire Messud, tr., 218, April 27, 1998, p. 33; Steven Rose, "Review" of *Consilience* by Edward O. Wilson, *Endeavour*, March 23, 1999, p. 37; Steve Jones, "In the Genetic Toyshop," [review of *Clone* by Gina Kolata, *The Biotech Century* by Jeremy Rifkin, and *Consilience* by Edward O. Wilson], *New York Review of Books*, 45, April 23, 1998, p. 16; Freeman Dyson, "Review" of *Consilience* by Edward O. Wilson, *The New England Journal of Medicine*, 339, July 16, 1998, p. 205. Other negative reviews of the book include Richard Rorty, "Against Unity," [review of *Consilience* by Edward O. Wilson], *Wilson Quarterly*, 22, Winter, 1998, pp. 28-38; Stephen M. Barr, "Mindless Science: The Brain and Edward O. Wilson," [review of *Consilience* by Edward O. Wilson], *The Weekly Standard*, 3, April 6, 1998, pp. 31-33; Daniel J. Kevles, "The New Enlightenment," [review of *Consilience* by Edward O. Wilson], *New York Times Book Review*, April 26, 1998, pp. 11-12; Gerald L. Schroeder, "Material Guy," [review of *Consilience* by Edward O. Wilson], *National Review*, 50, May 4, 1998, pp. 49-50; John Dupré, "Unification Not Proved," [review of *Consilience* by Edward O. Wilson], *Science*, 280, May 29, 1998, p. 1395; Jeremy Bernstein, "E. O. Wilson's Theory of Everything," [review of *Consilience* by Edward O. Wilson], *Commentary*, 105, June, 1998, pp. 62-65; Mary Midgley, "A Well-Meaning Cannibal," [review of *Consilience* by Edward O. Wilson], *Commonweal*, 125, July 17, 1998, pp. 23-24; D. Graham Burnett, "A Dream of Reason," [review of *Consilience* by Edward O. Wilson], *The American Scholar*, 67, Summer, 1998, pp. 143-147; Robert C. Berwick, "All Together Now," [review of *Consilience* by Edward O. Wilson], *The Los Angeles Times*, August 30, 1998, p. 12; Dale Jamieson, "Cheerleading for Science," [review of *Consilience* by Edward O. Wilson], *Issues in Science and Technology*, 15, Fall,

1998, pp. 90-91; Niles Eldredge, "Cornets and Consilience," *Civilization*, 5, October-November, 1998, pp. 84-86; Steve Pope, "A Scientist's Search for Comprehensive Knowledge," [review of *Consilience* by Edward O. Wilson], *Christian Century*, 115, November 4, 1998, pp. 1027-1033; Mark J. Spalding, "Review" of *Consilience* by Edward O. Wilson, *Journal of Environment and Development*, 7, December, 1998, pp. 442-449; Walter Truett Anderson, "Recycling Sociobiology," [review of *Consilience* by Edward O. Wilson], *Futures*, 31, February, 1999, pp. 101-104; Jean Bethke Elshtain, [review of *Consilience* by Edward O. Wilson], *First Things: A Journal of Religion and Public Life*, 91, March, 1999, p. 59. Also see Wendell Berry, *Life is a Miracle: An Essay Against Modern Superstition*, Washington, DC, Counterpoint, 2000.

⁴ Leah Ceccarelli, *Shaping Science with Rhetoric: The Cases of Dobzhansky, Schrödinger, and Wilson*, Chicago, University of Chicago Press, 2001.

⁵ In my book, I note the following reviewers who seem to sense a softer Wilson hiding in some passages of *Consilience*: Todorov, "The Surrender to Nature," p. 33; Burnett, "A Dream of Reason," p. 144; Dupré, "Unification Not Proved," p. 1395; Bernstein, "E. O. Wilson's Theory of Everything," p. 64.

⁶ Theodosius Dobzhansky, *Mankind Evolving: The Evolution of the Human Species*, New Haven, Yale University Press, 1962, p. xii. Further references to this book will be made in the text itself, with the abbreviation *DME*.

⁷ Consider the following reviews: G. G. Simpson, "Evolution's Two Components: Biological and Cultural," [review of *Mankind Evolving* by Theodosius Dobzhansky], *Science*, 136, April 13, 1962, pp. 142-143; Joseph Bram, [review of *Mankind Evolving* by Theodosius Dobzhansky], *Library Journal*, 87, June 1, 1962, pp. 2148-2149; W. W. Howells, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *American Scientist*, 50, June, 1962, pp. 208A-209A; Gavin de Beer, "The Role of Genetics in the Evolution of Man, Including His Future Evolution," [review of *Mankind Evolving* by Theodosius Dobzhansky], *Scientific American*, 207, September, 1962, pp. 265-266, 268, 270, and 272; C. O. Carter, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *The Eugenics Review*, 54, October, 1962, pp. 168-169; Bulkeley Smith Jr., "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *American Sociological Review*, 27, October, 1962, p. 725; J.

