

An Evolutionary Paradigm for Literary Study

1. The Current Institutional Position of Literary Darwinism

Over the past thirteen years or so, evolutionary literary study has emerged as a distinct movement, and that movement is rapidly gaining in visibility and impact. More than a hundred articles, three special journal issues, four edited collections, and about a dozen free-standing books have been devoted to the topic. Many other articles and books are in press, under submission, and in preparation. Commentaries on the field have appeared in newspapers and journals all over the industrialized world, including notices in *Nature*, *Science*, and *The New York Times Magazine*. As it has gained in visibility, the movement has also attracted a good deal of criticism from diverse disciplinary perspectives—from traditional humanism, poststructuralism, cognitive poetics, and evolutionary social science. In four previous articles—the first in this journal in 2002, the most recent in 2007—I have surveyed contributions to the field, aiming at bibliographic inclusiveness.¹ In this present article, I shall not replicate those bibliographic efforts. Instead, I shall briefly describe some of the more important contributions, discuss key theoretical issues, and respond to representative critiques.

The central concept in both evolutionary social science and evolutionary literary study is “human nature”: genetically mediated characteristics typical of the human species. In the concluding paragraph of the survey I wrote in 2002, I said that “we do not yet have a full and adequate conception of human nature. We have the elements that are necessary for the formulation of this conception, and we are on the verge of synthesizing these elements” (611). Over the past six years, that effort of synthesis has advanced appreciably. In a subsequent section, I lay out a model of human nature that incorporates the features on which most practitioners in the field would agree. One crucial element of human nature remains at least partially outside this consensus model: the disposition for producing and consuming literature and the other arts. Within evolutionary social science, divergent hypotheses have been formulated about the adaptive function of the arts.

Theorists disagree on whether the arts have adaptive functions, and if they do, what those functions might be. The alternative hypotheses on this topic involve alternative conceptions of human evolutionary history and human nature. They are thus vitally important to the whole larger field of evolutionary social science, and they also have important implications for the practical work of interpretive criticism. I shall lay out the main competing hypotheses, criticize them, and make a case for one particular hypothesis. I shall also discuss two problems that are more particularly concerns for literary study: the challenge of generating new knowledge about literature, and the challenge of mediating between the discursive methods of the humanities and the empirical methods of the social sciences.

The most modest claim that could be made for evolutionary literary study is that it is one more “approach” or “school” that merits inclusion in casebooks and theoretical surveys. Along with Marxist, psychoanalytic, feminist, deconstructive, and New Historicist essays, one would thus have a Darwinian “reading” of this or that text, *Hamlet* or *Heart of Darkness*, say. Most casebooks of course do not yet include a Darwinian reading, and in truth the Darwinists have had a hard enough time even getting panels accepted at the MLA. My own favorite rejection note explained that the program committee felt that the Darwinian approach was too “familiar” and that what was wanted were proposals along more “innovative” lines—this in a year in which proposals with Lacanian, feminist, and Marxist themes achieved levels of production comparable to those of the American and Soviet military industries in the latter days of the Second World War. In his superbly witty parodies of literary schools in *Postmodern Pooh*, Frederick Crews includes a chapter on the evolutionary literary critics, ridiculing them in tandem with their peers in more firmly established schools, but this was merely an act of kindness. By including them, Crews gave recognition to a struggling minority that—whatever their failings (as he might see them) in doctrinaire narrowness—shares his respect for reason and evidence. In a recent essay in *Style*, James Mellard speaks with evident alarm about “a growing army of enthusiasts for a new Darwinian naturalism” (1). So far as this description applies to the social sciences, it is apt enough. Darwinian social scientists hold key positions in prestigious universities, publish works in the mainstream journals in their disciplines, and win large popular audiences among the educated lay public. The literary Darwinists, in contrast, could most accurately be characterized not as an army but as a robust guerilla band. That standing could change fairly soon. If the rate of current publication in the field continues or increases, before long sheer numbers will tilt

the balance toward inclusion in casebooks more conventional than *Postmodern Pooh*.

Institutionally, the literary Darwinists occupy a peculiar position. On the one hand, they are still so marginal that being included in panel sessions and casebooks would constitute an advance in institutional standing. On the other hand, their ultimate aims sweep past any such inclusion. At least among their most ambitious adherents, they aim not at being just one more “school” or “approach.” They aim at fundamentally altering the paradigm within which literary study is now conducted. They want to establish a new alignment among the disciplines and ultimately to subsume all other possible approaches to literary study. They rally to Edward O. Wilson’s cry for “consilience” among all the branches of learning. Like Wilson, they envision an integrated body of knowledge extending in an unbroken chain of material causation from the lowest level of subatomic particles to the highest levels of cultural imagination. And like Wilson, they regard evolutionary biology as the pivotal discipline uniting the hard sciences with the social sciences and the humanities. They believe that humans have evolved in an adaptive relation to their environment. They argue that for humans, as for all other species, evolution has shaped the anatomical, physiological, and neurological characteristics of the species, and they think that human behavior, feeling, and thought are fundamentally constrained and informed by those characteristics. They make it their business to consult evolutionary biology and evolutionary social science in order to determine what those characteristics are, and they bring that information to bear on their understanding of the human imagination.

Virtually all literary Darwinists formulate “biocultural” ideas. That is, they argue that the genetically mediated dispositions of human nature interact with specific environmental conditions, including particular cultural traditions.² They nonetheless characteristically distinguish themselves from “cultural constructivists” who effectively attribute exclusive shaping power to culture. The Darwinists typically focus on “human universals” or cross-cultural regularities that derive from regularities in human nature. They recognize the potent effect of specific cultural formations, but they argue that a true understanding of any given cultural formation depends on locating it in relation to the elemental, biologically based characteristics that shape all cultures.

2. Literary Darwinism and Cognitive Poetics

In their effort to bring about a fundamental shift in paradigm, the literary Darwinists can be distinguished from practitioners in a school that is in some

respects their closest disciplinary neighbor—cognitive poetics. In her preface to a collection of essays in cognitive poetics, Ellen Spolsky explains that the cognitivists aim to “supplement rather than supplant current work in literary and cultural studies” (viii). She assures her audience that “these essays have no interest in repudiating the theoretical speculations of poststructuralist and historicist approaches to literature” (x). She and her colleagues wish only to enter into “a constructive dialogue with the established and productive theoretical paradigms” (x). Her co-editor, Alan Richardson, takes a similar line. Emphatically distancing the cognitivists from the literary Darwinists, he describes the work of the Darwinists “as an outlier that helps define the boundaries of cognitive literary criticism proper” (3). Describing the disciplinary alignments of individual contributors to the volume, he affirms that Spolsky seeks “not to displace but to supplement poststructuralist approaches to literature like deconstruction and New Historicism” (19), that F. Elizabeth Hart seeks only “to supplement ‘postmodern’ accounts of language, subjectivity, and culture” (20), and that Mary Crane “locates her work between cognitive and poststructuralist accounts of subjectivity, language, and culture” (21).³

Efforts to segregate cognitive poetics from evolutionary literary study are doomed to failure. One thinks of early stages in the development of American cities. Enclaves outside the city core are inevitably swallowed up as the cities expand outward. Evolutionary social science seeks to be all-inclusive. Because it is grounded in evolutionary biology, it encompasses all the more particular disciplines that concern themselves with human evolution, human social organization, and human cognition. As a distinct school within evolutionary social science, “evolutionary psychology” can be described as the offspring of a coupling between sociobiology and cognitive psychology.⁴ Evolutionary psychologists derive from sociobiology an emphasis on the logic of reproduction as a central shaping force in human evolution, and they seek to link that logic with complex functional structures in cognitive mechanisms. Hence the title of the seminal volume in evolutionary psychology: *The Adapted Mind* (Barkow, Cosmides, and Tooby). The human mind has functional cognitive mechanisms for precisely the same reason that the human organism has complex functional structures in other organ systems—because it has evolved through an adaptive process by means of natural selection. In the process of expanding outward from the logic of reproduction to the explanation of cognitive mechanisms, evolutionary social scientists have already given concentrated attention to many of the standard topics in cognitive psychology, for instance, to “folk physics,” “folk biology,” and “folk

psychology”; perceptual mechanisms; the relation between “modularized” cognitive processes and “general intelligence”; the relation between emotions and conscious decision-making; mirror neurons, “perspective taking,” “Theory of Mind,” and “metarepresentation”; “mentalese” and language acquisition; metaphor and “cognitive fluidity” or conceptual blending; “scripts” and “schemata”; and narrative as an elementary conceptual schema.⁵ If evolutionary psychology can give a true and comprehensive account of human nature, it can ultimately encompass, subsume, or supplant the explanatory systems that currently prevail in the humanities.

As things currently stand, the use of cognitive psychology in literary study can be located on a spectrum running from deconstruction at one end to evolutionary psychology at the other. At the deconstructive end, practitioners seek only to redescribe poststructuralist ideas in terms derived from cognitive science. Spolsky, for instance, argues that the supposedly modular character of the mind approximates to deconstructive accounts of the decentered and fragmented self (*Gaps* 12). Somewhere closer to the middle of this spectrum, Lisa Zunshine references evolutionary psychology to support her claims that the human mind has evolved special powers of peering into the minds of conspecifics—what psychologists call Theory of Mind (ToM). Despite her appeal to selected bits of evolutionary psychology, Zunshine strongly emphasizes the “cognitive” aspect of her views, muting and minimizing their sociobiological affiliations. Beyond ToM, she declines to attribute any very specific structure to the adapted mind, and in citing other literary scholars, she prudently avoids reference to most of the published work in evolutionary literary study. She unequivocally locates herself in the community of practitioners who explicitly segregate their work from the evolutionary literary critics. Moving toward the evolutionary end of the spectrum, in film theory, David Bordwell has long identified his work as “cognitive” in orientation, but he has increasingly envisioned cognitive mechanisms as the result of an adaptive evolutionary process, and he firmly contrasts his naturalistic vision with the prevailing poststructuralist theories in film studies. Bordwell and his associates have done excellent work in linking evolved cognitive mechanisms with specific formal features of film.⁶

Because evolutionary psychology draws heavily on cognitive developmental psychology, all evolutionary literary critics are in some measure *de facto* cognitivists. They vary, though, in the degree to which they have incorporated information on cognitive mechanisms not just indirectly through evolutionary psychology but directly from cognitive psychology. Among the evolutionary

literary critics, Brian Boyd has gone further than any other scholar in assimilating information directly from cognitive psychology, especially cognitive developmental psychology. In this respect, as in others, Boyd's work sets a high standard in professionalism. Like Bordwell, but with more explicit and detailed reference to evolutionary social science, Boyd demonstrates that the findings of cognitive psychology make sense ultimately because they are embedded in the findings of evolutionary psychology.⁷ Clearly, one central line of development for evolutionary literary study will be to link specific cognitive structures with specific literary structures and figurative modes, embedding both within the larger structure of evolved human dispositions. Within literary studies so far, the most advanced such work has concerned itself with the elements of fictional narrative. We await further developments in the study of poetic structures and drama.⁸

3. A Selective Survey of Works in Evolutionary Literary Study

Brian Boyd, Jonathan Gottschall, and I have recently compiled a reader in evolutionary literary study, provisionally titled *Evolutionary Approaches to Literature and Film: A Reader in Art and Science* (under submission). As we have gone over the materials for this volume, sorting and evaluating them, it has been evident that even five years ago we would not have been able to produce a collection that satisfied our own sense of scholarly and literary merit. The field has been developing very fast. A number of the items that we have chosen to include have not yet been published, and some are still under submission. Still, if we were compelled to select only from among already published items, we would now be able to put together a reader for which we would have no occasion to blush. The level of professionalism—of expertise in assimilating information from the social sciences, of clarity in theoretical principles, and of sophistication in the use of theory for the purposes of practical criticism—has steadily improved. A new high water mark for the field was registered in the edited volume *The Literary Animal: Evolution and the Nature of Narrative*, co-edited by Gottschall and David Sloan Wilson. Gottschall is a literary scholar who has made pioneering efforts in using empirical methods in literary study, and Wilson is an evolutionary biologist with wide-ranging cultural interests. The volume includes forewords by both a scientist (E. O. Wilson) and a literary scholar (Frederick Crews), and the authorship of the essays is about equally divided between scientists and literary scholars. One rule we adopted in compiling the collection now under submission is that we would duplicate no essays from *The Literary Animal*. There will soon thus be available two collections of high quality, with no overlap between them. (A good many of the

contributors, both scientists and literary scholars, will make appearances in both volumes.)

The first full-length books that could clearly be classed as works of literary Darwinism appeared in the mid-nineties, my own *Evolution and Literary Theory*, and Robert Storey's *Mimesis and the Human Animal: On the Biogenetic Foundations of Literary Representations*. Like many of the early essays in the field, these two books presented themselves as polemical confrontations between biological naturalism and poststructuralist efforts to dispense with nature. They both also contain elements of constructive theory. Storey sketches in features of a "biogrammar"—a model of human nature—and I work out correlations between elementary biological and literary concepts. I define character, setting, and plot in terms of organism, environment, and action, and I delineate literary activity as a form of "cognitive mapping"—a subjectively charged image of the world and of human experience in the world. I identify three chief levels for the analysis of meaning in texts: (a) elemental or universal human dispositions (human nature); (b) the organization of those dispositions within some specific cultural order; and (c) the peculiarities of individual identity in represented subjects, authors, and readers. I also argue for the systematic analysis of individuality through the incorporation of modern research into personality. In the essays collected in *Literary Darwinism: Evolution, Human Nature, and Literature* (2004), I develop all these ideas and work toward producing a comprehensive model of human nature and of literary meaning. Several essays in this volume contain instances of practical criticism from a Darwinian perspective.

More recent works of general theory have continued to define their principles in contrast to purely culturalist principles. On the whole, though, the polemical element has diminished relative to the efforts of constructive formulation. Ellen Dissanayake, an evolutionary theorist of the arts, offers an example. In *Homo Aestheticus* (1992), she set an evolutionary vision of art in contrast to poststructuralist views. In her most recent book, *Art and Intimacy: How the Arts Began* (2000), she concentrates on developing the positive aspects of her theories. In *Literature, Science, and a New Humanities* (forthcoming), Jonathan Gottschall gives evidence for a pervasive sense of a crisis of morale in the humanities. He traces this crisis to a methodological failure to produce empirically valid and progressive forms of knowledge, but he is less interested in attacking a failed ethos than in offering an alternative. He argues that the humanities can benefit from incorporating scientific methods and, along with the methods, the ethos of empirical inquiry. Gottschall has published about a dozen articles in which he uses

quantitative methods of “content analysis” to explore topics of sexual identity and characterization cross-culturally. *Literature, Science, and a New Humanities* includes several such studies as examples. Brian Boyd’s *On the Origin of Stories: Evolution, Cognition, and Fiction* (forthcoming) sets his work up against the culturalist models that still prevail in the humanities, but he occupies himself relatively little with criticizing poststructuralist formulations. Instead, he assimilates a vast range of research in evolutionary social science and incorporates that research in theories of writing and reading. He conceives of literature as a form of cognitive play that develops creativity and helps form social identity. He includes extended readings of individual texts in which he seeks to demonstrate that “a biocultural approach to literature invites a return to the richness of texts and the many-sidedness of the human nature that texts evoke.”⁹ Harold Fromm is a founding figure in “ecocriticism,” and his intuitive naturalism has in recent years converged with “The New Darwinism in the Humanities,” the title of a set of essays included in *The Nature of Being Human* (forthcoming).¹⁰ In an earlier book, *Academic Capitalism*, Fromm had actively engaged the prevailing poststructuralist orthodoxies. In his new book, collecting essays over a period of years, he is engaged with three primary topics in separate but cumulative phases: ecocriticism, the new Darwinism in the humanities, and a naturalistic philosophy of consciousness like that associated with Daniel Dennett.¹¹

The works of general theory noted above contain a fair amount of practical criticism but can be distinguished from works primarily dedicated to practical criticism. The first book-length work in practical criticism from an evolutionary angle was on Zamyatin’s dystopian novel *We*—Brett Cooke’s *Human Nature in Utopia: Zamyatin’s We*. Cooke draws on evolutionary psychology to delineate features of human nature—communal eating, play, charismatic authority figures, sex, filial relations, and visceral responses—that are systematically violated in dystopian fantasies. He concentrates on Zamyatin’s novel but locates it within the broader context of all utopian and dystopian fiction.¹² In *Shakespeare and the Nature of Love: Literature, Culture, and Evolution*, Marcus Nordlund produces an account of love, romantic and filial, in which he integrates evolutionary research with research into Renaissance ideas about love. That account serves as the context for his reading of several Shakespeare plays. Nordlund contrasts his “biocultural” critique with purely culturalist perspectives on love and identity in the Renaissance. In *Shakespeare’s Humanism*, Robin Headlam Wells gives a detailed account of ideas of human nature active in the Renaissance and, like Nordlund, sets this account in contrast to current views that align the Renaissance writers with

poststructuralist theories of cultural autonomy. (Headlam Wells has also co-edited a volume, *Human Nature: Fact and Fiction*, that like *The Literary Animal* includes essays by both scientists and literary scholars.) In *The Rape of Troy: Evolution, Violence, and the World of Homer*, Jonathan Gottschall integrates sociobiological theory with archeological and anthropological research in order to reconstruct the motivating forces in Homer's cultural ecology. Gottschall vividly evokes the Homeric ethos and convincingly demonstrates the value of a biological perspective for analyzing a specific cultural formation.¹³ In a context seemingly far removed from that of Homer's barbarian warriors, Judith Saunders adopts a similar perspective, concentrating on the shaping force of reproductive logic, to analyze character and plot in the novels of Edith Wharton (not yet titled; under submission).¹⁴ In *Comeuppance: Costly Signaling, Altruistic Punishment, and Other Biological Components of Fiction* (forthcoming), William Flesch uses evolutionary game theory as a thematic filter for summarizing character interaction in a wide variety of literary works, including works of Shakespeare, Dickens, and James. Collaborating with three other scholars—Jonathan Gottschall and two psychologists (John Johnson and Daniel Kruger)—I have co-authored a book that uses empirical methods for analyzing characters and reader responses in dozens of Victorian novels: *Graphing Jane Austen: Human Nature in British Novels of the Nineteenth Century* (under submission).

Many articles have been produced in this field. Rather than listing them here, later on I shall reference some of the more interesting ones to illustrate responses to a theoretical question about generating new knowledge through evolutionary literary study.

4. A Model of Human Nature

Writing from the perspective of a traditional humanist, Eugene Goodheart has devoted a book to repudiating Darwinian thinking in the humanities: *Darwinian Misadventures in the Humanities*. Questioning the claims of evolutionary psychology to give us an adequate account of human nature, he says, "Human nature may not be a blank slate, but do we know enough to know what is inscribed upon it?" (18). In the manner in which it is posed, this is not a very serious question. Goodheart himself does not want an answer. Still, the question itself is well worth asking and deserves an answer. The literary Darwinists have committed themselves to the proposition that it can be answered in the affirmative. As Alan Richardson observes, the evolutionary critics differ from the cognitivists "in their high evaluation of the progress of scientific psychology" (14). In the remainder of

this section, I shall outline what scientific psychology can now tell us about human nature, and in the following sections I shall draw out some of the critical implications of that knowledge.¹⁵

Natural selection operates by way of “inclusive fitness,” shaping motives and emotions so as to maximize the chances that an organism will propagate its genes, or copies of its genes in its kin. Evolutionary psychologists commonly distinguish between inclusive fitness as an “ultimate” force that has shaped behavioral dispositions and the “proximal” mechanisms that mediate those dispositions.¹⁶ The motives and emotions shaped by natural selection include those directed toward survival (obtaining food and shelter, avoiding predators) and toward reproduction, a term that includes both mating effort and the effort aimed at nurturing offspring and other kin. Species vary in length of life, developmental trajectory, forms of mating, the number and pacing of offspring, and the kind and amount of effort expended on parental care. For any given species, the organization of these basic biological processes constitutes a distinct species-typical pattern of “life history.” Like the species-typical pattern of life history for all other species, the species-typical pattern of human life history forms a reproductive cycle. In the case of humans, that cycle centers on parents, children, and the social group. Successful parental care produces children capable, when grown, of forming adult pair bonds, becoming functioning members of a community, and caring for children of their own.¹⁷

Humans share with all animals a physiology organized in basic ways around reactive impulses of “approach” and “avoidance.” They share with other social animals dispositions organized around affiliation and dominance.¹⁸ Like all mammals, they have evolved systems of mother-infant bonding, and like chimpanzees, they have evolved dispositions for forming coalitions within large social groups. All of these characteristics are part of the species-typical repertory of dispositions that we call “human nature,” but none of them is exclusive to humans. The traits that are most distinctively human constitute an integrated suite of anatomical, physiological and behavioral features. Humans are bipedal, but proportional to body size they have much larger brains than other primates. Upright posture produces a narrowed birth canal. The problem of squeezing a large brain through a narrowed birth canal requires that human infants be born in an “altricial” or relatively helpless state. Human infants are heavily dependent on parental care for much longer than other animals, and they have, further, a greatly extended period of childhood development—the period previous to reproductive maturity. In ancestral environments (and typically still today), the dependency of human

infants has required paternal investment—that is, care and resources provided by fathers. Humans share the characteristic of paternal investment with many birds and some other animals but with very few other mammals. Humans are the only animals that both have paternal investment and also live in large groups containing multiple males who form complex coalitions. Males of all species have evolved in such a way as to avoid investing in the offspring of other males, and living in multi-male groups reduces paternity certainty. Dispositions for pair bonding and sexual jealousy are thus prominent features in the evolved dispositions of human males. Human females are also distinctive in having menopause and thus a period of life that extends beyond the reproductive years. That period enables older women to raise their latest offspring to maturity and to aid in caring for grandchildren.¹⁹

Humans like other animals share fitness interests with their mates and their offspring, but, except in the case of monozygotic twins, the fitness interests of even the most closely related kin are not identical, and the logic of natural selection has shaped human dispositions in such a way that all intimate relations involve conflict. Females invest more than males in bearing and rearing children, and they also have certainty that their offspring are their own. Human males have evolved a reproductive strategy that includes both paternal investment and a disposition for low-investment short-term mating. Human females have evolved a need to secure the bonded attachment of a male willing to invest resources in them and their offspring, but they have also evolved dispositions for taking advantage of mating opportunities with males who have higher quality than their own mates. Male and female relations are thus not only intense and passionate in their positive affects but also fraught with suspicion, jealousy, tension, and compromise. These relations often work smoothly enough for practical purposes, but they not infrequently break down in rejection, separation, abandonment, violent struggle, abuse, and even murder. Parents and children share a fitness interest in the success of the child—in the child reaching maturity and achieving successful reproduction. But the fitness interests of a child and parent are not identical. A child has one hundred percent fitness interest in itself. Each parent has only a fifty percent genetic investment in a child, and investment in any one child has to be deducted from investment in other children or potential children. Parents must often disperse resources over multiple offspring who each wish more than an even share. Parents preferentially invest in certain offspring, and they must also balance the effort they give to mating with the effort they give to parenting. Siblings form a natural social unit, allied in competition with non-related people, but they are also caught in intense competition with one another. Mating involves a coalition between two people

who are not related by blood. They share a fitness interest in their own offspring, but they differ in the interest they have in the welfare of the kin they do not share with their mate. Even in nuclear families, fitness interests involve conflicts, and in step-families those conflicts are sharply exacerbated. The workings of inclusive fitness thus guarantee a perpetual drama in which intimacy and opposition, cooperation and conflict, are inextricably bound together.²⁰

Because of their extended childhood development, humans have a long period in which to develop the social skills required by living in exceptionally complex social environments. Those social environments are structured by kin relations, flexible and multiple social coalitions, status hierarchies, and in-group/out-group relations.²¹ Two features of the distinctively human suite of characteristics, both dependent on the expanded human brain, are particularly important in mediating these social relationships: (a) Theory of Mind and (b) language. Theory of Mind consists in the ability to attribute mental states to one's self and others, and it is thus the basis for self-awareness and for an awareness of others as distinct persons. The rudiments of Theory of Mind have been found in chimpanzees and some other animals, but the highly developed forms found in humans are unique. Self-awareness is a necessary precondition for the sense of personal identity—the sense that one has a distinctive set of traits, personality features, motive dispositions, social connections, and personal experiences, all extending continuously over a lifetime. Self-awareness is a necessary element of moral consciousness, and it is the precondition for self-esteem, embarrassment, shame, and guilt.²² In its other-directed aspect, Theory of Mind is the capacity for envisioning the inner mental state of other humans, their beliefs, desires, feelings, thoughts, and perceptions. A key diagnostic characteristic for this aptitude is the ability to recognize that other people can have beliefs different from one's own, an ability that emerges in normally developing humans between the ages of three and four.²³ Language is the chief medium for conveying information in non-genetic ways. That kind of informational transmission is what we call “culture”: arts, technologies, literature, myths, religions, ideologies, philosophies, and science. From the evolutionary perspective, culture does not stand apart from the genetically transmitted dispositions of human nature. It is, rather, the medium through which we organize those dispositions into systems that regulate public behavior and inform private thoughts. Culture translates human nature into social norms and shared imaginative structures.²⁴

When we speak of “human nature,” it is generally to this whole suite of characteristics—some common to all animals, some exclusive to mammals, some

shared with other primates, and some peculiarly human—that we refer. These characteristics are so firmly grounded in the adaptive logic of the human species that they exercise a constraining influence on every known culture. Individuals can and do deviate from species-typical characteristics, but the recognition of the species-typical nonetheless forms a common frame of reference for all people. Adaptations emerge from regularities in ancestral environments, and the basic ground plan of human motives and human feelings forms one of the most important such regularities within the ancestral environments of modern humans.²⁵ Because people are such intensely social animals, because their socio-sexual relations are so extraordinarily complex and highly developed, and because successfully negotiating with other humans is one of the most important skills contributing to survival and to successful reproduction, having an intuitive insight into the workings of human nature can reasonably be posited as an evolved and adaptive capacity.²⁶ That adaptive capacity constitutes a “folk psychology,” and it is in literature that folk psychology receives its most complete and adequate articulation.

The culture in which an author writes provides a proximate framework of shared understanding between the author and his or her projected audience, but every specific cultural formation consists in a particular organization of the elemental dispositions of human nature, and those dispositions form the broadest and deepest framework of shared understanding. Many authors make overt and explicit appeals to “human nature.” By delineating the folk concept of human nature, we can reconstitute the shared framework of understanding within which authors interact with readers. That shared framework includes intuitions about persons as agents with goals, basic human motives, basic emotions, the features of personality, the phases of life, the relations of the sexes, filial bonding, kinship relations, the opposition between affiliation and dominance, and the organization of social relations into in-groups and out-groups.

5. Shifting the Frame of Interpretation

Whether traditionally humanistic or poststructuralist in orientation, literary criticism over the past century has spread itself along a continuum between two poles. At the one pole, eclectic general knowledge provides a framework for impressionistic and improvisatory commentary. At the other pole, some established school of thought, in some domain not specifically literary, provides a more systematic vocabulary for the description and analysis of literary texts. The most influential schools have been those that use Marxist social theory, Freudian

psychology, Jungian psychology, phenomenological metaphysics, deconstructive linguistic philosophy, and feminist gender theory. Poststructuralist literary criticism operates through a synthetic vocabulary that integrates deconstructive epistemology, postmodern Freudian analysis (especially that of Lacan), and postmodern Marxism (especially that of Althusser, as mediated by Jameson). Outside of literary study proper, the various source theories of poststructuralism converge most comprehensively in the cultural histories of Michel Foucault, and since the 1980s, Foucauldian cultural critique has been overwhelmingly the dominant conceptual matrix of literary study. Foucault is the patron saint of New Historicism. Post-colonialist criticism is a sub-set of historicist criticism and employs its synthetic vocabulary chiefly for the purpose of contesting Western hegemony. Queer theory is another sub-set of historicist criticism and employs the poststructuralist vocabulary chiefly for the purpose of contesting the normative character of heterosexuality. Most contemporary feminist criticism is conducted within the matrix of Foucauldian cultural critique and dedicates itself to contesting patriarchy—the social and political predominance of males.

Each of the vocabulary sets that have come into prominence in literary criticism has been adopted because it gives access to some significant aspect of the human experience depicted in literature—class conflicts and the material base for imaginative superstructures, the psycho-symbolic dimensions of parent-child relations and the continuing active force of repressed impulses, universal “mythic” images derived from the ancestral experience of the human race, elemental forms in the organization of time, space, and consciousness, the irrepressible conflicts lying dormant within all partial resolutions, or social gender identity. All of these larger frameworks have enabled some insights not readily available through other means. They have nonetheless all been flawed or limited in one crucial respect. None of them has come to terms with the reality of an evolved and adapted human nature.

Humanist critics do not often overtly repudiate the idea of human nature, but they do not typically seek causal explanations in evolutionary theory, either. In the thematic reductions of humanist criticism, characters typically appear as allegorical embodiments of humanist norms—metaphysical, ethical, political, psychological, or aesthetic. In the thematic reductions of postmodern criticism, characters appear as allegorical embodiments of the terms within the source theories that produce the standard postmodern blend—most importantly, deconstruction, feminism, psychoanalysis, and Marxism. In their postmodern form, all these component theories emphasize the exclusively cultural character of

symbolic constructs. “Nature” and “human nature,” in this conception, are themselves cultural artifacts. Because they are supposedly contained and produced by culture, they can exercise no constraining force on culture. Hence Fredric Jameson’s dictum that “postmodernism is what you have when the modernization process is complete and nature is gone for good” (ix). From the postmodern perspective, any appeal to “human nature” would necessarily appear as a delusory reification of a specific cultural formation. By self-consciously distancing itself from the folk understanding of human nature, postmodern criticism loses touch both with biological reality and with the imaginative structures that authors share with their projected audience. In both the biological and folk understanding, there is a world outside the text. From an evolutionary perspective, the human senses and the human mind have access to reality because they have evolved in adaptive relation to a physical and social environment about which the organism urgently needs to acquire information.²⁷ An evolutionary approach shares with the humanist a respect for the common understanding, and it shares with the postmodern a drive to explicit theoretical reduction. From an evolutionary perspective, folk perceptions offer insight into important features of human nature, and evolutionary theory makes it possible to situate those features within broader biological processes that encompass humans and all other living organisms.

6. The Primacy of Psychology in Literary Study

Cultural critique characteristically insists on cultural differences, and the emphasis on specific forms of culture clearly gives access to a major dimension of literary meaning. Humans are adaptively organized to construct cultures and to assimilate cultural information. Through “gene-culture co-evolution,” the development of the capacity for advanced cultural organization has fundamentally altered the human genome.²⁸ Most human interactions are organized within cultural systems, and cultural systems profoundly influence most individual human experience. All experience is, nonetheless, individual. We can postulate collective entities and endow them, metaphorically, with the powers of experience—“the experience of a century,” “the American tradition,” or “the Western mind.” On the literal level—the level at which “experience” correlates with neurological events—all such collective entities instantiate themselves in individual minds. No physical, neurological entity corresponding to a transcendent collective mind—a mind existing outside and independently of individual minds—has ever been identified. Individuals can exist without cultures—individual organisms, and even individual human beings, as in the case of feral children. Cultures cannot exist without

individuals. If all individual human beings became extinct, human culture would cease to exist.

In several obvious and basic ways, the central organizing unit in human experience is the individual human being. Humans are physically discrete. Individual persons are bodies wrapped in skin with nervous systems sending signals to brains that are soaked in blood and encased in bone. Each individual human brain contains a continuous sequence of thoughts, feelings, and memories constituting a distinct personal identity. People engage in collective activities and share experiences, but when an individual person dies, all experience for that person stops. Motivations, actions, and interpretive responses all originate in the neurological events in individual brains. Thoughts, feelings, and memories are lodged in individual brains, and individual persons form the central organizing units in narrative depictions. Authors and readers are individual persons, and characters in fiction are fictive individual persons. Because experience is individual, the analysis of fictional narrative is always, necessarily, psychological analysis. Characters are individual agents with goals. Novelists and playwrights are individual persons who construct intentional meanings about those characters, and readers are individual persons who interpret those meanings. It is not possible to speak of depicted narrative events without at least tacitly identifying agents and goals, and virtually all literary commentary makes at least indirect reference to the intentions of authors and the imputed responses of readers.

Fictive depictions originate in psychological impulses, depict human psychology, and fulfill the psychological needs of readers. In all critical commentary, some form of psychological theory, implicit or explicit, is always at work. Literature itself embodies an intuitive folk psychology at its highest level of articulation, and impressionistic literary commentary draws freely on that collective body of folk psychology. In commenting on literature—on characters, authors, and readers—literary critics often also make explicit appeal to fundamental underlying principles of psychological causation. To engage responsibly in critical psychological analysis, we have no choice but to make appeal to those theories that seem to us most adequate. For evolutionists, the most adequate theories are those best grounded in empirical research, most fully rationalized in established knowledge of human evolutionary history, and most fully integrated with contiguous scientific disciplines. While invoking specific psychological theories, evolutionary literary scholars must also explicitly incorporate some theory about the nature of literature and the way it fits within the larger patterns of human life history.

7. The Adaptive Function of Literature: A Controversy

Arguments on the adaptive function of literature and the other arts have occupied more of the shared attention of evolutionary psychologists and evolutionary literary scholars than any other topic. In *How the Mind Works*, Steven Pinker made a provocative argument that the aesthetic aspects of the arts might not be adaptive at all; they might, he contended, merely be parasitic side effects of cognitive aptitudes that evolved for other functions (524-43; also see *The Blank Slate* 404-20). To illustrate this idea, he drew parallels between art and pornography, psychoactive drugs, and rich foods like cheesecake. In a recent review of *The Literary Animal*, he notes that humanists have argued this point with him endlessly, and he suggests that their arguments are motivated chiefly by a wish to confirm the dignity and prestige of the arts (“Toward” 169-70). Arguments countering Pinker have drawn attention to two aspects of the arts that are characteristic, defining features of adaptations: they are universal in human culture, and capacities for producing and consuming at least rudimentary forms of art develop reliably among all normally developing humans. Theorists also observe that since the arts consume vast amounts of human time and effort, selection would have worked against retaining them if they had no adaptive value. Pinker’s counter to these arguments is to insist on one further feature of an adaptive function: it must display complex functional structure that can plausibly be identified as efficiently solving adaptive problems within ancestral environments. Pinker acknowledges that fictional narratives might have informational content of some utility in providing game-plan scenarios for practical problems that might arise at some point in the future. All the other features of the arts, he suggests, reflect only the human capacity to exploit its evolved dispositions for the purposes of generating pleasure. This sort of pleasure, detached from all practical value for the purposes of survival and reproduction, would be equivalent to the pleasure derived from masturbation.

A second hypothesis from the side of evolutionary psychology, equally provocative in its own way, has been proposed by Geoffrey Miller. Miller argues that all displays of mental power, including those of the arts, might have had no adaptive value but might have served, like the peacock’s tail, as costly signals indicating the general fitness of the person sending the signal. Miller’s hypothesis identifies virtuosity in overcoming technical difficulty as the central defining characteristic of art (281). Since Miller grants that the arts and other forms of mental activity, once they got started, might have been co-opted or “exapted” for adaptively functional purposes, his argument reduces itself to an argument about the original function of the arts. Miller’s wider argument about the origin of all

higher cognitive powers has an obvious and, to my mind, decisive weakness: it requires us to suppose that the enlarged human brain—so costly, so complex and functionally structured, and so obviously useful for so many practical purposes in life—evolved primarily as a useless ornament for the purposes of sexual display. Virtually all commentators would acknowledge that human mental abilities can be used for sexual display, as can almost any other characteristic. We use bodily powers, clothing, and housing for sexual display, but we do not suppose that physical strength, clothing, and shelter have no primary functions subserving the needs of survival and the forms of reproduction not associated with display. Acknowledging that adaptively useful capacities can be deployed in a secondary way for the purposes of sexual display tells us nothing about any specific adaptive function those capacities might have.

Even if we overlook the weakness in Miller's broader hypothesis about the adaptive utility of the higher cognitive powers, his hypothesis about the arts says so little about the qualities and features that are specific to art that it has little explanatory value. Pinker's hypothesis is more challenging. He might be right that humanists object to his arguments at least in part because those arguments seem to diminish the dignity of the arts, but I think many of these objections come from a deeper and more serious level—from a feeling that Pinker's hypothesis, like Miller's, fails to give an adequate account of his subject. Those who have sought to counter Pinker's hypothesis have a strong personal sense of what art and literature mean for them, and they have an intuitive conviction that their own experience of the arts cannot adequately be reduced to didactic lessons and pleasurable fantasy.

Evolutionists in the humanities have identified various adaptive functions they think the arts might fulfill. Ellen Dissanayake argues that the arts exploit cognitive preferences to focus attention on adaptively salient features of life. Brian Boyd argues that "an explanation of art and fiction in terms of shared attention can account for both origin and function" ("Evolutionary" 170), and he further appeals to the power of art in stimulating general creativity. He defines art as "behaviors that focus not on the immediate needs of the here and now but on directing attention and engaging emotion for its own sake, even toward distant realities and new possibilities" ("Evolutionary Theories" 152). Both Dissanayake and Boyd, along with other writers, emphasize the idea that the arts subserve the purposes of social cohesion.²⁹ Drawing on work in cognitive developmental psychology, Boyd delineates several cognitive and behavioral components that enter into the production and consumption of art: enhanced pattern recognition, pretend play,

shared attention, heightened sociality, social attunement, narrative, fiction, Theory of Mind, and metarepresentation (the awareness of representation as representation). Explaining the way such components converge for the specific purposes of artistic activity provides an answer to half of Pinker's challenge. Producing and consuming art necessarily engages complex structures in the mind. Some of these structures, like those involved in fictional narrative and the production of aesthetically modulated verbal design, are particular to literary art, not merely instances of some more general adaptive mechanism. The other half of the answer to Pinker's challenge is to identify the adaptive problem these complex structures are designed to solve.

The idea that art enhances creativity in general seems problematic. If creativity were the adaptive target, generating cognitive novelty in technology would serve as well as art, would feed off of basic mechanical aptitudes, which activate their own forms of pleasure, would provide a medium of shared attention, and would have more obvious immediate utility. Moreover, art as a means of stimulating innovation in general is too roundabout; there are too many aspects of art that are not necessary to creativity and that, if creativity were the adaptive target, would have to be regarded as adventitious to the central adaptive function of the arts. (Dissanayake, concentrating on traditional tribal cultures, does not treat of creativity as essential to artistic production.) The idea of art as a source of information or of exemplary lessons in conduct has some merit, but information can be delivered in other ways more efficiently, and didacticism, like novelty, leaves out too much of what is peculiar and specific to art, while also excluding too many instances of art that could not plausibly be described as didactic. The idea that art can be used to enhance social cohesion has obvious merit, since one can readily envision many instances of art being used to communicate shared cultural values—from church rituals to communal song and dance to literary traditions. But it is of course also the case that art can be used to subvert social norms and to assert anarchic individuality. (Spolsky, following a trend in postmodern ideology, emphasizes the cognitively subversive idea of art, and that idea accords well enough also with the notions of play and creativity to which Boyd gives a particular emphasis.)³⁰

To solve the puzzle of adaptive function, we have to satisfy three criteria: (a) define art in a way that identifies what is peculiar and essential to it—thus isolating the behavioral disposition in question; (b) identify the adaptive problem this behavioral disposition would have solved in ancestral environments; and (c) identify design features that would efficiently have mediated this solution. Various

writers have formulated propositions that collectively meet these three challenges. We can define art as the disposition for creating artifacts that are emotionally charged and aesthetically shaped in such a way that they evoke or depict subjective, qualitative sensations, images, or ideas. Literature, specifically, produces subjectively modulated images of the world and of our experience in the world. The disposition for creating such images would have solved an adaptive problem that, like art itself, is unique for the human species: organizing motivational systems disconnected from the immediate promptings of instinct. The design features that mediate this adaptive function are the capacities for producing artistic constructs such as narrative and verse and emotionally modulated musical and visual patterns.

The core element in this hypothesis—the adaptive problem art is designed to solve—is formulated most clearly by E. O. Wilson in *Consilience*. Wilson directly poses the question also posed by Pinker:

If the arts are steered by inborn rules of mental development, they are end products not just of conventional history but also of genetic evolution. The question remains: Were the genetic guides mere byproducts—epiphenomena—of that evolution, or were they adaptations that directly improved survival and reproduction? And if adaptations, what exactly were the advantages conferred? (224)

Wilson's answer to this question draws a decisive cognitive line between the mental powers of humans and other animals. Other animals are "instinct-driven" (225). Humans are not. "The most distinctive qualities of the human species are extremely high intelligence, language, culture, and reliance on long-term contracts" (224). The adaptive value of high intelligence is that it provides the means for behavioral flexibility, for dealing with contingent circumstances and hypothetical situations. That behavioral flexibility has made of the human species the most successful alpha predator of all time, but achieving dominance in this way has come with a cost. Wilson speaks of the "psychological exile" of the species (224-25). The proliferation of possibilities in "mental scenarios" detached from instinct produces a potential chaos in organizing motives and regulating behavior. The arts produce images of the world and of our experience in the world. Those images mediate our behavior and the elemental passions that derive from human life history. The arts are thus an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence.

We live in the imagination. No action or event is, for humans, ever just itself. It is always a component in mental representations of the natural and social order, extending over time. All our actions take place within imaginative structures that

include our vision of the world and our place in the world—our internal conflicts and concerns, our relations to other people, our relations to nature, and our relations to whatever spiritual forces we imagine might exist. We locate our sense of our selves and our actions within imaginative structures that derive from our myths and artistic traditions, from the stories we tell, the songs we sing, and the visual images that animate our minds and cultivate our perceptions. We do not have the option of living outside our own imaginative constructs. “Meaning” for us is always part of some imaginative structure, and art works constantly at forming and reforming those structures. Used in this way, the word “meaning” does not of course signify only didactic lessons and thematic patterns. Meaning in art works through imaginative effects—through emotional and aesthetic impact—as much as through mimetic content or thematic abstraction. In literature, it works through representations, through emotionally charged images of ourselves, our cultural identities, and the forces of nature.

The contrast between Wilson’s and Pinker’s hypotheses on the arts involves a basic difference in the way they envision human cognitive evolution. Pinker comes to evolutionary psychology not through sociobiology but through cognitive science. In this version of evolutionary psychology, the governing conception of the mind is computational, and the governing metaphor for the mind is that of the computer. In Pinker’s vision of human cognitive evolution, humans faced certain adaptive problems involving survival and reproduction. All the basic problems were practical problems. The mind was geared to solve those problems in optimally efficient ways in a relatively stable hunter-gatherer ecology—the “environment of evolutionary adaptedness,” or EEA. Sociality and language were part of the human adaptive repertory. Imaginative culture was not. Imaginative culture, whenever it appeared in human evolution, was just added on as a parasitic by-product of the cognitive/behavioral mechanisms that solved practical problems. In Wilson’s vision, in contrast, the expanding human brain permitted “flexibility of response and the creation of mental scenarios that reached to distant places and far into the future” (225). The capacity for producing emotionally charged imaginative artifacts developed in tandem with the capacity for producing an imaginative virtual world. This alternative vision of human cognitive history is vividly evoked by the cognitive neuroscientists Panksepp and Panksepp:

What those vast cerebral expansions that emerged during the Pleistocene probably provided was a vast symbolic capacity that enabled foresight, hindsight, and the brain-power to peer into other minds and to entertain alternate courses of action, thereby allowing humans to create the cultures that dominate our modern world. . . .

What makes humans unique, perhaps more than anything else, is that we are a linguistically adept story-telling species. That is why so many different forms of mythology have captivated our cultural imaginations since the dawn of recorded history. (126-27)

In the early phases of evolutionary psychology, as a specific school within evolutionary social science, theorists seeking to counter the concept of the mind as a “blank slate” committed themselves to the idea of “massive modularity,” the idea that the mind operates almost exclusively through dedicated bits of neural machinery designed to solve specific adaptive problems in an ecologically stable ancestral environment. Cognitive modules—the neural machinery dedicated to sight, for example—are characterized by automaticity and efficiency. The idea of massive modularity thus carried within itself a general sense of humans as adaptation-executing automata. The idea of massive modularity over-generalizes from the most hard-wired components of the brain. It is a massive oversimplification of human cognitive architecture, and it is already fading into the archives of intellectual history. Its residual influence makes itself felt, though, in the ongoing debate over the adaptive function of imaginative culture. Theorists swayed half-consciously by the vision of massive modularity would have an understandable difficulty in making sense of that “vast symbolic capacity” that so signally distinguishes the human species.³¹

By satisfying the three criteria stipulated previously—isolating art, identifying an adaptive problem art would have solved, and identifying features of art that mediate the solution—we still would not, of course, have proved that this particular adaptationist hypothesis is correct. We would only have established that it could be regarded as a reasonable working hypothesis. Developing the hypothesis would involve the same kind of reasoning and evidence that enter into all other adaptive hypotheses—research into human evolutionary history, developmental cognitive psychology, and the analysis of “mechanism” at the level both of neurophysiology and of formal aesthetic structure. (The governing schema for these categories of evidence is that of Tinbergen’s classic formulation of the four parts of an “ethological” analysis—phylogeny, ontogeny, mechanism, and adaptive function.)³² The hypothesis would gain in strength in the degree to which it could be used to link causal chains extending across diverse fields of inquiry—for instance, cross-cultural anthropology, developmental psychology, social psychology, cognitive neuroscience, linguistics, literary study, film studies, and research into the visual and aural arts.

Like other adaptationist hypotheses, Wilson's hypothesis about the adaptive function of the arts could be falsified. With respect to literature in particular, if one could demonstrate that dispositions to produce and consume imaginative verbal artifacts are not universal and reliably developing, that they have no characteristic formal properties corresponding to specific cognitive structures, or that they have no effects on adaptively significant behavior (sexual or social), the hypothesis would be falsified. If, through paleoanthropological research, one could demonstrate that the arts, whatever effects they might have in contemporary environments, could not have produced similar effects in ancestral environments, the hypothesis would be cast into a highly problematic light. Even then, though, in order decisively to falsify the hypothesis, one would have to demonstrate that human cognitive evolution had simply stopped at some point in the past, before the arts began to have psychologically and socially significant effects.

Several evolutionists from the humanities and the sciences, have formulated hypotheses on the arts similar to those formulated by Wilson. Peter Swirski follows Wilson in contrasting instinct with the human capacity for considering counterfactual and hypothetical circumstances: "Swift but unswerving, instinctive responses are a maximin bet on the constancy of the environment: maximum efficiency for the minimum of fuss. But where time is not of the essence and environmental stimuli are complex, the mental calculus comes triumphantly into its own" (88). He invokes Wilson's hypothesis that the human mind is adaptively designed to produce "a prodigious and constantly updated library of scenarios" (74), and he argues that "literary scenarios are extensions of adaptive behavior to the human environment, whether bio-physical or socio-cultural in nature" (89). This aspect of Wilson's theory accords with Pinker's idea that literary plots provide game plan models, but Swirski acknowledges that literature also often "transmits a more holistic sense of the world and the individual" (94). Robert Storey suggests something of what is involved in this more holistic sense. He affirms that "the human subject" is "a seeker and maker of meaning first of all" (101). He insists that meaning is emotional and subjective, and he locates the largest organizing forms of meaning in generic structures like those of tragedy and comedy.