Maynard Smith, "Evolution of Man," [review of *Mankind Evolving* by Theodosius Dobzhansky], *Nature*, 196, November 10, 1962, pp. 505-506; Ashley Montagu, "The Time Has Come to Take Another Look at Ourselves," [review of *Mankind Evolving* by Theodosius Dobzhansky], *New York Times Book Review*, 67, December 9, 1962, pp. 3 and 34; Anonymous, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *New Yorker*, 38, January 12, 1963, pp. 113-114; John C. Greene, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *Technology and Culture*, 4, Winter, 1963, pp. 111-112; Harry L. Shapiro, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *Natural History*, 72, May, 1963, p. 5; Frederick S. Hulse, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *Eugenics Quarterly*, 10, June, 1963, pp. 88-89; J. N. Spuhler, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *American Anthropologist*, 65, June, 1963, pp. 683-684; Alice M. Brues, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *American Journal of Physical Anthropology*, 21, September, 1963, pp. 383-385; Bentley Glass, "A Masterwork," [review of *Mankind Evolving* by Theodosius Dobzhansky], *The American Scholar*, 33, Spring, 1964, pp. 276-282; C. Nash Herndon, "Review" of *Mankind Evolving* by Theodosius Dobzhansky, *American Review of Human Genetics*, 16, June, 1964, p. 263. Although there were a few words of criticism here and there, all the reviewers praised the book and recommended it to their readers. This contrasts with the reviews of Wilson's book, most of which rejected the claims of the author and failed to recommend the book to readers. In addition to the evidence of book reviews that show readers positively responding to Dobzhansky's book, there is evidence from the scientific record that the book was well received. Many scientific articles have cited Dobzhansky's book to support their own argument that the biological and social sciences should draw upon each other. For example, see Lionel Tiger and Robin Fox, "The Zoological Perspective in Social Science," *Man*, new series, 1, Marc, 1966, p. 76; Laura Thompson, "Steps Toward a Unified Anthropology," *Current Anthropology*, 8, February-April, 1967, p. 71; Derek Freeman, "A Matter of Values," *Man*, new series, 2, March, 1967, p. 133; Bruce Eckland, "Genetics and Sociology: A Reconsideration," *American Sociological Review*, 32, April, 1967, pp. 176, 177, 181, and 191; John A. Clausen, "The Organism and Socialization," *Journal of Health and Social Behavior*, 18, December, 1967, p. 245; Albert Somit, "Toward a More Biologically-Oriented Political Science: Ethology and Psychopharmacology," *Midwest Journal of Political Science*, 12, 4,

November, 1968, p. 561; Peter Corning, "The Biological Bases of Behavior and Some Implications for Political Science," *World Politics*, 23, 2, April, 1971, pp. 326, 327-28, 329, 332, 336, 353-55, and 359-60; Robert D. McCracken, "Lactase Deficiency: An Example of Dietary Evolution," *Current Anthropology*, 12, October-December, 1971, p. 479; Elliott White, "Genetic Diversity and Political Life: Toward a Populational-Interaction Paradigm," *Journal of Politics*, 34, 4, November, 1972, pp. 1207 and 1210.

8 The Scylla and Charybdis metaphor is from J. Maynard Smith, "Evolution of Man," p. 506. The word "balance" appears in Glass, "A Masterwork," p. 278; Montagu, "The Time Has Come to Take Another Look at Ourselves," p. 34; Simpson, "Evolution's Two Components," p. 143; Hulse, "Review," p. 88; J. Maynard Smith, "Evolution of Man," p. 506; Carter, "Review," p. 169; and Brues, "Review" p. 383. Others who commented on the way the book marks out a middle path between unreasonable extremes include: Bulkeley Smith Jr., "Review," p. 725; Howells, p. 209A; and Spuhler, "Review," p. 684.

9 Montagu, "The Time Has Come to Take Another Look at Ourselves," pp. 3 and 34; Bulkeley Smith Jr., "Review," p. 725; Simpson, "Evolution's Two Components," p. 142; Greene, "Review," p. 111; Spuhler, "Review," p. 683. This passage is also quoted in at least one scientific article that cited Dobzhansky's book to support its own argument. See Corning, "The Biological Bases of Behavior and Some Implications for Political Science," p. 336.

10 Bernstein, "E. O. Wilson's Theory of Everything," p. 65; Berwick, "All Together Now," p. 12; Hirsch, "The Pitfalls of Heritability," p. 33; Jones, "In the Genetic Toyshop," p. 15; Midgley, "A Well-Meaning Cannibal," p. 23; Todorov, "The Surrender to Nature," pp. 29-30; Robert Costanza, "One Giant Leap," [review of *Consilience* by Edward O. Wilson], *BioScience*, 49, June, 1999, p. 487; Michael Werner, "Review" of *Consilience* by Edward O. Wilson, *The Humanist*, 59, March, 1999, p. 44.

11 Like Wilson, Dobzhansky also describes a "problem" to be considered in his book, but for him it is how the great diversity of human natures arises from the interaction of biology and culture (*DME*, p. 23). The fact that Wilson's "problem" would focus on commonality and Dobzhansky's on diversity says a great deal about the difference between their two rhetorical approaches. In focusing on commonalities of human nature, Wilson would reduce

all explanations down to a common answer; Dobzhansky seems to have more respect for diversity, both of human natures and of explanatory forms.

12 At least four articles that have cited Dobzhansky's book to support their own arguments made a specific reference to the way he balanced biology and culture. See Charles F. Hockett and Robert Ascher, "The Human Revolution," *Current Anthropology*, 3, June, 1964, p. 136; Clausen, "The Organism and Socialization," p. 245; McCracken, "Lactase Deficiency," p. 479; Tim Ingold, "The Architect and the Bee: Reflections on the Work of Animals and Men," *Man*, new series, 18, March, 1983, p. 13.

13 For evidence of these aspects of Wilson's rhetoric and the negative responses of readers to them, see my book: *Shaping Science with Rhetoric*.

14 Other non-reductionist statements can be found at *DME*, pp. 220 and 345.