Like Storey, Ellen Dissanayake affirms that humans have a species-typical need "for finding and making 'meaning'" (*Art and Intimacy* 74). Like Wilson and Swirski, she contrasts human motivational systems with the much simpler ways in which the behavior of other animals is regulated by automatic processes. She observes that "nonhuman animals are born generally knowing what to do" but that humans "have to learn the rules and schemes that make their world orderly—

comprehensible and manageable” (79). She blends imaginative culture in with other forms of cultural organization, but she attributes to the arts a particularly potent force in shaping cultural values. In her understanding, all the forms of cultural imagination “direct our attention to particularly biologically significant things and help us to know what to think and do about them” (73). Dissanayake locates the prototypical experience of art in the rhythmic and emotionally modulated interactions of mothers and infants. Those interactions are verbal and expressive but not didactic or thematic. In this conception, the springs of art are closer to song and to lyric poetry than to narrative prose.

The kind of “meaning” provided by art can operate entirely without words and virtually without concepts, through images, sounds, and aesthetic patterns alone. For literature or its oral antecedents, though, meaning typically does involve concepts, and it usually also involves the positioning of human subjects within some imagined world. As Terrence Deacon puts it, “We tell stories about our real experiences and invent stories about imagined ones, and we even make use of these stories to organize our lives. In a real sense, we live our lives in this shared virtual world” (22). Thinking along similar lines, John Tooby and Leda Cosmides, seminal theorists in evolutionary psychology, tacitly identify narrative as the central form of art. Tooby and Cosmides explain that they had once themselves regarded the arts as an evolutionary by-product but have become dissatisfied with that explanation. They give several reasons for their dissatisfaction: (a) involvement in fictional, imagined worlds is a human universal; (b) the arts are intrinsically rewarding; (c) fictional worlds engage emotions while detaching the actions that are usually prompted by emotions; and (d) humans have evolved specialized cognitive machinery for participating in imagined worlds (“Does Beauty Build?” 7-9). They conclude, “We think that the human mind is permeated by an additional layer of adaptations that were selected to involve humans in aesthetic experiences and imagined worlds” (11). Affirming a principle that should awaken responsive chords in the minds of humanists, they argue that narrative representations “have a powerfully organizing effect on our neurocognitive adaptations” (21).

Weighing the alternative explanations presented by Pinker and by Tooby and Cosmides, Catherine Salmon and Donald Symons give credence to both and suggest a way that these alternative causal hypotheses can be used in judgments of literary quality:

Written fiction probably contains elements of both engagement of organizing adaptations and of pleasure circuit lock-picking, and different kinds of fiction may contain different

proportions. Perhaps “great” works of fiction are those that most fully engage organizing adaptations, which is why they have survived the tests of time and translation, while “lesser” fiction, including genre romance novels, may primarily pick the locks of the brain’s pleasure circuits. (“Slash Fiction” 95)

Salmon and Symons argue convincingly that Romance novels appeal to female mating fantasies and that pornography appeals to male mating fantasies. Pinker’s concept of the arts as evolutionary by-products accords most closely with genres like romance and pornography that simply activate pleasurable fantasies. It accords least closely with genres like tragedy that engage painful emotions but leave us feeling that we have a deeper and more adequate understanding of the elemental forces in nature.

In several articles, I have invoked Wilson’s hypothesis about the adaptive function of the arts and have sought to describe the way in which the arts produce “cognitive order.” For instance, in “The Human Revolution and the Adaptive Function of Literature,” I argue,

Modern humans cannot choose not to live in and through their own imaginative structures. The world presents itself to them not merely as a series of stimuli releasing stereotyped responses but as contingent circumstances containing complex causal processes and intentional states in other minds. . . . Action within that world takes on a definite value and meaning only within some given imaginative structure—some order of symbols vividly present to the imagination. (41)³³

In such formulations, the word “order” connotes no necessity of harmonious resolution. Dissonance, both formal and substantive, can be an integral and necessary part of any imaginative construct. An imaginative construct evokes or depicts the underlying order of human experience, and that experience is by its very nature fraught with conflict. Not all conflict is resolved, either in life or in art. The sense of satisfaction and of aesthetic pleasure that we experience at the conclusion of *Oedipus Rex*, *Antigone*, *Hamlet*, or *King Lear* has almost nothing to do with pleasurable fantasy. It has a great deal to do with what, in a different explanatory context, Freud calls “the reality principle,” the feeling that we have come to grips with reality (462-63). The quality of pleasure in this sensation is almost opposite to the quality of pleasurable fantasy, which depends on an escape from limiting conditions in reality.

If the hypothesis formulated by Wilson is correct, the arts fulfill a vital adaptive function. They fashion an imaginative universe in which the forces at work in the environment and inside the mind are brought into emotionally meaningful relations to one another. That is not the same thing as providing practically useful information or an objectively accurate map of the external

environment. An emotionally meaningful cognitive map provides points of reference within which humans adjust their sense of the relative value and significance of things. In their adaptively functional aspect, literature and the other arts would serve as devices of behavioral orientation. On the basis of what we can observe in all known cultures, the arts enter profoundly into normal childhood development, mediate the relations between individuals and their culture, and help orient individuals to the whole larger world in which they live.³⁴

By localizing the neurological character of specifically aesthetic responses, cognitive neuroscience could provide an important test of Wilson's hypothesis. If the arts have a vital adaptive function in their own right, literature and the other arts would be motivated as emotionally driven needs. The need to produce and consume imaginative artifacts would be as real and distinct a need as hunger, sex, or social interaction. Like all such needs, it would bear within itself, as its motivating mechanism, the impetus of desire and the pleasure and satisfaction that attend upon the fulfilling of desire. That kind of fulfillment would not be a parasitic by-product of some other form of pleasure, nor merely a means for fulfilling some other kind of need—sexual, social, or practical. Like all forms of human fulfillment, the need for art could be integrated with other needs in any number of ways. It could be used for sexual display or the gratifications of sexual hunger or social vanity, and it could be used as a medium for social bonding, but it would nonetheless be, in itself, a primary and irreducible human need. If it is the case, as I think it is, that all mental events correspond to specific neurological activity, it should be possible to identify specifically aesthetic forms of neurological activity.

8. Reduction and the Problem of Generating New Knowledge

In literary criticism, the word “reductive” is typically used with a pejorative connotation, the idea that a reading strips out essential features in a text or falsely conflates too many features with some one feature wrongly invested with elemental significance. To be “reductive” is to have failed in subtlety and justness. And yet, “reduction” is the ultimate aim in all efforts at producing real knowledge. We seek to reduce the multiplicity of surface phenomena to underlying regularities. We presuppose that some form of conceptual or causal hierarchy is built into the very nature of our subject, whether that subject is some aspect of the natural world or a literary text. Even the most rudimentary form of literary commentary—analytic summary or paraphrase—constitutes an exercise in reduction. As I already argued, both traditional humanists and poststructuralists have their own typical forms of reduction. In this respect, the Darwinists do not

differ from critics in other schools. They differ only in the terms to which they seek to reduce texts.

Can the Darwinists produce new knowledge? That challenge is the most serious challenge that has been posed to the evolutionary literary critics.³⁵ The Darwinists would themselves add a further challenge alien to the relativist mindset of their poststructuralist critics. Can the Darwinists produce formulations that are not only new but true? In one respect, the Darwinists start at what, from a poststructuralist perspective, might seem a disadvantage. If they believe that texts embody a folk understanding of human nature and that texts are communicative constructs, they must also suppose that most texts are understood reasonably well at the level of common language and common knowledge. They have no pre-fabricated sign systems, like those of Lacan or the Althusserian Marxists, into which they are prepared to translate the common-language content of a text. Are they then reduced to ordinary analytic summary, but without consoling recourse to the idealizing sentiments of the humanists?

Producing new knowledge—real knowledge, knowledge that is consilient with the broader world of empirical research—is difficult in literary study, as it is in other fields, but it is not impossible. The Darwinists can aim at extending, refining, correcting and contextualizing the common understanding. On the level of interpretive criticism, they can situate any given text or set of texts in relation to the pressure points in human nature. They can identify the biological forces that are invoked or repressed in any given work and can assess how those forces impinge on meaning. That interpretive effort opens a new range of aesthetic sensations and a new range of comparative analysis for the Darwinian critics. The governing terms in an evolutionary critique are not metaphysical abstractions, mid-level social and psychological concepts, or formalist principles. The governing terms are the urgent needs and driving forces in life—survival, reproduction, kinship, social affiliation, dominance, aggression, and the needs of the imagination. Physical realities and the rhythms of the life cycle shape the analytic categories through which Darwinians make sense of literary depictions. The governing terms in human life history are a matrix for other terms that are analytically neutral but resonant with elemental power and pregnant with qualitative differences. The shape of human life history is a basic reality shared by all authors and readers. Differences in the way any given author envisions that life history are essential to the imaginative qualities that distinguish the author, and those differences enter minutely into the subtlest nuances of tone, style, and formal organization. An evolutionary perspective can thus provide a comprehensive framework for comparing the perspectives of

authors, the organization of meaning in texts, and the responses of readers. Moreover, like critics from other schools, literary Darwinists have a scholarly responsibility to adjudicate differences in the critical tradition, with all its local agendas and cultural conditioning. They also have an obligation to situate texts and critical histories in the broader context of evolutionary social science, connecting local critical perceptions with general principles of literary theory, and integrating those principles with principles of psychology, linguistics, and anthropology. They have an opportunity to synthesize ideas and insights from diverse fields, and those integrations can often lead to new concepts. Those new concepts, in turn, should provide the instruments for new critical insights into familiar texts.

To give some instances. Few if any literary works have been more discussed than those of Homer and Shakespeare, and yet the Darwinists have devoted a good deal of attention to both. By locating the *Iliad* within the context of modern sociobiological theory, Gottschall assimilates previous explanations of Homeric conflict within a single, unified causal structure. That unified explanation is intrinsically satisfying, and it also brilliantly illuminates the imaginative qualities of the poem. As Gottschall observes, concentrating on the struggle for women among Homer's barbarian warriors "helps to explain more about Homeric society than its relentless violence; it also sheds light on the origins of a tragic and pessimistic worldview, a pantheon of gods deranged by petty vanities, and a people's resignation to the pitiless dictates of fate" (from the introduction). Robert Storey and Michelle Scalise Sugiyama both discuss reader responses to *Hamlet* among a Nigerian tribal population, thus illuminating both the universal features of the text that are available across divergent cultures and the interpretive limitations in a culturally circumscribed critical perspective.³⁶ Daniel Nettle is both an evolutionary psychologist and a professional Shakespearean actor. Commenting on *Hamlet* and several other plays of Shakespeare, he correlates the generic structure of comedy and tragedy with elemental motives of status-seeking and mate selection.³⁷ This effort in strong reduction moves in a direction opposite to that of Brian Boyd, who uses *Hamlet*, *The Odyssey*, *Lolita*, and other texts to demonstrate the "expansiveness" of readings that can incorporate a diversity of cognitive mechanisms and evolutionary themes. In discussing Dr. Seuss's *Horton Hears a Who*, Boyd triangulates the story with appeals to highly particularized local cultural history (post-war Japan), developmental cognitive psychology, and universal human motives. In his commentary on the comics artist Spiegelman, Boyd brings his analytic repertory to bear on the cognitive strategies of avant garde art.³⁸ One of the showpieces of evolutionary anthropology is a decisive

demonstration that Freudian Oedipal theory is quite simply mistaken.³⁹ In “New Science, Old Myth: An Evolutionary Critique of the Oedipal Paradigm,” Scalise Sugiyama removes Sophocles’ play from the distorting context of Freudian Oedipal theory and locates it within the more illuminating context of evolutionary findings on incest avoidance. Making use of the same body of research, Nancy Easterlin examines feminist psychoanalytic accounts of Wordsworth’s autobiographical poetry (“Psychoanalysis”). By invoking John Bowlby’s ethological research into attachment between mothers and infants, she produces a more cogent and adequate account of her subject. (In “From Lacan To Darwin,” Dylan Evans describes his own gradual disenchantment with Lacanian psychology.) Focusing on Sir Walter Scott’s *Ivanhoe*, Ian Jobling explains how principles derived from evolutionary psychology can deepen our understanding of common critical observations. He gives evidence that critics have commonly observed a split between “dark” and “light” heroes in Scott’s novels, and he argues that such observations have remained merely descriptive.

All literary criticism relies on assumptions about human nature, but *these assumptions have never been clarified or justified*. Indeed, in the cultural determinist atmosphere that prevails in contemporary literary criticism, it is taboo even to make reference to “human nature.” This absence of a theory of human nature in literary criticism is one of its major weaknesses. (31)

Brett Cooke’s appeal to basic features of human nature proves effective as a thematic grid for organizing the whole field of utopian and dystopian literature. In her reading of Edith Wharton’s novel *The Children*, Judith Saunders uses a sociobiological account of human life history to examine social configurations arising from the disruption of normal childhood development in the milieu of Jazz Age hedonism, thus usefully connecting human universals with local cultural history.

In my own essay on Oscar Wilde’s *The Picture of Dorian Gray*, I bring together various strands of criticism—the autobiographical and psychodramatic elements, the influence of Pater’s aestheticism, the submerged homoeroticism of the text, and the Christian themes. I draw on recent studies in queer theory but locate them within a broader theoretical context derived in part from Darwin’s own theory of the evolved moral dispositions of human nature and in part from Donald Symons’ evolutionary researches into the psychological character of homoerotic sexual relations. I have also used evolutionary psychology for comparing levels of integration between human nature, cultural order, and individual identity in five novels (*Literary Darwinism* 129-45); and I have articulated principles of literary

evaluation from an evolutionary perspective in relation to novels depicting Paleolithic life (163-85). In a reading of *Pride and Prejudice*, I integrate elements from life-history theory with an analysis of interplay in point of view among characters, authors, and readers (206-16). In the empirical study *Graphing Jane Austen*, I co-author an interpretive critique of Hardy's *Mayor of Casterbridge* in which we offer a fundamental interpretive revision of the critical tradition on that novel. We also use quantitative methods to delineate features of tone and gender across all of Austen's novels. We demonstrate that the common idiom of literary commentary can be effectively reduced to a structured set of categories lodged within a theoretically grounded model of human nature and of literature, and we maintain that by analyzing the relations among specific individual findings, we have discovered patterns of meaning that are not readily apparent when each finding is observed in isolation.

For the past three decades, crucial elements of the common understanding have been ruled out of play in poststructuralist discourse—mimetic referentiality, human nature, and the individual human “subject” as an originating source.⁴⁰ If evolutionary literary study did nothing more than clear away these distorting theoretical impedimenta, returning criticism to a ground of common understanding from which critics would still be required to generate new knowledge through scholarly research, they would have performed a valuable service. At the present time, producing a firm empirical foundation for elementary concepts that are integral with the literary tradition has a distinct value in its own right. Any scholar can benefit from having a solid basis on which to dispute false psychology, false epistemology, and inadequate social theories. But the Darwinians need not rest content with this merely negative merit. The examples I have cited here should be sufficient to indicate that an evolutionary perspective can meet the challenge of generating literary knowledge that is both new and valuable.

9. The Question of Empirical Methodology

Assessing the prospects for cognitive literary study, Tony Jackson points to an asymmetry in the relations between an empirical theory and its interpretive applications in literary study: “An application of that theory to literature may well change something of our understanding of literature, but it is difficult to see how the interpretive practice can possibly change the theory” (“Issues and Problems” 177). Even if the theory produces illuminating insights into texts, the absence of a reciprocal influence on the theory must be felt as a source of frustration for scholars who use the theory. As Jackson rightly observes, “a truly dialectical relationship

between theory, method, and practice seems to provide a basic intellectual appeal to the majority of scholars” (178). Most literary scholars have no training in quantitative methods, little or no understanding of statistics, and no sense of how to contrive an experimental design aimed at falsifying a hypothesis. How then are they to respond to the problem of the asymmetry identified by Jackson?

As a defensive measure, it is always possible to deny that literary scholars have any need for empirical knowledge. Eugene Goodheart takes this tack. Like many humanists, Goodheart is an epistemological and metaphysical dualist. He believes that the sciences deal with regularities in the physical world, and the humanities deal with qualitatively unique individual texts (23). In practice, of course, no literary scholar concerns himself only with the qualitatively unique. All literary scholars make appeal, in however occasional or opportunistic a fashion, to regularities of human nature and of cultural tradition. Goodheart hedges his claims by arguing that literature is not exclusively but only *primarily* interested in the qualitatively unique (20), but in celebrating the spiritual power of humanistic experience, Goodheart himself makes appeal to archetypal motifs of spiritual redemption—that is, to regularities of literary figuration grounded in regularities of human psychology (37). Much serious traditional scholarship concerns itself not with special cases but with regularities in the literary tradition. Goodheart’s appeal to archetypal patterns is extended on a monumental scale in Northrop Frye’s *Anatomy of Criticism*. M. H. Abrams’ *The Mirror and the Lamp* invokes heavy symbolic reductions to organize vast tracts of literary history. Ian Watt’s *The Rise of the Novel* articulates major trends in the development of narrative and formulates fundamental principles of realist representation. Such a list could be extended almost indefinitely. The point should be clear. Trying to isolate literary study from psychological and historical generalizations is a sophisticated maneuver that will not stand against the simplest appeal to factual evidence.

Literary critics cannot do without appeal to regularities of human psychology. Need they then be wholly dependent on the productions of adjacent fields? That depends on their own initiative. A substantial number of literary scholars have made some efforts to incorporate empirical methods from the social sciences.⁴¹ A smaller number have made efforts to adopt empirical methods and also to locate those methods within the field of Darwinian social science. As mentioned in a previous section, Jonathan Gottschall has successfully used word searches to study cross-cultural depictions in folk and fairy tales (*Literature*). Kruger, Fisher, and Jobling have used depictions of male characters in Byron and Scott to test whether contemporary readers respond to contrasting male mating strategies in predictable

ways. Salmon and Symons have used empirical methods in examining romance and pornography. Stiller and others have used empirical methods in assessing group size and social links in plays and soap operas.⁴² Miall and Dissanayake have done an empirical prosodic analysis of mother-infant interaction. In *Graphing Jane Austen*, Gottschall, Johnson, Kruger and I have used a model of human nature to examine characterization and reader response in numerous characters from dozens of novels. In the conclusion to this book, we explain the significance we think this kind of research has for both literary study and evolutionary social science:

Research that uses a purely discursive methodology for adaptationist literary study remains passively dependent on the knowledge generated within an adjacent field, and it does not contribute in any very substantial way to that primary source of knowledge. The methodological barrier that separates discursive literary study from the adaptationist program in the social sciences limits the scope and significance both of literary study and of adaptationist social science. The production and consumption of literature is a large and vitally important part of our specifically human nature. An artificial barrier that leaves adaptationist literary scholars in the stance of passive consumers of knowledge also leaves adaptationist social scientists cut off from any primary understanding of one of the most important and revealing aspects of human nature. Literature and its oral antecedents derive from a uniquely human, species-typical disposition for producing and consuming imaginative verbal constructs. Removing the methodological barrier between humanistic expertise and the expertise of the social sciences can produce results valuable to both fields.

(from the conclusion to the book)

In *Graphing Jane Austen*, we make specific predictions and test specific hypotheses, but some of the most important conclusions we reached were surprising to us. These conclusions have broad general implications and constitute new knowledge—not just empirically confirmed formulations of commonly received and accepted ideas. (Our focal point was “agonistic structure” or the nature and organization of protagonists, antagonists, and minor characters in the novels.) We analyze our findings by reference to sources in evolutionary social psychology, research into personality, and the theory of basic emotions. We draw on concepts in both psychology and literary theory, and we regard our findings as contributions both to literary knowledge and to evolutionary psychology.⁴³

This whole area of research is less well developed than areas that depend on purely discursive techniques of theoretical formulation and literary interpretation. The capital costs in gaining appropriate expertise are steep—steep for literary scholars, who would have to gain some familiarity with empirical methods, and steep also for psychologists and anthropologists, who would need to assimilate concepts and modes of thinking characteristic of the humanities and appropriate to

them. The costs are steep, but the benefits are potentially very large. The chief obstructions are not intrinsic but institutional. Given a few programs in which such work was encouraged, and in which the appropriate interdisciplinary training for graduate students was put into place, it is quite certain that ambitious young scholars, suitably geared in aptitude and interest, would quickly find ways to extend and develop the few pioneering efforts that have been made so far. The purely discursive study of science and literature, from largely culturalist and Foucauldian perspectives, has been a growth industry for nearly two decades. That approach to interdisciplinary study gives predominating place to an ideologically charged rhetorical analysis of science. It is surely now time for both literary scholars and scientists to explore the possibilities of a different form of interdisciplinary study, a form that gives a predominating place to scientific method and the scientific ethos. (One such program is already in place, the evolutionary studies program originated by D. S. Wilson at SUNY Binghamton.)⁴⁴

10. Conclusion: The Future

Who knows? Perhaps in ten or twenty years, looking back, cultural historians will be denying that the humanities and the evolutionary social sciences were ever in any way at odds with one another. The integration of historical scholarship with a knowledge of human universals will have become standard equipment in literary study. Humanistic expertise in manipulating cultural figurations will have flowed into a smooth and harmonious stream with Darwinian findings on the elemental features of human nature. Humanistic sensitivity to the fine shades of tone and style in literary works will have blended seamlessly with a rigorous empirical analysis of cognitive mechanisms, and a facility in writing elegantly nuanced prose will mingle happily with the severe logic of a quantitative methodology. Scholars and scientists occupied with literary study will balance with easy grace between the impersonal, objective scrutiny of science and a passionate humanistic responsiveness. All of this is possible, and it is worth working toward. Any of it that we can realize will be a gain for ourselves and a contribution to the sum of human understanding.

Responses

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Art as Adaptation: A Challenge

Joseph Carroll knows literary Darwinism not only through breaking in the field but also from helping so many newcomers over the fence, myself included. I agree with almost everything he writes in the bulk of the article, but since we learn more from disagreement, I will take issue with one section, The Adaptive Function of Literature. Carroll's account of my own proposal seems to me inaccurate, and his own proposal seriously wanting.

I have proposed that art is a human adaptation deriving from play, a widespread animal behavior.⁴⁵ Play evolved through the advantages of flexibility, of behavior not fully programmed genetically; the amount of play in a species correlates with its flexibility of action. Behaviors like escape and pursuit, attack and defense and social give-and-take can make life-or-death differences. Creatures with more motivation to practice such behaviors in situations of low urgency on average fare better at moments of high urgency. Animals that play repeatedly and exuberantly hone skills, widen repertoires and sharpen sensitivities. Play therefore has evolved to be highly self-rewarding. Because it is compulsive, animals engage in it again and again, incrementally altering muscle tone and neural wiring, strengthening and speeding up synaptic pathways, improving their capacity and performance.

Humans uniquely inhabit "the cognitive niche" (Tooby and De Vore). We therefore have an appetite for information, and especially for pattern, information that falls into meaningful arrays that allow rich inferences. Like other species, humans can assimilate information through the rapid processing that specialized pattern recognition allows, but unlike other species we also seek, shape and share information in open-ended ways. We actively pursue the patterns that make data swiftly intelligible, especially those yielding the richest inferences in our core information systems, the senses of sight and sound, and our most crucial domain, social information.

Art is a kind of cognitive play with pattern. Just as play refines behavioral options over time by being self-rewarding, so art serves as a playground in which

the mind increases cognitive skills, repertoires and sensitivities. Like play, art succeeds by engaging and rewarding attention, since the more focused our attention and the more frequent and intense our response the more powerful the neural consequences.⁴⁶ Art's appeal to our preferences for pattern means that we expose ourselves to high concentrations of humanly appropriate information eagerly enough so that over time we strengthen the neural pathways that process key patterns in open-ended ways.

Other functions follow from this. Individuals who can earn the attention of others through art gain in status. Emotional attunement in cognitively appealing forms improves social cohesion, as does the creation of engaging prosocial models. Fiction can create scenarios for reasoning about action in ways that earn attention, emotion and recall. Art can be appropriated by religion, to intensify traditions and social commitments, but it can also foster creativity, especially in large communities with high specialization of labor. Carroll critiques creativity as if it were the prime function I propose for art, when in my account it comes in fifth, and explicitly only because the other functions are already in place.

I find it hard to understand Carroll's proposal, so let me quote what I take to be his core claims: art

organiz[es] motivational systems disconnected from the immediate promptings of instinct. . . . The proliferation of possibilities in 'mental scenarios' detached from instinct produces a potential chaos in organizing motives and regulating behavior. The arts produce images of the world and of our experience of the world. Those images mediate our behavior and the elemental passions that derive from human life history.

Carroll rests much of his case on an appeal to the authority of E. O. Wilson, but Wilson—whom I admire on this side idolatry—offers little evidence for his claims.

Carroll rightly approves Tinbergen's famous four questions about any adaptation: where does it come from? (phylogeny); how does it develop? (ontogeny); what is it for? (ultimate function); how does it work? (mechanism or proximate function). Let us apply these criteria to his cognitive order proposal and my cognitive play proposal.

Phylogeny: Following Wilson, Carroll proposes a sharp discontinuity between the "instinct-driven" behavior of other animals and the human "proliferation of possibilities in 'mental scenarios' detached from instinct." Modern ethologists who focus on animal cognition argue with much convincing evidence for deliberate, reflective strategizing in chimpanzees, orangutans, dogs, wolves, dolphins, and corvids. Chimpanzees have been found to outdo humans on at least one evolutionarily novel cognitive task.⁴⁷ We and capuchin monkeys alike

have a visceral sense of fairness: we will choose to reject an offer, even at our own expense, if we deem it unfairly divided. Is this only instinct for a capuchin but something more for us?

For the purpose of this argument at least, Carroll stresses only human exceptionalism, a sharp phylogenetic break, a rise above instinct into a massive mental proliferation of scenarios of possible action. He provides no evidence to show that humans regularly decide to act by selecting from “a prodigious and constantly updated library of scenarios” (Swirski 74, building on Wilson, cited by Carroll). We can indeed concoct scenarios but rarely have the time to fashion them in detail on the fly and test the network of forking if/then outcomes. We produce scenarios only serially, and therefore slowly, in the highly constricted space of working memory. It takes time to develop them, time we rarely have in the heat of the moment. Elsewhere, Carroll rightly praises literature as a major repository of human self-knowledge. Odysseus, the most intelligent of Greek heroes, stops himself in Polyphemos’s cave because he can run one scenario forward and see that *if* he kills Polyphemos *then* they will all be trapped behind the boulder only the Cyclops can move. It takes even Odysseus hours to work out *one* other scenario that he indeed executes successfully. Homer has it right: human minds can inhibit automatic reactions better than other animals through the enlarged prefrontal cortex (for inhibition, specifically, especially the orbitofrontal cortex), but they cannot generate and evaluate under pressure a large number of scenarios involving ramifying if-then calculations. Our minds can form options, when allowed time, but these options remain simple and even one we may choose to follow tends to become irrelevant as other parties react unpredictably.

A sharp phylogenetic break between action driven by instinct and action chosen through the production and selection of options from a Borgesian library of possibilities seems contrary to the evidence of both ethology and cognitive neuroscience. But because Carroll supposes such a break, he also proposes, with Wilson, “a potential chaos in organizing motives and regulating behavior.” Art, which he claims exists to solve this alleged and evolutionarily unprecedented problem, therefore has no evolutionary precursors. Bird and whalesong, with their dialects and fashions, elaborate gibbon duetting, the creation of visual displays by bowerbirds, dolphins or chimpanzees: these are automatically excluded from any prospect of continuity with human art.

The cognitive play proposal by contrast derives art from play, already self-motivating across many animal classes and perhaps universal in mammals; from our intense curiosity (an attribute developing among the higher primates), and the

intense appetite we have for rich and therefore patterned information; and from the unique human pressure for social attunement⁴⁸ (another attribute developing along the primate line), especially between parent and child, and leading therefore, to the patterned play of protoconversation as a start for art.⁴⁹

Ontogeny: Carroll refers to Dissanayake on protoconversation, and to Tooby and Cosmides's "Does Beauty Build . . .," although not to their stress there on childhood, but he seems to have little interest in the individual development of art. The potential chaos in "organizing motives and regulating behavior" that comes from a proliferation of scenarios seems to be a problem he envisages adults facing and needing art to solve.

The cognitive play proposal by contrast stresses the development of art in the individual, since we can see emerging capacities there in detail and through experiment in ways we cannot in the phylogenetic record. With Dissanayake, I see protoconversation, with its play with rhythmic, harmonic, melodic and kinetic patterns, as an important evolved scaffolding for the further elaboration of pattern that infants engage in as they learn to sing, dance, draw or shape and especially as they engage in pretend play. Infant behavior seems not to arise out of a need to cope with over-proliferating scenarios. Rather, pretend play amplifies their capacity to generate scenarios, but scenarios that engage attention through unusual characters and actions—a duck confronting a dinosaur, dragons poo-pooing on rooftops until the houses collapse. Children learn to fashion short, simple, vivid scenarios first in action, with the physical props at hand, including each other, and then without action props but with the cultural props of received story elements like dragons and fairies. But the evidence of childhood storymaking suggests it has much more to do with play and engaging intense attention than with constructing scenarios for non-play action.

Function: The cognitive order proposal sees the function of art as compensating for a hypothesized motivational disorganization arising from a hypothesized over-proliferation of mental scenarios, for neither of which independent evidence is offered. Even supposing art did have this function, how would it work? Carroll suggests that the images of art "mediate our behavior and the elemental passions that derive from human life history." "Mediate" could hardly be more vague. How does the invention of the piccolo or of a new pigment like ultramarine "mediate" our behavior, control (if it does) our over-proliferation of scenarios, organize our motivation? I can see how either would attract attention and therefore invite engagement with the art in which it features, in a world where

habituation threatens any mere repetition of stimuli, but I cannot understand how a piccolo or a pigment might “mediate” our alleged motivational disorganization.

My cognitive play hypothesis proposes a series of functions, beginning with the core function of strengthening neural pathways through the intense repeat engagement that the play of art invites, in the patterns that matter most to us—especially, in story, patterns of agency and action—so that we can more readily produce and especially process patterns in those modes. Evidence of neural growth as a consequence of play in rats is already at hand.⁵⁰ Animals trained or raised in enriched environments increase brain weight “by 5 per cent in the cerebral cortex . . . and up to 9 per cent in areas that the training directly stimulates” compared with genetically identical animals in impoverished environments (Dooidge 43). We cannot experimentally impoverish human children, but the human predisposition for art has ensured for tens of thousands of years that we grow up in especially enriched environments. Since we cannot dissect the brains of human experimental subjects and cannot yet easily investigate single neurons in live human minds, we rely on animal evidence. This shows that training makes discrimination finer, processing faster and signals clearer, provided the animals pay close attention and provided training occurs in increments (Dooidge 67, 155).

Art depends on attention, and its capacity to command attention means that just as with play we are motivated to engage in it again and again. Neuroscience has yet to show the long-term effects of visual art and storytelling on the brain, but in at least one art, music, there is already robust evidence for improved pattern detection in those who have had even some training.⁵¹ In a highly social species inhabiting the cognitive niche, any gain in mental processing in our key modes, especially, in the case of narrative, in interpreting social events and managing multiple representations, offers a competitive advantage. And any gain in the ability to attune one’s feelings to others and to motivate such attunement, in a situation where multilevel selection operates—as it has repeatedly done in human evolution⁵²—offers a competitive advantage against other groups. Think work songs, battle songs, anthems, hymns, heroic stories.

Mechanism: Carroll does not explain the proximate mechanisms that would make people engage in art as he conceives it. Formulations like “Modern humans cannot choose not to live in and through their own imaginative structures” do not even begin to point to a mechanism. If people over-proliferate scenarios and therefore suffer motivational disorganization, how do they know to make an elaborate headdress or paint a still life, or to sing or dance or tell stories as the way to help them? Help them do what, in any case? Reduce the number of scenarios?

(Won't more stories increase the number of scenarios?) Select the appropriate scenario to act on? How does a Bach fugue or the Beatles' "Blackbird" help here—and how do we know which to choose?

The cognitive play proposal suggests a number of motivational mechanisms. The key motivational neurotransmitter, dopamine, is elevated at the onset of and during play, and that same reward factor presumably helps motivate protoconversation, pretend play, and the playfulness of any inventive art. We know humans have strong preferences for high-yield, high-pattern information over informational chaos. We know of the strong human status drive, and its correlation with attention; individuals particularly motivated to seek status and attention in artistic ways can therefore design their work in order to maximize the attention-engaging power of their art. We have a strong drive to imitate others, which enables us to acquire at least the rudiments of local artistic traditions. We have a pleasure in mastery, when we dance or sing or make visual designs or tell stories, and partly by way of mirror neurons we can feel the effort and estimate the mastery involved in others' craft. We have a uniquely intense motivation to attune ourselves to others,⁵³ and song, dance and story fine-tune and amplify our capacity for attunement.

Carroll claims that in order decisively to falsify his or Wilson's hypothesis, one would have to demonstrate that human cognitive evolution had simply stopped at some point in the past. He seems closer here to immunizing the hypothesis from falsification than inviting it to genuine test. And his proposal seems to me, in Pauli's terms, "not even wrong." Various phases of my hypothesis, on the other hand, would be falsified, for instance, if repeat engagement in particular arts were shown not to improve the processing of information patterns in the relevant cognitive modes, or if there were on average a negative correlation between artistic success and individual status, or if there were on average a negative correlation between the artistic richness of societies and independent measures of social cohesiveness. I offer phylogeny, ontogeny, a series of functions and suggestions toward mechanisms. Joseph Carroll's contribution to the field of literature and evolution has been immense, not least in this magisterial survey, but I am not sure what he offers here on the adaptive value of art and literature except the authority of E.O. Wilson.

Evolution and Paradigms in the Study of Literature

Joseph Carroll is a leader in the movement to bring evolutionary analysis into the humanities and literary criticism in particular. Not only did he write the first major monograph in this area (*Evolution and Literary Theory*), but he has immersed himself in the original writings of Charles Darwin and edited a volume of his major writings. Indeed, he has avoided the sometimes bowdlerized and narrow takes of many evolutionary psychologists, anthropologists, and sociobiologists to evolution and Darwin himself. In this target article, the depth of Carroll's understanding and familiarity with the biological areas of psychology combined with his inclusion of recent scholarly contributions to literary and broadly humanistic applications of evolutionary approaches, both pro and con, is very impressive.

Some Problems with Evolutionary Psychology

I am not a literary scholar nor a human-focused evolutionist or psychologist. My love and interests go more to watching non-human animals in the field and studying their behavior in the laboratory. This field is greatly indebted to Charles Darwin.⁵⁴ But for me, as for Carroll, all behavior is of a piece, and as we slice and dice and specialize, it all must come together again. Many ethologists and biologists have written about the origin and development of art, such as Desmond Morris, Dale Guthrie, Jocelyn Crane, Eibl-Eibesfeldt, and Wolfgang Wickler.⁵⁵ Music is gaining recent attention as well. Early human history and nonhuman premonitions of art and music are increasingly able to be reconstructed based on archeology, anthropology, and study of living nonhuman animals. However, literature has remained the most resistant, since it is dependent on both the development of writing and its preservation. We have no ability to know the stories passed on orally, with the possible exception of preliterate art that may have some narrative thrust. It is thus understandable that those humanistic and historical disciplines dependent on the written word have had little use for evolution until recently. Besides, their adherents may claim, since writing is such a recent

innovation in human history, evolution probably has little to do with it. Here I will make some general comments on the issues discussed by Carroll, the status of cross-disciplinary evolutionary thinking derived from my experience, and comment on the research program that he advocates.

Joseph Carroll visited the University of Tennessee some years ago after I had organized an interdisciplinary colloquy on Evolution and Culture. This colloquy grew out of a luncheon talk I gave to a large group of faculty interested in interdisciplinary outreach at the university. The talk was on the promise and perils of the “new” evolutionary psychology. The resulting colloquy lasted for a number of years involving professors from English, sociology, economics, history, psychology, philosophy, classics, biology, computer science, modern languages, law, political science, and anthropology. After several invigorating years, our university administration had a call for interdepartmental research/training proposals. Our proposal to formalize our bottoms-up faculty initiative with significant funding for courses, visiting fellows, and graduate students was summarily rejected as nothing new! What I also discovered is that for all their general interest in evolution, suspicions of a *real* incorporation of evolutionary thinking into their fields were a threat to many faculty members, even the sympathetic. Although we began with a noted evolutionary biologist at UT giving a primer on levels of selection and a series of other presentations on evolution and Darwinism, for too many evolution was, at most, just one more perspective to be added to their field, as Carroll notes. Suspicions of evolutionary hegemony, social darwinism, genetic determinism, quantitative science, and the sensationalist claims made in popular books and magazines were too strong. In retrospect, the old view that revolutions take place through replacing the graybeards, resistant to accepting ideas that seem to put their entire intellectual life at risk, should have been realized. Even young traditional scholars in the social sciences and humanities have, until recently, been exposed to little serious evolutionary or even scientific thinking. And biologists have not helped either. E. O. Wilson’s strident reductionism and ‘we will bury you’ rhetoric should have been expected to raise red flags. The politically motivated resistance of S. J. Gould, Lewontin, and others to accepting that evolutionary processes have any direct effect on our behavior seemed to give scientific credence to an old-fashioned behavioristic environmentalism. Many of the first phalanx of self-proclaimed evolutionary psychologists and journalists quickly produced heavily marketed popular books, longer on adaptationist plausibility than solid evidence, and this disturbed psychologists and evolutionary biologists alike. Perhaps this is why, after an initial

flutter of interest, most evolutionary biologists at UT avoided serious involvement in the colloquy as well, seeming to view it as a bit too discursive and unscientific.

Ironically, one of the problems is that E. O. Wilson and others make the strong and very old-fashioned claim that animals are motivated by instinct and humans by rational thought. I hear here the echo of Descartes and the more modern scholastics such as Adler (*The Difference of Man*). If, as Carroll claims, cognitive psychology and neuroscience are essential resources for literary Darwinism, then it may be relevant to incorporate some of growing literature on the cognitive and emotional expressiveness of nonhuman species, episodic memory (necessary for narrative), theory of mind debates, proto-language, etc. (for example, Terrace and Metcalf). Furthermore, emotion and motivation are all closely tied to biological processes and have certainly been incorporated in discussions of instinct.⁵⁶

During the 'instinct wars' of the 1950s and 1960s, set off by Nobel Laureate Niko Tinbergen in *The Study of Instinct*, many useful refinements were made and incorporated into our understanding of the development of species-typical behavior. Indeed, terms such as instinct and innate are now far more commonly used in mainline studies in behavior and neuroscience than was imaginable in 1970. But we also now appreciate more fully that innate or instinctive mechanisms underlie even much learned and cultural behavior, from what we fear to what we like to eat to how we fight, love, and play. There is a heritability and individual difference factor to how we process experiences, and there is no reason that this cannot be reflected in literary analysis beyond the bland assertion that animals are instinct machines and we are not (of course the related ideas of nature versus nature have been a stock ploy of much literature including Caliban in *The Tempest* and the novels of Thomas Hardy). Just as we can find roots of morality in our primate relations (de Waal, *Primates*), so may we find roots of narrative and discourse. The last thing we want to do is return to Cartesian dualism, and I sometimes fear that in an attempt to show how special we are in terms of social life, culture, and the arts we are prone to accept bad science that accords with our anthropocentric 'instincts.' It is difficult to ignore our relationship with other species at the same time arguing that the same selective processes operating in solving similar recurrent themes underlie our behavior.

Some recent books, not cited by Carroll (for example, Buller), explicitly critique many of the founding examples in the field of evolutionary psychology. As in the instinct wars, these will ultimately fail in their major purpose of derailing the field, but may put it in on a firmer track with a richer destination. Carroll may want to address these critics (including Panksepp and Panksepp, whom he does cite) as

well as those on the literary side. Sometimes wars have many fronts to be held for ultimate victory.

The Tinbergen Tradition

One of the possible weaknesses of literary Darwinism is the neglect of earlier evolutionary approaches to psychology. Ethology was a field started to incorporate a more truly comparative approach to animal and human behavior. The term 'ethological psychology' pre-dated modern evolutionary psychology.⁵⁷ Ethology as I define it is "the naturalistic study of behavior from an evolutionary perspective" (Burghardt, *The Genesis* 10). It builds on Tinbergen's famous four aims of all behavior study (Tinbergen, "On the Aims"): the study of causal mechanisms (stimuli, hormones, and neural mechanisms), development, adaptive value (or function), and evolution (both pattern and process). Tinbergen was himself very uncomfortable with issues of subjectivity, questioning even the study of play behavior, perhaps a result of his struggle to wrest the 'objective study of behavior' from remnant Dutch vitalists in the 1930s and 1940s. Be that as it may, I added as a fifth aim, critical for the future of ethology, that of 'private experience,' broadly conceived ("Amending Tinbergen"). In any event, it seems to me that losing an integrative perspective has held back both a rigorously empirical evolutionary psychology, and associated branches that are only now be rectified. Note that traditional experimental psychology was based primarily on the first two of Tinbergen's aims. Classical ethology reinvigorated the evolutionary aim, but empirical studies of adaptiveness were rare. Tinbergen himself reinvigorated that aspect of ethology. With the advent of the writings and conceptual advances of Hamilton, Trivers, E. O. Wilson, Maynard Smith, Dawkins, and others, use of genetic models and selfish gene thinking became incorporated into a revitalized study of adaptiveness. This bore fruit largely due to a combination of new methods including computerized behavior recording and model testing, developments in tracking individual animals in captive and field settings, and especially the advent of DNA methods to assess individual identity and paternity in the field. A second critical development was the renewed interest in sexual selection that grew out of the volume marking the 100th anniversary of the publication of Darwin's seminal tome *The Descent of Man, and Selection in Relation to Sex* (1871). Thus, while the earliest modern evolutionary psychologists largely ignored individual differences (for example, Barkow, Cosmides, and Tooby), they did not ignore sexual differences, and the earliest applications of evolutionary thinking to literature and myth involved sexual selection logic. The initial focus on some almost mythical,

but vaguely dated, EEA (Environment of Evolutionary Adaptiveness) may have been useful conceit early on, but the premise that there was some “golden age” in which natural selection shaped our social and cognitive traits more than any other time is not credible (for example, Panksepp and Panksepp). Carroll is stimulating when he discusses the need to incorporate life history, human universals, and the recurring problems endemic to all human lives regardless of culture.

My point is that it is essential to look at literature and all other human endeavors through all 5 aims to obtain genuinely useful understanding of human nature and the evolutionary background involved. By doing so we can, in effect, incorporate much of value from related social sciences and humanities while still working towards the inclusive vision put forth by Darwin at the end of the *Origin*, as well as more recent comprehensive visions such as Wilson’s *Consilience*. Carroll is clearly aware of these issues, but I wonder why they were relegated to minor status. In short, Carroll did not go far enough.

I share and resonate with the view that evolutionary literary analysis should not shy away from the quantitative and testable and go beyond the discursive. But I noted that there is no explicit discussion in his paradigm of using quantitative phylogenetic methods in tracking literary themes or cultural and historical mythology as has proved useful in linguistics. As for development, in spite of the mention of “developmental cognitive psychology” I see no formal incorporation of the development of literary/story telling and story appreciation skills in children from infants on. Major academic areas are indebted to children’s literature and emergent literacy. Certainly insights can be gained from more formally incorporating such understanding, especially as it relates to cultural, ethnic, religious, social class, economic, and education backgrounds in how students react to literature. Although Shakespeare is repeatedly mentioned, theatre is largely ignored, as is film, science fiction, popular fiction, and other genres that could be useful testing grounds for the generality of hypotheses.

Additionally, literary Darwinists seem particularly fixated on the issue of the adaptive value of literature and the arts. Certainly this is an interesting issue, and eventually may be critical, but perhaps not as urgent as Pinker, E. O. Wilson, George Williams and other might think. Consider play behavior. For years the major question asked was what it was good for. With no convincing methods for determining this, scientists largely lost interest in the topic in spite of its ubiquity in human and nonhuman behavior. Consequently, in my recent book *The Genesis of Animal Play*, I was at pains to look at the phenomenon from all five of the ethological aims, not just one or two. I think any intellectual contribution the

volume will have is based on presenting an integrative view. In fact, I argue that fixating on adaptiveness held back serious scientific attention to play as constituting important and fascinating phenomena. I think the long-term success of literary Darwinism is tied to encouraging multiple rigorously applied paradigms to the study of literature, broadly conceived.

In spite of any critical points above (and the ignorance on which they may be based), I think that Joseph Carroll's essay is a true example of productive and integrative scholarship.

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Compliments and Complements

From the evidence offered in Carroll's target article, we can say that Darwinian Literary Studies (DLS) have come of age. Once Ellen Dissanayake (*What Is Art For?, Homo Aestheticus*) demonstrated the presence of "making special," a feature salient to natural selection, in works of art of all cultures, all periods, it seemed evident, at least to a few of us, that all artistic media would be encompassed in a paradigm like that described by Carroll. Looking back over the past three decades, from Dissanayake's first article on art and ritual ("Hypothesis"), it seems obvious that the time was ripe. Until the mid-nineties the nascent field was characterized by something like "convergent evolution," as investigators working independently arrived at similar conclusions. Carroll's *Evolution and Literary Theory* (1995) had a profound impact and became a rallying point for the field. It set out a large-scale theoretical program and helped isolated researchers realize that they were part of a collective effort. Carroll has continued to play a major role in this effort both by pursuing his own individual research and by repeatedly surveying and critiquing the field as a whole. The target essay makes bold and sweeping claims. Some readers might understandably quail at the prospect of an all-encompassing, apparently monolithic, critical perspective conveyed in often alien language and suggesting, perhaps, an air of arrogant intellectual superiority. I strongly support the general program described by Carroll, but I think some qualifications and modulations could help promote wider acceptance.

The chief promise of DLS lies in its potential to explain what I term *differential interest*. The central function of any viable modern work of art is to attract our attention. Some do this better than others, indeed, repeatedly, possibly for predictable reasons. Darwinian scholars often cite the universality of themes related to genetic issues readily adducible to genetic influences. Although literary fashions change, some subjects are virtually ubiquitous, while others are rarely, if ever encountered. Incest avoidance, romantic love, birth defects, interpersonal justice, and other issues of adaptive significance not only are universal. Ancient

environments are often reflected in modern literature. Albeit snakes are now a minor threat, science fiction continues to swarm with “Dracs,” much as folktales once teemed with dragons.⁵⁸ The same plots get written over and over again because we never tire of reading them. Others are ignored. One exception derives from a wager: Chekhov’s story about an ashtray.

A related feature is that these so-called universals appear to elicit nearly inexhaustible interest. This is certainly a feature of oral literature; however rich a given tradition, it is nevertheless quite restricted by modern standards. Just the same, it presumably sufficed to satisfy its host population over the course of entire lives. Inevitably this meant rehearsing the same tales several, possibly many times. Perhaps this is why we find them so replete with universals, although, no doubt, other factors are involved. Some of this same limitation may be perceived in other modern narrative media shared by most Western cultures. The core opera repertory could be said to number less than two hundred works. Yet more (or, literally, less), full-length narrative ballet is dominated by the same six or seven pieces.⁵⁹ And it may hold true for us, inasmuch as most scholars of modern literature reread favorite classics with deepening satisfaction.

The relationship of DLS to other critical perspectives is not necessarily hostile. One obvious exception is the cultural constructivists’ complete rejection of genetic influences on human behavior, a position increasingly untenable in the face of recent behavioral science. But need we throw out the baby with the bath water? Are there no valid findings of LitCrit that may find a welcome place in Carroll’s paradigm? For example, consider the issue of bias, relevant to deconstruction. Much of evolutionary psychology concerns how our cognition is not a seamless, let alone faultless, general processor, but rather is conditioned by ancestral (and relatively recent) history; we are somewhat predisposed to select certain behavioral alternatives instead of others. There may be common ground regarding the pervasive force of ideology, which may be attributed to the needs of social bonding. After all, political theories like the divine right of kings and fascism that now seem ridiculous to many of us once held sway over large populations. Could this same penchant for gullibility pertain to the hold fictions have on us?

DLS promises to help us understand super-stimuli or exaggeration. Compared to reality, works of art tend to exaggerate the iterance or urgency of a biological issue. Much as male peacocks exhibit outlandish tail feathers to catch the eyes of peahens, artists have recourse to human “universals” to attract our attention. They may need to exaggerate these common proclivities or, more likely, what triggers their expression, if only to out-compete other artists who are doing likewise. Of

course, exaggeration may be counterposed with understatement, as artists vie for our attention. Preliminary results suggest that Darwinist tenets are easier to apply to narrative fiction than to actual human behavior, perhaps for the same reason. I am at present finding more incest in *War and Peace* than can be discerned in Tolstoy's social environment. Utopian fictions almost eerily conform to or reverse traditional patterns of human nature, probably more than any actual society.⁶⁰ And operas are, well, operatic.

Acceptance of the evolutionist paradigm by the academic establishment also may depend, however, on how Darwinist scholars address questions such as those before. My expectation is that some answers will be found in the interconnection of evolutionary psychology and cognitive studies (or at least, as Carroll describes it, its most proximate wing), especially in so-called Theory of Mind.

How do we account for individuality and unique texture? While Darwinist studies have often emphasized proclivities found in most human societies, in other words, the commonalities of literature, scholars frequently are attached to the peculiar qualities of favorite, sometimes *sui generis*, texts. It stands to reason that both universals and individual particulars are characteristics of any literary classic, but some readers may think that Darwinians are answering the question of lesser interest. How can we explain not just panhuman features, often seen as evidence of a shared evolutionary history, but also unique qualities? Furthermore, how can the same genome (individual writer) produce hundreds of works, each bearing his or her individual stamp, but also each somehow different from the others?

Perhaps much of this can be attributed to social competition. Darwinism envisages a marketplace of competing interests. Much as higher species disseminate a great variety of genetic alternatives, the artistic marketplace is one of a waxing array of ideas. Other avenues to this issue of individuation and change are connected to the following two questions.

What is the relationship between an artistic text and reality? Naively stated, does art convey truth of some sort? Michelle Scalise Sugiyama advances the hypothesis that a major source of aesthetic attraction to stories lies in the information they impart ("Food"). This may work for traditional oral literature where useful data regarding prey and predators are mentioned, sometimes featured. But can this same thinking be applied to modern literature, let alone to abstract forms of art, such as instrumental music? I suggest that it can, if sufficiently abstracted beyond intended lessons to information about the environment, especially the human environment, that can be *inferred* from the text. Literary historians are aware of instances where real world discoveries are soon

reflected in narrative, much as composers respond to the invention of new instruments or artists to new technologies such as lead tubes for oil paint. This also applies to new philosophical and psychological insights. Much of literary sentimentalism can be attributed to the recognition that the lower classes had sentiments similar in nature to those of the nobility. Indeed, literature can readily be seen as playing an active role in what is, after all, a co-evolutionary construct; culture is a means of accelerating biological adaptation, which itself is a means of retaining increasingly refined information. Scalise Sugiyama notes the vital insights modern narratives give into interpersonal politics and personal subjectivity (“Reverse”). Contemporaries often react to works of European literature as if they were about real people. Since the major selection pressure on us derives from other human beings, whereas we can learn to control most prey (often now livestock) and predators (seemingly destined to survive only in zoos), this consideration produces a model that yields unending competition and a consequent need for ever more insight into human nature, the major topic of literature. I propose that literature also serves to develop awareness of our own capabilities. *Aesthetic cognition*, whereby art occasionally provides productive thinking, may account for some of its appeal. In this may lie the satisfactions not only of literary and plastic portraiture but even of instrumental music and other non-representational arts.

How can a largely static genome account for the increasing dynamism of stylistic change? Artistic history, if we look at the last few centuries, appears to be accelerating. I suggest we can quite plausibly argue that this is due, in large part, to the factors mentioned above: social competition among conspecifics, responses to increasingly dynamic environments, and a waxing interest in subjectivity. Style is more than mere form; to be viable it also needs to reflect modes of thought, often newly recognized ones. Frequently stylistic innovations are accompanied by novel insights, as in the case of Tolstoy’s gestural language, Dostoevsky’s multileveled subjectivity, or Joyce’s stream-of-consciousness.

What is the Darwinian structure of a text? Probably, in a word, complex. Although Darwinist studies of individual works often focus on one or a few vital tenets, and the logic concerning a single strand may appear to be relatively simple, this is not to say that these are the only genetically-derived or –relevant drives at hand. One reason that I published a book on utopian fiction (*Human Nature*) was that I found that many different features of our evolved psychology were relevant to a reading of Evgeny Zamyatin’s *We*, at least nine in all. I have since drafted a tenth chapter and still sense that I have only scratched the surface.

Moreover, genetic proclivities may counterpose one another just as easily as they may be complementary. Much aesthetic fascination may derive from the clash and/or choice of mutually exclusive goods or evils. As in the case of *Romeo and Juliet*, the internal structure may be agonistic, as we find in that play's selection between assortative mating (e. g., romantic love) and kin altruism (nepotism, family).⁶¹ Many parts of our genome express themselves in our physiology and behavior. Their interaction, along with many environmental factors, greatly adds to our individuation. Should we expect art to be any less complex? Potentially everything about a classic text is subject to biocultural interpretation, and it would be difficult to think of a feature in such a text that is not vital to its aesthetic success. Much as I regard Joseph Carroll's magisterial study of Jane Austen's *Pride and Prejudice* (*Literary Darwinism*) to be the finest produced heretofore in the field, I am confident he agrees that his is not the last word, that we may anticipate further Darwinian insights into this novel.

Though Darwinian Literary Studies have come of age, their agenda is hardly complete. Tasks like those outlined above will fill out the picture of what they promise for literary scholarship.

Apriorism for Empiricists

When Joseph Carroll's *Evolution and Literary Theory* appeared in 1995, I read the first hundred pages or so with great interest and took comfort from its critique of the then poststructuralist-dominated literary academy. Carroll's presentation stood out for its comprehensiveness and its uncompromising embrace of empirical values—the same values to which, since 1980, I myself had been appealing against applied deconstruction and its ideologized progeny.⁶² In addition, I found that Carroll and I shared an intellectual hero, Charles Darwin, who, for both of us, epitomized a determination to explain observed effects only by reference to commonly ascertainable, temporally prior facts and factors, without appeal to “final causes” and other such remnants of an exhausted supernaturalism.

I had no quarrel in 1995, and I have none now, with the central role that Carroll assigned to Darwin's theory of evolution for an explanatory overview of our species. As I have recently stated, “Only a secular Darwinian perspective . . . can make general sense of humankind and its works.”⁶³ But whether that perspective ought to become the guiding philosophy of academic literary studies is a different matter. That proposition struck me as lame when I first encountered it, and the reasons now assembled by Carroll in its behalf haven't caused me to change my opinion.

Carroll's program is truly grand in intended scale. The literary Darwinians, he writes, “aim at fundamentally altering the paradigm within which literary study is now conducted.” Their goal is to “subsume all other possible approaches” to the field. And if they succeed, that field's current disrepute in empirical circles will give way to admiration. By responsibly connecting literary analysis to reliable knowledge about human nature and by making their own scrupulous additions to such knowledge, critics will contribute to E. O. Wilson's consilience, helping to chart “an unbroken chain of material causation from the lowest level of subatomic particles to the highest levels of cultural imagination.”⁶⁴

In demurring from Carroll's initiative, I do not mean to reject the realm of theorizing to which his program appeals (sometimes rather sheepishly) for its

scientific backbone, evolutionary psychology. To be sure, that subdiscipline has been plagued by a scarcity of hard evidence that might substantiate one “Just-so Story” about emergent dispositions at the expense of rival hypotheses. But this drawback may be mitigated someday by new sources of information, and meanwhile there is much to be learned about cross-cultural regularities that are suggestive of biological roots and adaptive functions in a broadly Darwinian sense. That is why I agreed to contribute an encouraging foreword to one of the cultural evolutionists’ most promising books, Jonathan Gottschall and David Sloan Wilson’s anthology *The Literary Animal*.

The chapters of that volume, along with most of the other studies that Carroll now marshals as evidence of an incipient intellectual revolution, are interdisciplinary efforts. Examining literary productions, from myths and fairy tales through Shakespeare plays, they uncover motifs and narratological patterns pointing to traits of general human nature. The results belong to aesthetics, psychology, and anthropology, but not, as Carroll acknowledges, to literary criticism, because the goal here is data extraction and replicable social-scientific knowledge rather than identification and explanation of the features that set a given work apart from others.

Nevertheless, Carroll doesn’t hesitate to claim that critical analysis per se also ought to take an explicitly Darwinian turn. Criticism, he holds, now suffers from a “blank slate” neglect of biological and behavioral universals—a neglect fostered on one side by impressionistic, idealizing, sentimentalizing humanists and on another by poststructuralist obfuscators and ideologues. A Darwinian outlook, in contrast, keeps a steady eye on “the urgent needs and driving forces in life—survival, reproduction, kinship, social affiliation, dominance, aggression, and the needs of the imagination.” And thus the Darwinian critic, starting from the expected “life history” concerns of gendered authors, characters, and readers, possesses an objective analytic baseline for showing how a given work exemplifies, challenges, or complicates the norm. Such a critic, Carroll maintains, can be fully sensitive to the work’s linguistic uniqueness without neglecting “the world outside the text” and its more or less mimetic representation.

To illustrate the difference that is made by approaching a work from the angle of evolved human interests, Carroll has elsewhere offered us sample analyses of well-known fictions, most notably *Pride and Prejudice*. In his treatment, the demanding cognitive style of Jane Austen, with its valuation of keen intellect and moral integrity, is shown to work in fruitful tension with that novel’s raw life-history themes of “resource acquisition and reproductive activity.”⁶⁵ This sounds

dry and diagrammatic, but in Carroll's hands it is not; his discussion faithfully recounts the structure and tone of Austen's masterpiece. When compared with recent academic practice, with its predetermined lessons about patriarchy, class conflict, imperialism, desire, dialogism, and the self-cancellation of the signified, that is distinctly refreshing.

Here I must ask, however, whether this demonstration piece and others resembling it can be generalized to warrant an overtly Darwinian emphasis in criticism at large. Although Carroll derived his vantage on *Pride and Prejudice* from evolutionary theory, all that was needed to arrive at the same emphasis was open-minded attention. "Sex and property, family or kin relations, parenting, social relations, and cognitive power" ⁶⁶ are Austen's manifest concerns, largely forecast in her novel's satirically playful opening paragraph. Indeed, the very choice of a realistic novel about courtship seems all too convenient on Carroll's part. Would his "life history" orientation be an equally good match for *Beowulf*, "Batter My Heart, Three-Personed God," *A Tale of a Tub*, *Candide*, "Kubla Khan," "There's a Certain Slant of Light . . .," "Bateau Ivre," "Jabberwocky," "In a Station of the Metro," "Sweeney Agonistes," "The Red Wheelbarrow," "The Emperor of Ice-Cream," *Six Characters in Search of an Author*, *Animal Farm*, *Waiting for Godot*, *Dutchman*, *Rhinoceros*, "Daddy," *The Crying of Lot 49* . . . ?

The question here is whether biologically grounded "human nature" themes and their evolutionary background deserve a privileged status in particular critical studies before we have even begun to find out where an author's priorities lie. Apparently so, in Carroll's estimation. He expresses impatience with traditionalist critics who "do not typically seek causal explanations in evolutionary theory," whereas Darwinians, he writes, "can identify the biological forces that are invoked or repressed in any given work and can assess how those forces impinge on meaning." "Invoked or repressed"? Carroll's omnibus rejoinder will perhaps explain what he means here by repression and whether he holds, with Derrideans and Lacanians, that the undetectability of a favored "force" is really a sign of its imperfectly negated, and therefore shaping, presence in the creating mind.⁶⁷ Isn't this the apriorism that Carroll decries in others?

In rebuking colleagues who complain about reductive discourse, Carroll points out that all explanatory efforts entail reduction. True enough. The pertinent question, however, is whether much of anything is explained by reduction to the most primordial level we can find, where perceived factors tend to be banal common denominators that aren't helpful for the particular instance. The logic of inquiry would seem to require that we begin tackling a literary problem just below

the textual surface, where unified or divided intentions, biographical experiences, psychological stresses, linguistic resources, traditions and conventions, historical events, and social circumstances can all be seen to have played a role. That is the normal practice of most critics, but it is scarcely recognized, much less approved, in Carroll's less than fair division of the non-Darwinian literary professoriate into effete, allegorizing humanists and madcap poststructuralists.

Although he does attempt to promote his own school of literary criticism, Carroll has a larger aim that requires a quite different strategy. In his opinion, students of literature possessing a powerfully explanatory theory and a scrupulous research protocol can unearth what he chooses to call "real knowledge, knowledge that is consilient with the broader world of empirical research." Such lore consists not of *aperçus* about one work or another but of universally valid truths about human propensities. The difference here is crucial, because "the broader world of empirical research" won't be impressed by findings that fail to extend beyond, say, the time scheme of *Othello* or the quaint theology of *Paradise Lost*. The rescue of literary study from its current doldrums, Carroll feels, will be effected only if its practitioners show that they, too, can cease being "passive consumers of knowledge" and become, themselves, scientific investigators into human nature. Accordingly, he recommends that literary academics be trained in statistical analysis and other "empirical methods" borrowed from the social sciences.

Underlying my several reservations about this program is an apparent disagreement with Carroll on the meaning of empiricism—a pivotal term for both of us, but one that points to different paths according to whether it is interpreted narrowly or broadly. From Carroll's manifesto I infer that he sees empiricism as the sum of formalized procedures that, employing "the severe logic of quantitative methodology," can uncover verifiable patterns in structure or behavior. By that definition, a critic who is accurately describing one text isn't being fully empirical. To count as such, our findings ought to be generalizable, couched in numbers, procedurally controlled against bias and error, and preferably collaborative, so that our neighbors in the flourishing sciences can trust them as meeting their own standards of acceptability.

Judged by these criteria, even Darwin would come under suspicion of having been a third-rate empiricist. He worked and published alone, didn't conduct experiments, didn't quantify his results, and was content to report his impressions instead of laying out data that others could check. Yet we regard the theory of natural selection as a triumph of scientific reasoning, because later investigators who pressed that theory from every angle have found it to be sturdy and

indispensable. This suggests that empiricism resides not in any methodological protocol but in all-around responsibility to evidence.

Such responsibility, I would add, can be exercised in any nonaxiomatic field, regardless of whether the knowledge in view is particular or general. Empiricism entails setting aside partisanship and dogma, weighing the merits of competing hypotheses, attending to objections and recalcitrant facts, and wielding Ockham's razor. Darwin did all that; but so, more modestly, does a literary critic who is taking seriously the task of being as inductive and circumspect as possible about analysis of a text.

The subject matter of literary study is not human nature; it is literature. There is nothing trivial about trying to make rich sense of single works, or single careers, or single moments in literary history, that strike the common understanding as representing a pinnacle of insight and skill. To imply otherwise, as Carroll does in placing sorted and tabulated "real knowledge" ahead of critical judgment, is to exemplify, not to rectify, the low valuation of imaginative writing that is already depopulating our field while its remaining exponents quarrel with one another over methodology. Moreover, students who are still drawn to that field because certain poems and stories have heightened their self-awareness and whetted their appetite for teaching are left cold by charts, graphs, and tables. Carroll is proposing an improvement that would induce them to stay away or drop out, further constricting the already diminished lifeblood of our profession.

Many literary critics and scholars, whether or not they make an occasional perfunctory bow to some Continental guru, do earnestly observe empirical canons in their work. That is, they conduct themselves as if they actually cared about suiting their conclusions to the burden of available facts. Since the 1980s, however, in the face of intimidation from the academic avant-garde, they have been reluctant to speak openly about such "logocentric," "positivistic," "epistemologically naïve" empiricism. But the intimidation appears to be easing now that the top poststructuralist lawgivers, to whom few academics are listening any longer, have reached their own nadir of bafflement and demoralization. This would seem to be a propitious hour, not for advancing the interest of one empirical school at the expense of others, but for urging a profession-wide ethic whereby evidence is treated as the only legitimate arbiter between competing theories and hypotheses.

A consensus on that point would surely strike an outsider as uncontroversial and hardly worth articulating. How else can one maintain a discipline than by observing impersonal standards to which all parties are equally accountable? But we who have watched "English" become the doormat of academic specialties

know that epistemic cynicism, identity politics, cliquish power plays, animus against science, and a lax hospitality toward any theories that generate abundant discourse have stifled objective judgment and even, in some quarters, rendered it a term of abuse.⁶⁸

Joseph Carroll and I are in agreement about this state of affairs. We differ, however, on what should be done about it. Carroll writes as the chief evangelist for a single critical faction that comes near to claiming a monopoly on intellectual seriousness, and he looks forward to a day when we will all pay homage to Darwin as an earlier generation did to Foucault. In contrast, I believe in affirming and rewarding what is already empirical in our field while standing apart from factions and allowing intellectual give-and-take (as in this present forum) to determine which current or forthcoming approaches to literature are most cogent and comprehensive.

As I have suggested, the biological and prehistoric emphasis of critical Darwinism makes for forced or downright irrelevant application to most textual analysis. Instead of conceding this limitation, Carroll draws instances from the most congenial texts he can find, avoiding the harder cases that might test his ambitious claims. Further, in a hermeneutic pirouette that would appear to border on mysticism, he counts the “repression” of adaptationist factors—that is, their failure to show up—as another form of presence. And then he proposes that literary study expand its range, adopting social-scientific problems and methods to which his Darwinian assumptions are, I grant, much better suited. What lies behind all of these moves is loyalty not to the goal of open-ended inquiry but to a theory that Carroll is bent upon exercising at all cost. When he entreats his colleagues to be more empirical and invites their attention to his own example, that partisanship is what they are likely to notice and deplore.

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Beyond Words: Can Literary Darwinism Address the Unsaid and Inexpressible in Literary Creation and Response?

Joseph Carroll is essentially the founder and the preeminent theorist of Darwinian adaptationist literary study, with an enviable mastery of the subjects relevant to his interests: evolutionary theory (he has written a splendid monograph-length introduction to his own edition of Darwin's *The Origin of Species*) and evolutionary psychology as well as an enormous amount of Western literature. In addition, he understands statistics and can apply it in his own work; he is also highly conversant with recent advances in cognitive science and neuroscience. He is the obvious first choice to write a target article about the emerging field that is called Literary Darwinism or Darwinian (evolutionary, adaptationist) literary study and *Style* should be commended for presenting to a broad audience this fertile and historically inevitable approach. The curious, the convinced, the skeptical, and even the hostile will be well repaid for their consideration of the article and the commentary it provokes. The list of references is itself a compendium of provocative recent thought about humans and their works (and workings).

Carroll makes an excellent case for the necessity that scholars in the humanities and social sciences be aware of the relevance of biology to their view of the human—what E. O. Wilson has called “consilience.” It is a view that I wholeheartedly share. Participation in and receptivity to the arts are demonstrably part of human nature, from infancy (Dissanayake, “In the Beginning”), and the human mind, adapted for life in the Pleistocene, is the source of all human thought and behavior. Today when every educated person accepts that an individual human’s personality, talents, susceptibility to disease, and indeed all other physical and psychological traits are influenced by genes and DNA, it takes a very blinkered scholar indeed to maintain that “cultural products” (inventions by humans, such as the many different arts) appear willy nilly and can be about anything at all.

My addenda to Carroll’s fine synthesis emerge from the rather different paths we have chosen rather than from personal antagonism to his findings or conclusions. On the contrary, I agree with him on just about every point. I suggest,

however, that there is additional evolutionarily-related knowledge that literary Darwinists should consider. My own work uses a specifically ethological approach that is concerned with artistic *behavior* more than with finished *works* such as stories or novels or the *qualitative features* that make these better or worse than each other. I deal with nonverbal arts, primarily music, which in its origins and indeed today in many parts of the world would seem to have included rhythmic movement or dance as part of the same activity. I view all the arts as products of what I now call “artification”—that is, treating ordinary objects, surroundings, sounds, movements, words, themes, motifs, ideas, and so forth in specified ways that make them *extra-ordinary*. These specified ways are the devices or “operations” on ordinary behavior that are used instinctively by other animals in ritualized behaviors—formalization, repetition, exaggeration, elaboration, and manipulation of expectation. Humans use these intentionally or consciously to artify (or “make special”) their experience. Evidence of this kind of behavior can be found as early as 100,000 years ago if not earlier. Bednarik finds evidence of artification as early as 900-200kya, if one accepts carefully carved cupules and incised lines on rocks as examples of modifying objects and surroundings and red ochre fragments as decorating the body. It is also likely that, like the arts in recent premodern or traditional societies, early arts were participative and communal or, in the case of petroglyphs and pictographs, the occasion for ritual/ceremonial behavior. Artification is in my view a behavioral proclivity that—like speaking, tool-using and making, and infant attachment—benefits all members of a society, not only a talented few.

This is not the place for a full exposition of my views about the evolution of the arts, but the foregoing paragraph provides enough background for what I see as unaddressed subject areas and perhaps problems for Darwinian literary study. (They are problems for other schools of literary study too insofar as these ignore our Pleistocene past and the lives of our hunter-gatherer ancestors whose way of life over hundreds of thousands of generations molded our behavior and emotions).

In my view, humans were artificers long before they were able to write and read, perhaps even before they were able to speak or speak well. As Carroll points out, the earliest literature would have been oral. I would suggest that there has not been sufficient time for evolution to have acted specifically on reading as an adaptation. Indeed, reading is a quite recent cognitive or behavioral acquisition. It relies on the invention of writing in the Neolithic period, the use of specifically alphabetic writing, and eventually the invention and widespread use of the printing press. Literacy is a specialized skill and only a small percent of all humans who have ever

lived can read and even fewer read fluently or for pleasure. Learning to read changes the brain and behavior of individuals and the cultures they live in so that there are significant differences between preliterate and literate individuals and societies (Ong; Leavis; Wolf).

Reading, which is not an adaptation, has obviously emerged from the human penchant (need?) for listening to and telling *stories*, apparently a human universal. Reading is a solitary act and listening/telling a social one. At the transition, people gathered in a crowd to be read to (Leavis)—still a social experience, like the participatory experiences in the arts that predominate in societies that have not undergone the process of modernity.

The work by Gottschall and others on cross-cultural and oral literature is welcome and I hope there will be more. But there is something else to be learned about preliterate literature than the way it reveals the human mind and its perennial concerns. Even before (and alongside) the telling and hearing of stories, I think a case can be made that our ancestors artfied their voices and speech for incantations, magical spells, lamentation—expressive verbal/vocalizations that make more or less use of understandable words. That is, they may have intended to produce musical (nonverbal) emotional effects more than to depict events with narrative meaning. I suggest that a significant portion of our response even to literature of today has to do with non-depictive or nonverbal aspects. In poetry, it is not only the paraphrased “story” or even subject matter of the poem (e.g., lost love, thoughts about dying, a sea voyage) that is memorable and affecting. There are passages in literature and especially poetry—and film—that have stunning or even indescribable-but-unforgettable emotional residue that comes from image, sound, structure or unfolding in time, and whatever can be suggested beyond words. This residue cannot be subsumed by Basic Emotions theory.

One might say that like Western classical music (also the product of *musical* literacy—a first carefully composed and then published score that can be read and performed by others), written literature is the product of people who can work and rework their creations in order to make possible a kind of sophisticated response in readers that goes beyond the fundamental human response to the underlying elements of the story. Oral literature and improvised music have their own significant rewards and can produce gripping or transfiguring experiences—think of well-told tales and the music traditions of the Middle East, South Asia, and East Asia—but the possibilities for manipulation of emotion by published literature and music have provided new sorts of appreciation in readers and listeners that are unavailable to oral, improvised renderings. Concepts without distinct referents—

”poetic truth,” the “inexpressible”—are elements that some people value in novels by Woolf, Proust, or Emily Bronte and in much poetry, as much as or more than the fundamentals of the story. These have to do with *the way* in which the story is presented. My own scheme of aesthetic operations—formalization, exaggeration, elaboration, and manipulation of expectation—does not pin down the unpinnable, either, but I would like to see Literary Darwinists at least acknowledge the aesthetic/emotional reward of this aspect of reading, and locate its origin in *affective* (not purely cognitive) neuroscience. Cognitive science makes much of symbolic representations, but in music it is the *analogical rather than symbolic* meanings that carry affect. The arts, including literature, also make important use of synaesthetic effects that engage all the senses. Studies in *affective* neuroscience and in the cognitive neuroscience of music might be a good place to look for models of how to approach these less-traveled but important components of literary/artistic response (for example, Malloch and Trevarthen; Panksepp, *Affective*).

Adaptationist literary scholars should also remember that the experience of literature, like music, may not be as aesthetically high-minded as I just described. Many people who read do not read fiction (stories) and those who read fiction often read what most of us who read *Style* would call CrapLit. People read fiction for escape, titillation, vicarious adventure, and to kill time in an airplane or on the beach. Nancy Pearl, a Seattle librarian, has written *Book Lust* and *More Book Lust*, in which she recommends fiction for readers of varied tastes: some primarily want a good plot, some historical sweep and atmosphere, some are most interested in character: she presents nearly two hundred categories and subcategories. Pearl’s readers seem to have distinct personality types. Where do they fit into Carroll’s psychological scheme as *readers*? Are they like the personality types of literary characters? Writers too would seem to excel in one or another category. Carroll has mentioned character, setting, and plot as constituting aspects of literary representations but these appeal differentially to various sorts of readers or writers too.

I feel sure that Professor Carroll would not disagree with most of what I say in this commentary, which presents ideas that are of special interest to me. It is more a matter of emphasis and personal predilection than of criticism or challenge. My remarks are not meant to suggest inadequacies or deficiencies in the superlative work done by Carroll and the other Literary Darwinists whom he mentions. I bring them up here as interesting and relevant things to think about and I hope that

scholars who are attracted to the field might find them worth considering in the future.

I would also suggest that those who dismiss or ridicule adaptationist thinking audit a good course in—or read a good introduction to—human behavior and evolution before making their pronouncements.

Misleading Alternatives

Joseph Carroll, the doyen of Literary Darwinism, has convincingly portrayed the present (mainly Anglo-American) state of the art in the application of evolutionary theory to the analysis of literature. We do not have any objections against his very instructive and well-balanced sketch, but we would like to point to some key aspects which might follow out of the European tradition.⁷⁰

Only few culturalists would nowadays still deny the theory of evolution and its basic significance for the explanation of human behavior; conversely, only few biologically oriented naturalists would still deny the significance of culture for the explanation of human behavior. The communication difficulty rather seems to be that both sides of the controversy, almost instinctively, immunize their reasoning against each other by downsizing, or even ignoring, the significance of one component or the other, so that the mutual acceptance frequently remains on the level of formulaic lip service.

The controversy between Joseph Carroll and Steven Pinker,⁷¹ for instance, in our eyes, reveals a typical case of underestimating the cultural component. Its bone of contention has an old and dignified pre-Darwinian tradition: “Aut prodesse volunt aut delectare poetae”—poets wish to either be useful or to delight—as Horace writes in his *Ars Poetica*. And he continues (this is quoted less frequently): “aut simul et iucunda et idonea dicere vitae”—or they wish to achieve both at the same time! We think that the misleading alternative of either providing “pleasurable fantasies” or fulfilling a “vital adaptive function”—that is, the explanation of art as either a by-product or a distinct adaptation—could be dissolved in a similar way: art can indeed be both, for it embraces a great range of very heterogeneous activities. Moreover, as we shall argue in the following, the pleasure we derive from art is particularly connected with the adaptive value of art; whereas what is frequently assumed to be its adaptive function—the production of “meaning,” as Carroll argues in the target article—seems to us rather a *cultural* functionalization of the arts. But first things first.

Carroll introduces three criteria to determine the adaptive function of art: “(a) define art in a way that identifies what is peculiar and essential to it—thus isolating the behavioral disposition in question; (b) identify the adaptive problem this behavioral disposition would have solved in ancestral environments; and (c) identify design features that would efficiently have mediated the solution.” A first difficulty is already apparent in the first criterion. “Art” is a concept of ordinary language, precise enough if it is used in, and rendered monosemic by, a particular conversational context; but is it useful as a starting point for an evolutionary explanation? It would be more appropriate, perhaps, to speak of the “arts” in the plural. To Pinker, an enthusiast of music, other properties might be significant than to the literary scholar Carroll. But even if we speak of the “arts” in the plural utterly diverse phenomena will be subsumed in this term. Does fine arts embrace everything from Da Vinci to Duchamp? Is literature everything from *Hamlet* to *Donald Duck*, and music everything from Beethoven to digital ringtones? And if we also count the body painting of the Huli people in Papua New Guinea, how about pierced teenagers in Western societies? Every social environment produces its own ideas about “art.” In fact, it would be no mistake to assume that those ideas, be they socially, regionally or historically grounded, are *cultural* ideas. In every social environment, then, diverse properties and functions are connected, in various combinations and with various predominances: ‘purposiveness without purpose’, ‘making special’, representation/depiction, play, religion, ‘handicap’, instruction, emotional training, utopian imagination, mental health, and so on; and, of course, sounds, colors, contours, words—all these are features and functions which can occur in artifacts and aesthetic behavior—but they do not necessarily have to.

However, there is no need to give up the question for the evolutionary origins of the arts. On the contrary, we should try to *decompose* what we today intuitively think art to be into its fundamental elements, and then go back to the emergence of these individual components in their respective EEA. This conforms with Carroll’s second criterion that we must “identify the adaptive problem this behavioral disposition would have solved in ancestral environments”—provided that we put “problems” and “dispositions” into the plural. What is at stake is a *multitude* of *diverse* adaptations, which were developed for a *multitude* of *diverse* problems. And the procedure would have to be extended by yet another step. This step is the analysis of the historico-cultural conditions and constraints which determine that a specific combination of dispositions could establish itself, and could perhaps even be employed to resolve new problems. Thus, the task would be: (a) to decompose

the everyday concept and phenomenon of “art” into its fundamental elements, (b) to identify the evolutionary origins of these components, and (c) to analyze the respective selection and higher-level interplay of these components under diverse cultural circumstances.

This cannot be done without a clear distinction between the original emergence of an adaptation on the one hand, and its present form and function on the other hand, i.e., between the “ultimate” causation (the evolutionary origin) and the derived “proximate” causation which persists through various cultural conditions.⁷² Concerning the *proximate* cause of aesthetic behavior, Pinker’s vote for “pleasure” is, we think, an important contribution. In addition to that, however, we would have to ask for the *ultimate* cause of that pleasure. We would have to ask, in other words, why humans have evolved an intrinsic motivation to activate their mental apparatus in non-functional contexts. On this question, we regard the observations by Tooby and Cosmides in their essay “Does Beauty Build Adapted Minds?” as seminal: They point out that “building [such a complex machinery as the human] brain, and readying each of its adaptations to perform its function as well as possible is [...] a vastly underrated adaptive problem” itself (14). This problem was solved, they believe, by evolving “aesthetic motivations” (i.e., ‘pleasure’ responses), which help to “detect, seek, and experience certain aspects of the world,” activate adaptive programs, and, by this means, serve as “a necessary guidance system for the development of each adaptation” (15). Thus, seemingly pointless behaviors do have an adaptive value, because those repeated performances in a purely “organizational mode” (16) “help adaptations become organized into their mature form” (15).⁷³

From this perspective, art behavior aligns with play behavior in animals and children as formerly characterized by Karl Groos and Karl Bühler.⁷⁴ The aesthetic preference systems detect appropriate occasions for play, that is, they detect stimuli which are appropriate to trigger adaptive programs because of an at least partial “isomorphism” (Tooby and Cosmides, “Does Beauty Build?” 16ff.) with selectionally relevant features of the EEA. Hence, the effects of works of art have been compared to those of stimulus models.⁷⁵ This comparison works especially well for several non-semantic aspects of the arts. One can think of the many pointless repetitions which provoke endless delight in little children and reoccur, as rhyme and verse, in poetry, as melodic phrase in music, or as ornamental arabesques in painting (Eibl, “Biologie”). One can further think of pre-semantic patterns of intensification and decrease, or generally of all regular patterns and ‘gestalt’ forms which normally guide our environmental experience and, in the

organizational mode, can be enjoyed as pleasurable principles of arrangement. Thus, even the attendance at a symphonic concert is based, among others, on the pleasure which already in the Pleistocene derived from pointlessly exercising and calibrating our auditory system.

Stimulus model effects also determine our emotional responses to the arts.⁷⁶ This regards not only our more agreeable feelings, of which the phrase of the famous “cheesecake for the mind” reminds us first, but also less agreeable emotions like fear, sadness, or disgust. As the latter are equally adaptive programs, their performance in the organizational mode is intrinsically rewarding and can lead to such paradoxical phenomena as the ‘agreeable horror’ or the ‘joy of grief.’ However, unlike a bird, for instance, whose feeding activities can be triggered by the open mouth of its offspring as well as by an appropriate dummy, humans are able to “decouple”⁷⁷ the sequence of information, drive and action, and to enjoy the triggered emotions without the need for final reactions. Humans are not more “detached from instinct” than any other animals (or even, ‘not “instinct-driven” at all’), as Carroll paraphrases Wilson, but they are particularly capable of cognitively controlling contingently true information by means of a specialized “scope syntax,”⁷⁸ of segmenting the triggered programs into individual subsequences, and creating new combinations of them. Hence, the organizational mode also provides the basis for fictional information, that is, for a core element of literature.

So far, the capability to perform adaptations in the organizational mode would indeed be an indispensable and constitutive property of all forms of art. However, it extends beyond the traditional scope of the arts in that it is also a precondition for numerous other cultural activities, from general learning by exercise, through dance, conviviality, cooking, and religious service, up to the Finnish ‘art’ of wife carrying and the Australian ‘art’ of dwarf tossing. To put it academically: this capability is not a sufficient but necessary condition of what we call ‘art.’ Moreover, the organizational mode, in the context of human behavior, not only serves ontogenetically to adapt the individual organism to a given environment but also to display, discuss, and culturally shape this environment. As is generally known, most animals are disposed to play only in their youth; as soon as they have acquired the necessary routines, however, their behavior becomes severe and inflexible. The fact that humans are ‘playing’ throughout their entire lifespan renders their behavior far more flexible than that of their animal relatives—and, at the same time, more insecure. Humans need culture, because culture builds the ‘in-between worlds’ (Eibl, “Zwischenwelten”) which regulate, by means of standardization, the mutual adjustment between the changing world and the

evolved nervous system. Mere play, Pinker's pure pleasure behavior, thus rather turns out to be a limiting case. In the standard case, playful behaviors are, in the sense of a 'secondary severity' (Eibl, "Zwei Kulturen," 38ff.), superimposed by new, and frequently culturally conditioned, functions such as, for instance, cultivating informational secureness, reducing contingency, and constantly practicing social consensus.

One might regard this as an evidence for the particular 'adaptiveness' of the arts. However, one would have to acknowledge that the function of providing imaginative in-between worlds and producing "meaning" can just as well be achieved by other, non-artistic, cultural phenomena such as law texts, traffic rules, science, or morals. Hence, we do not think that the arts are "an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence" (target article); here we would prefer to put "culture." 'The arts,' we think, do not have one biologically adaptive function but undergo many cultural functionalizations. This leads to the third step of analysis: the question for the culturally specific inter-relation of innate dispositions and actual conditions and requirements.

Pursuing this question may reveal that an evolutionary heuristics not only opens up new aspects within general literary theory but can also enter the realm of historicist analysis and be of valuable assistance there. First, the evolutionary approach can explain how, and on the basis of which innate adaptations, certain cultural phenomena could come into being at all. There is, for instance, no conception of the 'sublime' without innate fear stimuli (Mellmann, *Emotionalisierung*, 92ff., 231ff.); there is no delight in detective novels without a 'cheater detector' and so on.—Secondly, a comparison of the original adaptive functions of a behavior and its actual cultural ones can help to define the culturally specific more precisely. To give an example: naturalists have rightly argued against the assumption that romantic love is 'merely' a social construct. However, one should keep in mind that also the hypothesis of romantic love as a cultural 'invention' is based upon an important and accurate observation. Passionate love, understood as an innate psychic module for adaptive mate choice (Fisher, "Lust"), has presumably always existed. Why, however, on the ground of this general human experience, the sophisticated (predominantly literary) technique of *self articulation and world depiction* developed in the course of the eighteenth century cannot be answered but in a cultural-historical perspective. It is therefore not enough to refute radical statements from social constructivists. Instead, we should

specify them further and let them gain new relevance by adding the evolutionary perspective.

Carroll also highlights the cultural superimposition on human nature when he remarks (with Wilson): “We do not have the option of living outside our own imaginative constructs.” However, two additional considerations are necessary here. Biologists should pay attention to the fact that not only products of the arts provide us with imaginative constructs but that our entire culture essentially consists of constructs; and culturalists should pay attention to the fact that those constructs are by no means free inventions but are built on elements of our biological inheritance and still have to stand the test of their evolutionary environment.

The Evolving Study of Literature

Carroll offers a wide-ranging survey of “literary Darwinism.” Along with his prior surveys, it will certainly serve as a starting point for research in what he hopes will become a burgeoning field. He is, however, rightly concerned that this new angle on the critical analysis of literature should not become another erratic on the plains of the post-modern glaciation. Recognizing the possibility of a fresh start, grounded on the foundations of the historical sciences, his ultimate hope is for literary Darwinism to contribute new knowledge. If this is plausible, it could add to the storehouse of consilient knowledge that has emerged from Darwin’s holistic evolutionary perspective. That, certainly, would be something that literary criticism has not attempted or been known for, of recent. The basis for optimism regarding the possibility of creating new knowledge in literary Darwinism is sound—nothing less than the holistic ecology of evolutionary biology and the interconnections of emergent complexity in the cosmos (Kauffman 119). The literary Darwinists reviewed by Carroll attempt to describe the manifestation of this interconnectedness at the level of human culture and reflection. Tenuous as first steps may be, we see here a solid foundation from which to escape the political forms that have stymied humanistic scholarship.

Carroll’s optimism regarding the possibilities for a new contribution to knowledge draws our attention directly to manifestations of evolutionary nature in literature and the arts and particularly to the disputed topic of human universals. Universals are central adaptive characteristics that have emerged as the human species interacted with its terrestrial environment over millions of years. Of course some foundational elements of these universals emerged before humans, making their cultural expression the more powerful and universal (Shubin 27). The basic responses and emotions deriving from the biological prime directives (survival and reproduction) are pre-human and constitute the core of perennial literary themes such as love and war. Identifying and describing the manifestation of these universals in literature and the arts is the first great challenge in implementing literary Darwinism as a practical criticism. Repeatedly in Carroll’s survey of

existing research, one senses a struggle to make the connection between the simple elegance of the Darwinian mythos and the cultural and psychological complexities of literature and the arts. The surveyed results offer a quilt-work of suggestions ranging from the fundamental to the overwrought. So, for example, Brian Boyd's hypothesis that literature is "cognitive play that develops creativity and helps form social identity" (in target article) seems only weakly connected to the temporal character of literature. Under the heading "The Adaptive Function of Literature," similar suppositions (focusing attention on adaptive salients (Dissanayake), focusing shared attention (Boyd), and social cohesion (Boyd and Dissanayake) do not seem to possess the low-level hooks that one looks for in a biologically rooted cultural form. Carroll himself observes that the suggested adaptive functionality of enhancing creativity is not specific to the arts; technology does this as well.

In several places Carroll describes observations that converge on a connection between a basic literary form and a primary environmental condition. In an earlier book, *Evolution and Literary Theory*, Carroll linked several literary phenomena under the rubric "cognitive mapping" (in target article). Several independent studies in his survey agree that the link between story and environmental processes lies near the centre of literature's adaptive function (for example, Panksepp & Panksepp; E.O. Wilson's scenario machine; Tooby & Cosmides' "powerful organizing effect"). Carroll extrapolates this function from narrative to the arts generally. Although this linkage may be apparent in other arts of spatio-temporal representation, generalization at this point seems a mistake. The focus on story and its direct connection to environmental events is a solid lead, the best and broadest example of human ecology evoking literature. E.O. Wilson's surmise that literature and the other arts meet some deep emotional needs ([the] "need to produce and consume imaginative artifacts would be as real and distinct a need as hunger, sex, or social interaction") is derivative from this fundamental functionality. Given the early stage of literary Darwinism it seems advisable for primary energies to concentrate on the basics. A focus on the narrative form of literature provides two important linkages for literary Darwinism: one, an immediate linkage with the orienting Darwinian narrative of life; the other, a connection between a cultural form and the pervasive environmental condition of causally connected events. Like many of the stories from the ancient world that achieved "classic" status, the Darwinian story of evolution provides an encompassing narrative, mirroring and mapping the natural historical processes in which humans find themselves. Although a great deal of human adaptation is

unconscious and genetically based, literature is at least partly a product of conscious adaptation. And at the centre of literary structures of representation we find story—a representation of the matrix of environmental events and agentive behaviours that constitute the human environment. Stories are “cognitive maps” (in the target article) by which conscious adapters navigate, remember, and communicate valuable information about their environment. Of course cognitive maps were not, in the first instance, full blown literature. The novel comes much later, but the simple beginnings of story certainly would have provided human ancestors with a competitive edge over other organisms relying on comparatively glacial and unreflective genetic memories. The same holds true with regard to inter-human competition. Groups with the most accurate stories would also have been in a position of competitive advantage (just as Darwin saw that those with the greatest internal cohesion would be ahead of the others).⁷⁹

Carroll’s concern that the new Darwinian perspective should not become just another critical approach is justified. Academic libraries are stuffed with scholarship that takes more space on shelves than in heads. Darwinism teaches us to ask what something is for, what its adaptive purpose is. When something loses utility it atrophies and turns to dust, an alarm raised by the dusty volumes in academic libraries. So what hope is there for a literary Darwinian to make a contribution in its native environment, where fame may be built on the biophobic perception that culture has escaped its natural ecology (cited in the target article)? Perhaps the best course would be for literary Darwinism to take a chance and stop trying to reform the old haunts of literature and the arts. Carroll mentions conference proposal rejections for a Darwinian perspective perceived as not on the post-modern edge. I expect that his experiences have been duplicated many times. What, then, about a contribution not to literature and the arts but rather along the lines of one of the oldest forms of humanistic reflection? “Know thyself”: for the last 150 years or so, many of the most penetrating insights into the human condition have come from Darwinism and the historical sciences. “Darwinian literary studies” marries an evolutionary framework that provides a new critical perspective with the natural reflective qualities of the best in literature. Taken together and set on a new page uncoloured by the politics of humanistic discourse there is a good hope that literary Darwinism might add at least some of the self-knowledge we seem to need to steer culture’s course back toward something fit for nature’s ecology.

How Might Literature Do Harm?

Literature enriches human experience, as Carroll and other evolutionary theorists have pointed out. Many positive aspects of literature, such as how it can be used to transmit social information and how it can help people organize knowledge about the world, have been highlighted recently by evolutionary theorists (Boyd, “Evolutionary”; Scalise Sugiyama, “Reverse-Engineering”). As Carroll’s essay indicates, there is an on-going debate about whether the capacity to produce and comprehend narratives is an adaptation or is parasitic on other evolved cognitive abilities. We suggest that this debate should be more informed by the possible negative—and sometimes maladaptive—consequences of the human species’ capacity to experience narrative and engage in imagination.

Researchers have argued that fiction allows people to simulate new experiences and vicariously learn about new situations (Mar Oatley; Scalise Sugiyama, “Reverse-Engineering”). These analyses have suggested that people expand their social knowledge through narratives, allowing them to learn about how society deals with things from marriage to murder. Through narratives, people learn what is expected of them and how to behave in new situations in accordance with societal norms. Narratives also bolster the ability to understand what is happening in the minds of other people. Many narratives allow people to take a different perspective, such as the perspective of somebody of the opposite gender. When people engage in social interactions, they may draw on the knowledge gained from narratives to help interact more smoothly. In that way, narratives play an important role in passing on social knowledge.

While this analysis suggests that narrative plays an explicitly prosocial role in human development, we would do well to recall why Plato expressed a strong fear that stories could have a negative impact on children’s moral development. In the *Republic*, Plato notes that “poets and story-tellers are in error in matters of the greatest human importance. They have said that unjust men are often happy and just men wretched, that wrong-doing pays if you can avoid being found out, and

that justice is good for someone else but is to your own disadvantage” (Lee translation 148-149). For these reasons, we must be concerned that literature has the potential to corrupt.

In fact, researchers have demonstrated that, after reading a moderately engaging story, people will express more agreement with statements that straightforwardly contradict real-world truths (e.g., that mental illnesses are contagious) (Prentice, Gerrig, and Bailis; see also Wheeler, Green, and Brock). Narrative impact does not fade quickly: When compared to immediate tests, readers’ beliefs were more influenced by the story content two weeks after reading a story (Appel and Richter). When readers experience a strong sense of being transported to a narrative world—when they give reports of focused mental involvement with the story—they are also more likely to modify their beliefs and attitudes in the direction of the story (Green and Brock, “The Role”). The experience of being transported effectively reduces readers’ motivation to argue against information presented in a story (Green and Brock, “Mind’s Eye”; and Prentice and Gerrig). Those works of literature that most effectively immerse their readers have the greatest potential to do both good and harm. The question becomes what distribution of information is actually made available through texts. Plato’s characterization of the lessons offered by poets and story-tellers has great contemporary resonance. How can we be certain that, on balance, it’s a good thing that readers absorb lessons from literature?

As an example of why we might be concerned, consider the question of whether exposure to televised aggression has a negative impact on people’s subsequent behavior. To address this question, Huesmann, Moise-Titus, Podolski, and Eron undertook a longitudinal study. Beginning in 1977, the researchers spent two years recording the extent to which 557 first- and third-grade children watched TV shows with violent content. Fifteen years later, the researchers were able to locate 329 of those children (as 20- to 22-year-olds). The participants’ adult levels of aggression were assessed both through self-reports and other-reports (from individuals such as spouses). The data revealed a clear pattern: For both men and women, those individuals who had viewed the most televised violence in grade school displayed the highest levels of aggression as adults. The researchers used other data to argue against the possibility that the predilection toward aggression comes first (e.g., the data showed only a small relationship between childhood aggression and the individuals’ viewing of TV violence as adults). Thus, the data suggest that the lessons children absorbed from violent narratives predicted later aggression.

Of course, the human species' capacity to experience narrative evolved well before the advent of television. For that reason, we are on dodgy ground when we invoke contemporary examples to reflect on literature as a means for instruction. That point is equally true whether those examples serve to illustrate the potential for good or the potential for harm. Still, any discussion of the processes by which readers acquire information from literature should not ignore the potential for harm.

Another argument in favor of the adaptive value of literature has centered on the virtues of imagination. Imagination, which plays a key role in our understanding of narratives, plays an important role in our everyday life. As Carroll states in the target article, "We live in the imagination. No action or event is, for humans, ever just itself. It is always a component in mental representations of the natural and social order, extending over time." However, other commentators have noted that the "longing to lose ourselves in fiction" incurs "the dangers of confusing fantasy with reality" (Pinker, "Towards a Consilient Study" 163). Research in psychology suggests that those dangers are quite genuine.

Studies on false memories have demonstrated that people confuse events that they have only imagined with events that really occurred. Consider a study by Thomas and Loftus that unfolded over two weeks. In an initial experimental session, the researchers asked the participants either to perform certain actions (such as bouncing a ball on the floor) or to imagine doing the actions. Twenty-four hours later, participants returned to the laboratory and only imagined themselves performing actions—including some from the previous day—from one to five times. Two weeks later, the participants returned and attempted to discriminate between those actions they had actually performed and those that they had only imagined. Many of the participants claimed to have performed some of the actions that they only imagined, including bizarre events such as balancing spoons on their nose or sitting on dice. The more times an action was imagined, the more likely it was that people would falsely claim to have performed the action. Experiments of this sort demonstrate the permeability of the boundary between the imagination and reality.

In fact, the permeability of this boundary gives rise to behavior that is explicitly maladaptive. Consider the experiences of individuals who suffer from obsessive-compulsive disorder (OCD). OCD is characterized by obsessions—persistent, recurring inappropriate thoughts—that intrude on a person's consciousness in a way that causes anxiety and compulsions—repetitive, purposeful behaviors—that function to neutralize anxiety (*DSM-IV*). For example,

“individuals with obsessions about being contaminated may reduce their mental distress by washing their hands until their skin is raw” (*DSM-IV* 418). At some point in their lives, 1.6% of U.S. adults experience the disorder (Kessler, Berglund, Demler, Jin, Mrikangas, and Walters). Researchers have suggested that, in the experience of OCD, “imagination plays a decisive role in rendering remote possibilities more probable” (Aardema and O’Connor 194). Consider this case report from a patient: “I could be crazy enough to cut out my tongue. When I’m anxious, I can ‘see’ myself doing it, using a knife to cut it off. It feels like I could actually do it” (O’Connor, Aardema and Pélissier 121 as cited in Aardema and O’Connor). Such obsessions represent circumstances in which “the imagination is informed not by objective criteria but by a persuasive narrative leading the person to treat a possibility as reality” (Aardema and O’Connor 190). Thus, as possibilities migrate from the imagination, OCD sufferers begin to engage in behaviors that have a negative impact on their day-to-day functioning. This is one consequence of the human imagination. OCD is just one example of circumstances in which “believed-in imaginings” have potential negative consequences (see de Rivera and Sarbin).

As we noted at the outset, Carroll and others have called attention to the various ways in which literature enriches human experience. We are inclined to agree with that assessment. However, we have attempted to illustrate why the potential for good and the potential for harm should be evaluated side-by-side. By recognizing circumstances in which experiences of narrative and uses of imagination may have negative consequences, theorists can enter into a more nuanced debate about particular evolutionary analyses.

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Human Nature's Human Nature

Joseph Carroll's overview of an evolutionary paradigm for literary study is so comprehensive and lucid that there isn't very much I would care to criticize. But I *would* like to expand its reaches. The whole notion of "human nature" has had a fairly bad history, exploited as it has been to reinforce conservative and reactionary programs to force human beings into conformity with transient social imperatives. Homer and Nature may have been the same for Alexander Pope, and Jon Gottschall does very well with his literary analyses of *The Iliad* in terms of the updated human nature that has been so improved upon by biology and neuroscience, but we obviously will continue to need revised contemporary models. Freud's picture of human nature now strikes us as verging on the bizarre: penis-envy, myths buried in neurons somehow inscribed with Oedipus and Elektra? Put otherwise, "human nature" as a concept needs to be open-ended, since its particular biological foundations will be subject to revision like all scientific truths. Even Joseph Carroll, coming as he does from Victorian Studies and its constitutive elements, such as the 19th century novel, is bound to seem limited by criteria that eventually won't appear as "scientific" as he would hope, since "scientific" is best understood along a sliding scale. (Think of the pre-Foucauldian misdirections of Thomas Kuhn.)

Scientists themselves tend not to speak of "the" scientific method. Alan Sokal, a physicist notorious for his famous hoax, speaks in his new book of "epistemological opportunism" as the best bet for validation in the sciences, since there is no single "method" that equals "science" (249 *et passim*). And one need only consider all the clinical trials for food nutrients, anti-cancer drugs, regimens for warding off Alzheimer's, macular degeneration, and colon cancer (flat lesions being the latest discovery) to see how radically revisionary the most widely researched conclusions tend to be. In the more discursive sciences, such as evolutionary psychology, interpretation is perhaps the chief and most vulnerable technique. Even statistical findings fail to speak for themselves as we have already seen in the above examples from the hard sciences. And speaking personally, when

it comes to the humanities, I react to the use of “scientific” as if it were metaphor. I probably would feel more at ease with “in the spirit of the sciences.” I say these things as a believer in the various post-Darwinian sciences who nevertheless suffers from a fear of triumphalism.

So there are still lots of worlds to conquer that will have been totally neglected or denied by all sorts of conventions and proprieties as well as research questions not asked because not even thought of. Jon Gottschall and his students did not find unsurfaced, unacknowledged, unwitting conventions or needs in folk and fairy tales from around the world and Joe Carroll does not find them in Victorian literature. Taboos are unspoken even as they are operative while “invisible.” But what you don’t ask you’re unlikely to find. And of course, you can’t ask about things you know nothing about. There’s a growth industry out there. “Reality” is in little danger of being used up. Ph. D. students, *nota bene!*

Do We Need Literary Darwinism?

In his essay, “The Sleep of Reason” the philosopher Thomas Nagel remarks: “[Postmodernism] may be on the way out, but I suspect that there will continue to be a market in the huge American academy for a quick fix of some kind. If it is not social constructionism, it will be something else—Darwinian explanations of practically everything else” (Patai and Corral 552). Now associated with extraordinary advances in genetics, Darwinism promises a scientific understanding of any and all disciplines in the humanities and the social sciences. Think of postmodern skepticism about words like “truth” and “reality.” The neo-Darwinian approach removes the quotation marks that surround them. As I say in my book, *Darwinian Misadventures in the Humanities*, “I would be less than candid not to acknowledge that the present condition in the humanities (its self-doubt and disarray) is a kind of invitation to the neo-Darwinists” (1). E. O. Wilson, founder of sociobiology, draws the following contrast between the Enlightenment tradition in which he places himself and postmodernism. “Postmodernism is the ultimate polar antithesis to the Enlightenment. The difference between the two extremes could be explained as follows. Enlightenment thinkers believe we can know everything, and radical postmodernists believe we can know nothing” (*Consilience* 44). This is a debatable formulation, but it does reveal the mindset of the neo-Darwinian approach. In his book *Consilience* Wilson has no less an ambition than to unify all the disciplines on the basis of biology. The ultimate ambition of literary Darwinism, as Joseph Carroll makes clear very much in the Wilsonian spirit, is “to fundamentally [alter] the paradigm within which literary study is now conducted” and “to subsume all other possible approaches to literary study.” Historical, aesthetic, sociological, rhetorical perspectives are to be incorporated into a predominantly biological approach to literature. Though Carroll acknowledges that theoretical approaches other than literary Darwinism have provided insights into literature, he sees them as all flawed, requiring their

rescue by evolutionary psychology. The chutzpah is breathtaking, given the absence of anything approaching a theory of literature in the paradigm he presents.

Can evolutionary psychology say anything interesting about literature? My answer is that it is possible, that I am not a prophet and can't predict the future. On the basis of what I've read up to now, I must confess that I am a skeptic. Both the general understanding of literature and the interpretations of individual works are crudely reductionist. Reductionism in the natural sciences is no vice; on the contrary, it enables one discipline (for instance, physics) to explain another (chemistry). In the humanities, however, it subverts the uniqueness and complexity of works of art. Carroll's complaint about "traditional humanist criticism," (which I exemplify in his essay) is that lacking in empirical curiosity, it "operates on the level of the author's lexicon and seeks no systematic reduction to simple principles that have large general validity" (*Literary Darwinism* 213). Well, this hardly seems a deficiency. The alternative that Carroll and his fellow literary Darwinists propose is the dissolution of the individuality of a work (the very reason that we enjoy and value it) into large generalizations that remove all of its distinctive features and vitality.

Here are some samples, striking in their banality: "Humans are bipedal, but proportional to body size they have much larger brains than other primates.... Human beings are heavily dependent on parental care for much longer than other animals...Parents and children share a fitness interest in the success of the child—in the child reaching maturity and achieving successful reproduction...Human beings are physically discrete. Individual persons are bodies wrapped in skin with nervous systems to brains that are soaked in blood and encased in bone." And then there is the occasional sentence of stupefying opacity: "The arts are thus an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence." I would think that a detailed attention to particular works of literature would be a mark of empiricism. None is forthcoming in Carroll's essay. Despite its claim to be empirical, literary Darwinism encourages readers to find confirmation of what evolutionary psychology determines to be psychological truth rather than being open to what a work of literature does or says.

Worse, straining to find to find such confirmation the result may be an exercise in irrelevance as when David and Nanelle Barash offer up the following in their grotesquely titled book *Madame Bovary's Ovaries*.

Like the rest of us [Othello] has been restricted to just one Desdemona at a time. [Where in the play is there the suggestion that Othello feels restricted in his love for Desdemona?]....During the rut, bull elk are notoriously aggressive and

intolerant of each other, while cow elk are comparatively placid; even among monogamous songbirds, males regularly patrol their territories, alert for intruders. [What do the rutting habits of bull elk have to do with Othello's behavior in the play?] ... It is also worth noting that Othello is considerably older than Desdemona, a pattern that lends itself to an additional slate of evolutionary insights. Yet another biological asymmetry between sexes is that whereas women go through menopause, men remain potentially reproductive into old age" [Neither Desdemona's menopause nor Othello's putative geriatric fertility figures in the play.] (20, 21).

If it weren't for the obvious seriousness of the authors, we might think that we were being treated to a parody of literary interpretation. The book, listed in Carroll's bibliography, has the endorsement of none other than E. O. Wilson, who speaks of it as an "account of an important new development in literary criticism: the incorporation of the biology of human nature."

The key idea in Carroll's account of the evolutionary paradigm for literary study is that "humans have evolved in an adaptive relation to their environment." This is accomplished through the agency of natural selection, "shaping motives and emotions so as to maximize the chances that an organism will propagate its genes, or copies of its genes in its kin." It would then follow that the writing and the reading of works of literature help in the adaptation, a plausible but hardly comprehensive claim for the whole of literature. I can think of many major works of literature that have the contrary effect of unsettling our relation to the environment. How does *King Lear* or *Gulliver Travels* or Kafka's *The Metamorphosis* illustrate the adaptive function of literature? A person in the bourgeois comfort of her home would do well to avoid reading any of these works if she wished to maximize her chances for a successful adaptation to the environment. Not a word in Carroll's benign paradigm of evolutionary psychology on the nihilistic, genocidal propensities of tribes and nations. His depiction of human nature has a comfortable middle class setting.

Carroll takes me to task for not being truly interested in what constitutes human nature. Of course, I want to know as much as possible about human nature. As I made clear in my book, I do not share the postmodern view that human nature is a blank slate. I am, however, skeptical about the confidence of evolutionary psychologists that their putative knowledge of human nature gives them the authority to interpret and evaluate literature. In quoting my sentence, "human nature may not be a blank slate, but do we know enough to know what is inscribed upon it," Carroll fails to provide the context for it, Steven Pinker's blinkered

wholesale repudiation of modern and postmodern in *The Blank Slate*. Unhappy about the condition of modern art, he wants to answer the question of why “the arts are in trouble.” And he finds the answer in Virginia Woolf’s misguided statement that human nature changed in 1910. So, in Pinker’s view, modernism, mistakenly proceeding as if human nature has changed, abandoned realism in literature in which works unfold from beginnings through middles to endings in true Aristotelian fashion for narratives of indeterminate structures, and it rejected representational art for paintings that are “freakish distortions of shape and color and,, abstract grids, shapes, dribbles, splashes” (15) and so on. The modernist literature of Joyce and Proust, the modernist art of Picasso and Braque and the postmodernist art of Jackson Pollack among many others are judged to be violations of human nature, according to a scientific, evolutionary psychological understanding of it. Human nature for Pinker turns out to be the exercise of bourgeois virtues. “The fact is that the values of the middle class—personal responsibility, devotion to family, and neighborhood, avoidance of macho violence, respect for liberal democracy are good things, not bad things. Most of the world wants to join the bourgeoisie, and most artists are members in good standing who adopted a few bohemian affectations” (18). Pinker defends bourgeois virtues, which are real, but he writes about them as if they are pieties immune to criticism, so much for Stendhal, Flaubert and Baudelaire and so much for a disinterested scientific treatment of the subject.

Is it unreasonable to wonder about an evolutionary psychologist’s claim to knowledge about human nature when it is the basis for a wholesale rejection of a body of great literature? The effect of Pinker’s approach is prescription and proscription. It is not literature and the arts that explore the uncharted territory of human nature, but “science” that is supposed to establish what human nature is and in effect police literature and the arts. Rather than being open to the creative surprises of the literary imagination, the evolutionary psychologist seeks confirmation for his theory in literature and when he doesn’t find it, it is literature that is at fault. It is hard to see either science or critical illumination of literature and the arts in such an approach. Taken seriously, Pinker’s philistine view would inhibit rather than foster the creative imagination. I would be curious to know Carroll’s opinion about Pinker’s approach.

Natural selection is *a* driving, if not *the* driving, force in evolutionary theory. Human life is a result of natural selection, but intelligent design has a large role to play in human achievements. It is not at all clear how the mindless activity of genes contributes to the making and the understanding of literature and the arts. Aware of

the problem, Richard Dawkins, perhaps the most fervent advocate of the neo-Darwinian synthesis, has proposed an amendment to “the genetic history of mankind.” He has introduced “the meme” as a cultural counterpart to the gene. “Mimeme comes from a suitable Greek root, but I want a monosyllable that sounds a bit like ‘gene’ . . . it could alternately be thought of as relating to ‘memory’ or to the French word *meme*” (*The Selfish Gene* 18). Examples of the meme are physical embodiments of ideas such as “the wheel,” “calculus,” “chess,” “impressionism.” Memes like genes replicate themselves. What is not evident is how they produce cultural variation. Take the instance of impressionism: how does the meme produce the differences among Renoir, Pissarro and Monet? The concept is the product of speculation—without any empirical or experimental basis as far as I know. Enough to say that the conception of the role of culture in the neo-Darwinian synthesis is rudimentary and hardly justifies the high confidence of its advocates in their forays in the studies of literature and the arts. Aristotle’s *Poetics* is grounded in his conception of biology, but he knew, as the current breed of Darwinists don’t seem to know, that you need to have both a theory of literature and a literary sensibility that produce results when you engage a particular work of literature and not be content simply with generalities about human nature. Are there biological components in the making and understanding of literature and the arts? I am sure there are. My main objection is to the attempt to turn evolutionary psychology into a systematic approach to literature, comparable to a Freudian or Marxist or Structuralist approach. The result would be disastrously Procrustean.

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What Are Literary Scholars For? What is Art For?

On May 11 2008 I published an article in the Ideas section of the Sunday *Boston Globe* called “Measure for Measure.” The article was basically a précis of my book *Literature, Science, and a New Humanities*, and it sounded many of the same themes that dominate Professor Carroll’s target article.

Like Carroll, I argued for a fairly radical solution to the malaise in academic literary study: we should study the successes of the sciences and, insofar as possible, we should try to emulate them. Also like Carroll, I did not argue that scientific tools can replace judgment, imagination, erudition, or good scholarship. I argued that combining these humanistic virtues with scientific tools would create new synergies (I find Carroll’s synergistic vision for the future of the discipline, expressed in his conclusion, entirely appealing and entirely achievable). In the digital age, a counter-intuitive argument appearing in a high-profile forum instantly becomes a target article itself. By now about one hundred bloggers have weighed in on my article.

The blog is a genre for impulsive rants, and in addition to substantive critique, posts about my article are rife with ridicule and *ad hominem*. To many bloggers the *Globe* article marked me as “pathetic,” a “philistine,” a “bullshit artist,” a peddler of ignorant “tosh” and “silly scientism,” and “a tenured nitwit” (alas, not even tenure-track, in reality). There were positive responses too. One blogger said that the article gave him a “man crush” and inspired “explosively incontinent affection” (er, thanks). But the positive responses were dominated by people who are deeply disaffected by what one blogger called the “useless nonsense” and “inane babbling” of contemporary literary study. I had the feeling that many of these writers would applaud anything smiting standard practices in the field.

I predict that Carroll’s target article will receive robust support from respondents who are already committed to a consilient, biocultural approach, but there will also be many stridently negative responses which—while robed in

academic niceties—will seethe with the kind of resentment that was freely vented in the blogospheric reaction to my *Globe* article.

I think all of the sound and fury about a more scientific approach to literary study signifies a deep rift in intellectual culture about the *raison d'être* of literary scholarship. Carroll references this rift in his overview of disciplinary history,

Literary criticism over the past century has spread itself along a continuum between two poles. At the one pole, eclectic general knowledge provides a framework for impressionistic and improvisatory commentary. At the other pole, some established school of thought, in some domain not specifically literary, provides a more systematic vocabulary for the description and analysis of literary texts.

Obviously, naturalistic literary study has most in common with the latter pole, and that may make it seem like merely the latest attempt to force a grand, faddish “theory of everything” onto the field—like Marxism or psychoanalysis or poststructuralism. But this actually underrates the radicalism and ambition of Carroll’s vision. Carroll is not only arguing for reinterpreting texts through the lens of consilient knowledge, he is arguing for a wholesale disciplinary migration toward a scientific ethos.

In so doing, Carroll is making an argument about the ultimate point of literary scholarship. This comes through in the final section of the essay where he argues that the most serious challenge for the Darwinists is this: can we “produce formulations that are not only new but true?” Can we produce “new knowledge—real knowledge, knowledge that is consilient with the broader world of empirical research”?

So for Carroll, and for me, the ultimate test of a literary paradigm is whether or not it succeeds in making durable contributions to the sum of human understanding. And his critique of the currently dominating paradigm—expressed here rather gently, and in his earlier writings rather less so—is that it has spectacularly failed to do so.

I think Carroll is right about this. But there are at least two ways in which we both might be wrong.

First, it may be that we have simply missed the point. It may be that the *raison d'être* of professional literary study is *not* knowledge accumulation. This position was recently expressed to me by a good friend over beers. In the course of our conversation, I was able to corner him and make him admit that Freud was in all probability wrong about The Oedipus Complex and that Lacan was in all probability wrong about The Mirror Stage. But I could not convince him that psychoanalysis’s weak claim to explanatory validity meant that it should be

drummed out of literary theory. My friend says he will still teach the tenets of psychoanalytic criticism in literary theory class, not because he thinks they have truth value but because they “are still illuminating, they bring out pattern.” So, for my friend, the ultimate point of literary study is not to accumulate knowledge that is “truer” than what we possessed before. For him, the point of professional literary study is harder to express, but it involves appreciation, imaginative play, self-improvement, and cognitive exercise. (Note that the issue is not how people ought to *read* literature. It is about what professional literary scholars are supposed to be producing when doing their jobs.)

On the other hand, many respondents might agree with Carroll that the ultimate purpose of literary scholarship is to accumulate more reliable knowledge about the subject, but vehemently disagree about how we should go about this. Carroll proceeds on the assumption that there is no real barrier between the sciences and humanities, no wall or moat or prophylactic of any kind that blocks the application of scientific tools to humanities questions. Humanities questions are often deeply complex (as are questions in the life and social sciences), but they are not irreducibly complex. I share Carroll’s conviction. But if reaction from the blogosphere is any barometer, this is a minority view. Most would feel that any proposal for “literary science” would be risibly (if not pathetically) oxymoronic; such a proposal would signal a stunning failure to grasp that literary scholars and scientists are studying *fundamentally, radically* different kinds of stuff.

There are signs that scholars are girding up for a big fight about the role of scientific theory, method, and ethos in humanities scholarship. Happily, however, the question of whether or not scientific tools can help humanists generate more reliable knowledge is not one of those academic disputes that has to drag on and on until everyone gets exhausted and gives up. This is a dispute that will yield to empirical evidence. Either movement toward a more scientific paradigm in literary studies will yield superior results (of the kind Carroll describes in the conclusion to his article) or it won’t. As E. O. Wilson wrote in his preface to *The Literary Animal*, “There is only one way to settle the issue [of whether the humanities are consilient with the sciences]: Go there and find out; utilize Francis Bacon’s dictum that truth comes more easily out of error than out of confusion” (vii).

Shifting lanes, I will respond briefly to Carroll’s discussion of controversies about the possible adaptive function(s) of fictional narrative and other art forms. Natural selection is a ruthlessly utilitarian process. So the question is, Why art? Why should

humans spend (waste?) so much time with this stuff? Why did our ancestors choose to consume or compose songs or tales or poetry when they could have been out courting mates or stalking food—finding direct ways of passing on their genes? Shouldn't individuals and groups that engaged in seemingly wasteful activities like making visual art or telling tales have been rapidly out-competed and displaced by those who kept their eyes on the ultimate evolutionary prize: sustaining survival in order to produce more and healthier offspring?

Steven Pinker has argued that art forms may have no genetic benefits at all—they may simply be, as Carroll puts it, “parasitic side effects of cognitive aptitudes that evolved for other functions.” (Pinker makes a possible exception for fictional narrative, which he believes may have conferred adaptive benefits as a sort of virtual reality simulator). As Carroll acknowledges, humanists who have grappled with this evolutionary riddle have typically preferred adaptive explanations and have been highly critical of by-product explanations like Pinker's. As Carroll notes, a frequent argument against by-product has been to “observe that since the arts consume vast amounts of human time and effort, selection would have worked against retaining them if they had no adaptive value.”

This argument has been made by several theorists, but it is framed with most vigor and precision by Brian Boyd in his forthcoming book, *On the Origin of Stories: Evolution, Cognition, Fiction*.

If the byproduct hypothesis were correct, then over thousands of generations and millions of births, individuals and societies with a lesser disposition to art would have prospered, because they did not incur the high costs of art and either simply had more opportunity to rest and harbor resources—like other top predators, such as big cats—or had more to time and energy to devote to activities that did yield benefits, such as producing new resources or competing to acquire the resources of others. These more ruthlessly utilitarian and competitive realists would have survived and reproduced in greater numbers, and over evolutionary time their descendants would have supplanted those with a disposition to art. Societies without any inclination to create their own dress, song and story would have ousted those that did have these things. Individuals and groups without art—without shared songs and dance (including anthems and war-dances), without their own styles of dress and design (including face-paint, scarification or tattoos, uniforms, emblems, flags, or monumental architecture), without shared stories and sayings (including myths, heroic legends, proverbs)—would fare better than those with all these things that art makes possible. But that seems never to have been the case. No human society lacks art, and the most successful societies have more art than ever before.⁸⁰ (127)

My point is not that Boyd is wrong in his critique of the by-product theory—clearly he has a point here, and there is more to his critique than this snippet. Moreover, *On the Origin of Stories* marshals a stunning amount of information from a broad

swath of fields to offer compelling arguments for how and why art propensities may have evolved. But I think Boyd and other theorists have been too quick to reject by-product scenarios based, in part, on the logic above.

The problem with this logic is that it seems to all but rule out the possibility of a costly evolutionary by-product. Try it out. Pick some other human trait and plug it into the argument above—just make sure the trait carries costs. Instead of “art,” substitute “senescence.” The argument would then read something like this, “Senescence is an adaptation. Otherwise through the passages of deep time individuals who did not senesce would outcompete those who did, and the high fitness costs of getting old would have been selected against. Therefore since senescence has high fitness costs, yet it still persists in all human populations, it must confer adaptive advantages. In other words, getting old and dying is better for ones genes than staying young and strong forever.”

I’m choosing a semi-facetious example, absolutely the first illustration that came to mind. But by the logic given above, anything that currently exists, *so long as it carries high costs*, must be adaptive. (So this logic would *not* apply to traits like the redness of blood or the whiteness of bone—these can qualify as by-products because they are cost-free.)

Now consider a more serious illustration. Think of sickle cell anemia. No one thinks sickle cell is an adaptation. It is literally the textbook illustration of a maladaptive byproduct of an adaptive solution. Sickle cell is a damaging by-product of genes that have been favored, in certain populations, because they confer malarial resistance. Genes for sickle cell manage to persist because they are inextricably tied to genes for malarial resistance. They persist because the huge benefits of malarial resistance outweighed the smaller costs of a somewhat higher likelihood of contracting sickle cell.

It could be the same with art. For now, let’s consider only narrative art. Boyd’s literature review amply demonstrates that humans are incorrigible gossips. We have innate and insatiable hunger for strategic social information because humans reap adaptive benefits when they understand the full complexity of their social groups. Who is allied with whom? Who is sleeping with whom? Who is plotting against whom? Who is dominant? Who is up and coming?

So here’s a by-product scenario based on information gleaned from Boyd’s book. Enterprising individuals discover that they can rivet attention (and hog up the good things that come with it—including enhanced social status) by fabricating stories that are drippy with rich social information about fictive persons (think *Madame Bovary*, *The Tale of the Genji*, *The Ramayana*, *The Arabian Nights*, or

almost anything else in world literature, high or low, past or present). This could confer *benefits* on the tale teller while inflicting *costs* on members of the audience. Even if there are real costs to biological fitness associated with sitting around and listening to (or reading) stories, that propensity might not be selected against if it were inextricably knotted up with the bigger benefits of craving strategic social information—if, in other words, selection couldn't act against our susceptibility to stories without also acting against our adaptive craving for social information. In this view, storytellers would be evolutionary parasites exploiting the cognitive dispositions of their audiences. The strange human fascination with stories about made-up people would be a by-product, not an adaptation.

I'm not saying that I actually favor this specific by-product scenario or any by-product scenario; in fact, based in large part on Boyd's total argument, I think it is at least as likely that humans possess art-specific adaptations. I'm only saying that by-product scenarios strike me as plausible, and that humanist theorists have been too quick to dismiss them.

There are now a broad variety of competing hypotheses (hostile commentators would call them "just-so stories") for the riddle of art. All of these hypotheses make predictions about what should be true about art, or people's reactions to art, if the theory is true. Going forward, the big challenge—and this applies as much to the scientists as the humanists—is to start moving past the stage of generating and debating hypotheses and to begin devising ingenious ways to test them scientifically. As with emerging controversies over the merits of a more scientific approach to literary study, there is a clear (though not easy) path toward resolving controversies about the adaptive function of the arts: "Go there and find out; utilize Francis Bacon's dictum that truth comes more easily out of error than out of confusion."

Evolutionary Theory and the Naturalist Fallacy

Joseph Carroll's target article "An Evolutionary Paradigm for Literary Studies" makes a bold argument for the importance of an evolutionary perspective in the humanities, and it provides a sweeping overview of the literary research based on evolutionary theory. Carroll makes important arguments for the necessity of fusing methods and research results from the humanities and the natural sciences and the necessity of combining cognitive and evolutionary perspectives. (I make similar arguments in *Embodied Visions*.) To build bridges between the sciences and the humanities is a vital project if the humanities are to survive as a scholarly endeavor.

Central to Carroll's argument is to reopen the question of Human Nature. Given the way social constructivism in sociology and the humanities has neglected universals based on innate features of human nature, this is a crucially important move. The question of human universals has not been central to the study of fiction since the Structuralist era, and social constructionists have falsely presupposed that the human brain has no innate architecture and is thus infinitely malleable. Carroll argues convincingly that the central themes in literature reflect problems that have been vital to human survival. Further, Carroll's emphasis on universalism avoids an excessive reliance on a fine-grained modularity, and the critique of massive modularity is a convincing argument for the role of culture in establishing universal themes and structures. Carroll also gives an important emphasis to the idea that culture can only be instantiated in individual brains with specific life histories. In short, the target article is a great argument for the value of evolutionary bioculturalism.

The most tricky part of the article is the section on the adaptive function of literature, which raises many thorny questions and problems. The central problem in the article is linked to the use of the word "art." Carroll wants both to define "what is peculiar and essential" to art and to identify a specific adaptive problem that this peculiar and essential mental disposition would have fulfilled in ancestral environments. He further wants to identify design features that mediated this

adaptive function. The problems derive from the requirement that art should be something peculiar and essential, since such an essentialist definition relies on a rather historically specific understanding of art related to its institutionalization. It makes much more evolutionary sense to see the different activities that we now call art as developed out of a series of adaptations that have provided behavioral flexibility. Activities like storytelling develop in tandem with the radical increase of intelligence and the ability to provide verbal representations of memorized or imagined scenarios. As pointed out by Carroll and E. O. Wilson, whom Carroll cites, flexible intelligence evidently had enormous adaptive advantages. A flexible intelligence even supports inventions of recent art activities like film or video games that run on the old bio-computer developed in the Pleistocene by synthesizing visual, acoustic, and narrative skills. There are no special design features in the brain developed in the EEA (Environment of Evolutionary Adaptedness) and reserved for an art-essence, for instance film art, to be invented many years later. Different arts and different types of a given art activate different mental capacities, and although it is highly probable that we could identify neurological activity typical of a given aesthetic activity, I doubt that it is possible—as Carroll supposes—to identify neural activity specific for aesthetic forms. Art enhances many different activities, from strengthening social bonds to allocating special resources for perceptual activities and thus making certain phenomena special, to borrow Ellen Dissanayake's term for the function of art, or serving as means of strengthening mechanisms for imagining counterfactual situations.

Part of Carroll's argument is aimed at refuting the "hard" and problematic version of Pinker's skepticism (he has later provided softer versions) as to the adaptive value of art in general: art is a kind of "cheesecake" that activates the mind's pleasure circuits in ways similar to drugs or pornography with no adaptive value, a kind of short-circuiting of mental dispositions produced by natural selection to fulfill adaptive functions.

Pinker's sharp distinction between "just pushing pleasure buttons" and something that is adaptive and functional is difficult to maintain, because—a point I shall return to—it implies a problematic distinction between "pleasure" and adaptive behavior. Cheesecake provides you with nourishment, and environmental factors decide whether it is adaptive for you, or whether lack of exercise and too much cheesecake make it maladaptive.

However, Pinker's argument lures Carroll into taking the opposite position and to forming ideas about art based on the problematic distinction between what

simply elicits pleasure and what serves higher purposes or even causes pain. Carroll uses Freud's distinction between the pleasure principle and the reality principle, a distinction that deviates radically from an evolutionary and psychological understanding. Pleasure is an inbuilt go-mechanism aimed at motivating fitness-enhancing activities, just as pain is an inbuilt fitness-enhancing avoidance-and-stop-mechanism (see Grodal, *Moving Pictures*). There is therefore no evolutionary reason for thinking that romance novels that articulate mating fantasies, pleasurable go-scenarios, should in principle be more or less fitness-enhancing than stop-enhancing tragedies that cause pain by depicting failure and death, or that even glorify heroic suffering or martyrdom. Thoughts of death and pain may be just as escapist or maladaptive as fantasies of mating, as any mental hospital could demonstrate. Romances can provide illuminating mating scenarios and serve to reinforce urges to bond. Thus, the hedonic tone of a given fiction does not per se provide a clue as to its degree of adaptive value, it depends on the work as well as the circumstances of the given reader or viewer. It is even not so clear what counts as adaptive and functional in the present day environment. What from one point of view might be evaluated as "pressing pleasure buttons" might from another point of view seem to serve vital functions (relaxation, reinforcement, diffusion of tension etc.).

Furthermore, Salmon's and Symons's claim—cited by Carroll—that great works of art are those that most fully engage organizing adaptations, is problematic. I know of many works of art that I would call great for different reasons—their linguistic or visual style, the force by which they portray given emotions, or skillfully activate counterintuitive, supernatural phenomena—although I might think that their way of molding human nature is maladaptive (Milton or Tarkovsky, for instance by their advocacy of supernaturalism). There are also numerous examples of mass art that portray the world in an adaptive way, although perhaps more examples to the contrary. To be widely recognized as great works of art requires that the work be engage central human concerns or central aspects of the functioning of our perceptual dispositions, but whether the result is adaptive is a quite different problem. High art often caters for a certain segment of the population and might have elements that are fitness-enhancing for these segments and their function in society as a whole. Abstract art might, for instance, enhance the ability to concentrate and focus or enhance skills in design and communication. To enhance communication by design is important, whether for flowers that "try to get" the attention of bees and thereby also get the attention of humans, or for avant-garde artists or producers of mass art that try to get the

attention of their audience. But it is much more difficult to evaluate say whether high art design is more adaptive than mass art design than to evaluate how flowers enhance their fitness by their design efforts, because our evolutionary process is still in the making.

A Darwinian model explains why given features have been selected in the past due to their fitness-enhancing qualities in a given environment, say the EEA, and it might therefore also explain why certain elements are selected in the present due to our biological makeup. The human environment has changed radically since the exodus from the Pleistocene savannas. Since the upper Paleolithic cultural explosion, radical cultural development has taken place, but our biological nature has changed very little. It is therefore difficult to assess whether a given feature of our biological nature is still fitness-enhancing or has become maladaptive. The success of violent action films and violent video games is a good illustration: Such films make up a very substantial part of the repertoire in film, TV, and the game world, and they certainly activate mental and emotional dispositions such as violent coping, tribal bonding, and revenge, which were vital for the survival of our ancestors in their environment. However, the violence and the action performed do not correspond to typical situations for typical persons in, say, a modern suburban world. Horror films exploit our biological dispositions for being afraid of horrible agents with lethal teeth “out there.” Pascal Boyer and Justin Barrett have described how such hyperactive agency detection devices (HADD) are remnants of features that were fitness-enhancing for our ancestors, who sought to avoid becoming a tasty lunch for predators. However, to what extent such stories are fitness-enhancing in a modern environment, by strengthening coping or hazard-precaution, for example, is a topic for research.

Violent action films or horror films are therefore not comparable to drugs that shortcut complicated mechanisms by directly activating pleasure buttons without the kind of coping that these mechanisms were supposed to elicit. On the contrary; the violent or horror-inspiring fictions portray and activate behaviors that were selected in the EEA for their fitness-enhancing aspects. Thus, even if fiction is supported by mental mechanisms that in general are or have been fitness-enhancing, this does not in itself provide a basis for making value judgments. Evolution is an open-ended process, and the last 50,000 years of rapid change in our physical, social and cultural world does not make it easier to evaluate what is adaptive and what is not. Taking into account the EEA only explains the evolutionary background for our present day fascinations. Evolutionary theories of literature, film, and other arts need to avoid the naturalistic fallacy—that is, the idea

that all that is natural is for that reason good. Human nature is made flexible to achieve fitness in changing environments, and culture is part of those flexible control mechanisms that mold the mind within the limits of our mental architecture.

These reservations do not diminish the need for evolutionary theory and for a synthesis of state of the art psychology, evolutionary theory and the humanities. Quite the contrary. As pointed out by E. O. Wilson, Cosmides, Tooby, and Carroll, fiction in general supports adaptive flexibility and mental organization. The better we understand the adaptive problems raised by the radical environmental changes that have taken place in our recent evolutionary history, the better the humanities will understand and participate in our current cultural evolution. The quicker we leave blank-slate theories behind us, and the quicker we expel the anti-rationalistic and anti-scientific ethos of post-structuralism, deconstructionism etc., the better. Joseph Carroll's "An Evolutionary Paradigm for Literary Studies" is a very valuable contribution to a reorientation of humanistic scholarship that reintegrates the humanities with the great family of the sciences.

Disciplinary Fitness

I am grateful to have Joseph Carroll's commanding summary of the state of the field of evolutionary literary study (which I will for the purposes of efficiency baptize EVOLIST), with its authoritative account of the fundamental premises, aims, and goals of this emergent—emergent what? school of thought? point of view? discipline? One of the most interesting things about EVOLIST is the fact that, without having determined what exactly it is, it is now, on Carroll's account, poised to flood the market, and this at a time when many university presses are cutting back on their lists in literary criticism. At the very least, EVOLIST is an "approach" like Marxism, feminism, new historicism, or deconstruction; at the most, it has ambitions to change the whole "paradigm within which literary study is now conducted," to "establish a new alignment among the disciplines and ultimately to subsume all other possible approaches to literary study." This sounds almost apocalyptic, and Carroll's conclusion explicitly summons up a vision of lions and lambs; but as I will suggest below, Carroll and his colleagues might wish to aim even higher, beyond literary study. They should, I will argue, want not just to exploit the account of human nature now emerging from evolutionary biology and evolutionary psychology, but to make their own contribution to the new synthesis, giving that synthetic account what other disciplines cannot, an explanation of the human drive to produce and consume art.

What I have described so far, and what Carroll describes at immense length, is an undertaking distinctive for its adaptive fitness in an academic environment. In this respect, EVOLIST can be compared with the discipline that in many ways constitutes its direct opposite, deconstruction. Like EVOLIST, deconstruction was both an "approach" and the end of approaches with the advent of an ultimate truth; and like EVOLIST, deconstruction represented itself as a form of literary study consistent with science—not Darwinian biology, but Saussurean linguistics. And both attempt to link literary forms with other, more empirically solid forms, cognitive in the one case and linguistic in the other. Deconstruction was manifestly

hostile to any kind of nature, especially human nature, but it was almost unbelievably effective in competing for scarce resources, attracting advocates and sponsors, and in replicating itself. If it wanted a model of disciplinary fitness, EVOLIST could do no better than deconstruction.

EVOLIST has two competitive advantages in the form of explanations for things that routinely stump other schools of thought. Both explanations concern value—the artistic merit or quality of the work itself, and the value of literature to human beings generally. The first, the question of artistic merit, has been particularly troublesome for professional criticism. Traditional approaches treat it either as an objective feature of the work, which can be identified and declaimed, or as an historical fact, a social consensus with objective markers that can be duly noted. The most common option is to treat it as a profound but largely irrelevant mystery that lies outside the domain of what can be usefully discussed in a scholarly setting. If I understand Carroll correctly, EVOLIST treats literary quality as a measure of how adequately the work registers the facts of nature, and therefore as something subject to precise description and analysis.

On the second point, the value to human beings of literature in general, traditional arguments have pointed to the personal and social utility deriving from the cultivation of desirable cultural sensitivities such as empathy and moral discrimination, or from the pleasure or gratification we take in tracking, understanding, and appreciating formal representational structures. According to Carroll, EVOLIST takes an entirely different approach, one that stresses not the individual or society, but the species. Literature, according to this approach, exercises and rewards precisely those attributes that are most useful to us as humans struggling for survival.

I would like to say a few words about both promised contributions. First, literary merit. All readers “know” that Charles Dickens is a great writer who sometimes descends to didacticism and sentimental cliché. The death of little Nell, they understand intuitively, is a shameless mining of sentiment that seems subliterate in its intense emotionality; the moralizing of *Hard Times* is considered to be beneath Dickens’s artistic dignity in another sense, because its polemic is too one-dimensionally obvious to require a novel to articulate it. The mercilessly intricate anatomy of the dark bonds of masochism, dread, shame, arrogance, and self-hatred that tie Paul Dombey *père* to Edith Granger in *Dombey and Son*, on the other hand, is commonly thought to represent Dickens at his very finest. What Carroll calls “impressionistic” literary criticism might note the contrast between these Dickensian moments, but would have no systematic deeper account of it

other than to say, for example, that sometimes Dickens made concessions to popular taste, or that his own sensibility included a regrettable but fortunately rarely expressed streak of vulgarity. EVOLIST would begin the discussion by linking Dickens at his worst to the instinctual desire for pleasure or gratification, a narcissistic indulgence in one's own exquisite sensations at the expense of realism or reality, and Dickens at his best to the human capacity to transcend instinct and to confront, intellectually and emotionally, the deeper complexities or "dissonance" of existence. This would provide a sound basis for our intuitive value judgments, since the denial of dissonance through the generation of pleasurable fantasies appears, from the evolutionary perspective, not just bad art but a rejection of the very conditions of our existence, a turning-away from reality that would, if pursued by one and all, spell our end as a species.

And why, one might ask, do all "deeper" truths take difficult or dissonant form? EVOLIST has an answer for that, too: it's our fault. The presence in the world of such a singularly powerful intelligence as ours *is* the dissonance. Unlike us, other animals are instinct-driven, and make their ways by pursuing the shortest path between two points. For them, the immediate gratification of instinctual desire or drive is the only option considered, and when it is achieved the mission is accomplished and they can rest until seized by another organic impulse. We never achieve that profound state of rest. Our freakish capacities for discerning counterfactuals, hypotheticals, and other minds turn us into "psychological exiles," wandering through a world created in part by our own imaginings. The capacity to create and appreciate representations whether they are based in reality is, in a sense, the problem; but it is also the solution because we can deploy this capacity to create artistic forms that mediate our experience and help us make sense of it. This, according to EVOLIST, is what art is for. If art does not register the human exile from nature and instinct, it not only betrays its own nature, but fails to perform the adaptive function for the species that is its only real justification. This is why we value more highly the difficult, the elusive, and the contradictory even as we respond with guilty pleasure to the cheap, the sentimental, the obvious, the regressive.

This is a powerful explanation for what often seems important but inexplicable. I wonder, however, if it is not at odds with its own founding hypothesis about the non-instinctive character of human existence. If, as Carroll says, humans "do not have the option of living outside our own imaginative constructs," if the need for art is "primary and irreducible," then why should we not consider the disposition to create and consume art an instinct, a fixed action

pattern? To think of art as a kind of unwilling behavior peculiar to the species makes art a necessary rather than an optional feature of our existence, and creates a richer understanding of human being as well. Our distinctiveness in the order of being is not that we alone have the capacity to deny or defer instinct, but that our instincts are different, more complex, productive, and genuinely creative than those of other animals. This redescription of both art and human nature is, I think, is a far more suggestive and even accurate notion than the one Carroll proposes here, but I think that it is entirely consistent with the general thrust of his thinking and may eventually turn out to be among the primary contributions of EVOLIST to scientific understanding.

Having—if it takes my advice—revolutionized our understanding of instinct, art, and human nature, EVOLIST would be in an excellent position to take on another problem largely unaddressed by traditional criticism, the value of art itself. Here the contribution seems indisputable: the account given by Carroll of the emergent consensus of his colleagues is powerful, clear, and convincing. The arts, he says, “fashion an imaginative universe in which the forces at work in the environment and inside the mind are brought into emotionally meaningful relations to one another”; this “universe” “provides points of reference within which humans adjust their sense of the relative value and significance of things”; in this way, artifacts serve as “devices of behavioral orientation” that help us understand and find our place in the world that our intelligence makes available to us. Spiders, beavers, and birds create their homes instinctively, and so do we. But the homes we make instinctively are not the buildings in which we dwell, which are made by deliberation and craft. Our instinctual home-building, EVOLIST could argue, is the creation of art.

If humanists could respond to the often hard-edged and aggressive skepticism of legislators, administrators, or parents concerning the value of the humanities with a rich account of the instinctual character, and therefore the enduring necessity, of art, they could alter the terms of the discussion. Instead of seeming “soft” by comparison with science and technology, the humanities would be hard, or semi-hard, because they would have not only a scientific underpinning, but would be making their own contributions to scientific understanding. Claims for art’s “universal” appeal would no longer seem to be based on generous imaginings or cosmopolitan sensibilities, but would be based on a factual understanding of human being. The humanities would have their own distinctive contribution to make to an understanding of globalization. And rather than seeming to represent the inessential frills of life, humanists, and especially literary scholars, could claim

in all seriousness to be in touch with the constants in human nature, and with “the urgent needs and driving forces in life.”

I look forward to having such a formidable arrow in the quiver of responses to the ongoing deterioration in the status of the humanities, and literary study in particular. I do, however, have one reservation. Great literary criticism impresses us with the power, richness, and responsiveness of the critic’s mind. Reading it, we not only say, “How true!” but also, “What a genius—I would never have seen that on my own.” Great criticism has a performative, which is to say, an individual character that takes shape in the confrontation of a superior mind with a powerful text. We think of “the scientific community” as having a natural authority over the contrarian individual scientist; for the humanities, by contrast, consensus never outfaces a brilliant individual performance, and often serves as the ground against which the value of that performance stands out. Will EVOLIST, in its desire to accommodate criticism to science, still be able to generate great criticism, or will we have to surrender our appetite for critical performance along with our primitive delight in other non-adaptive behaviors?

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For Evolutionary Criticism, Against Genetic Absolutism

Joseph Carroll's overview of evolutionary literary criticism and theory is lucid, wide-ranging, and sensible. He presents a strong case for the value of an evolutionary approach to literature. I entirely agree that evolutionary theory can make illuminating contributions to the study of the arts (see "Laughing" and *Understanding*). I hope many readers are convinced by this aspect of Carroll's essay.

On the other hand, I do not agree with a project of making evolutionary theory the defining approach to literary study. Carroll states that "If evolutionary psychology can give a true and comprehensive account of human nature, it can ultimately encompass, subsume, or supplant the explanatory systems that currently prevail in the humanities." I demur from this view on many grounds. Consider, for example, something as central to literary study as reputation. It seems clear that, say, Shakespeare's reputation is the result of many factors. Some involve the possibility of making use of his work ideologically, as in the wartime cooptation of *Henry V*. Some involve the political economy of publication (e.g., the ownership of copyright—see Taylor). Some involve Shakespeare's incorporation into the English education system and the spread of that system via colonialism. Some involve network factors, such that Shakespeare connections reached a tipping point, while those for other writers did not. The list could be extended almost indefinitely. None of these explanatory systems is evolutionary.

Of course, an evolutionary critic could respond that all such systems must be compatible with the results of evolution. Ideological effects cannot operate on cognitive mechanisms that have not evolved, for example. That is true, but trivial. It does not show us that the evolutionary account should play a significant, not to mind "encompassing, subsuming, or supplanting" role in explaining the ideological use of *Henry V*. The same point holds for, say, physics. The ideological use of the play cannot violate the laws of physics. That does not mean that physics contributes significantly to explaining the ideological uses of the play.

What about a more limited project, then—say, explaining literary universals? Carroll characterizes universals as “cross-cultural regularities that derive from regularities in human nature.” But universals may be produced in many ways. In consequence, our explanatory principles should not be confined to biology. As I have discussed elsewhere (“Non-Genetic,” “Of Universals”), cross-cultural patterns may arise from regularities in the physical environment, recurring developmental experiences that are not genetically programmed, emergent features of the phenomenology of self-consciousness (Hogan, “Literature”), convergent results of group dynamics, network patterns, etc.

My qualms about some aspects of the evolutionary study of literature are related to the common distinction between evolutionary psychology and Evolutionary Psychology, since much work in evolution and literature involves not only the former, but the latter as well. When writers refer to “evolutionary psychology,” lower case, they have in mind a view along the following lines. The brain evolved; the mind is an emergent system causally dependent upon the brain; thus structures, processes, and even some contents of the mind must be open to evolutionary accounts, to the extent that their neurological substrates are open to such accounts. In my view, this should be uncontroversial. In contrast, when writers refer to “Evolutionary Psychology” (EP), upper case, they have in mind a specific set of hypotheses and a set of approaches and theoretical preferences that characterize a particular group of researchers in evolutionary psychology, including Tooby, Cosmides, Pinker, and others. Since I have argued against some aspects of EP elsewhere (*Cognitive*), and since others have addressed these issues at length (for example, Buller), I will not overview the topic. However, I do wish to emphasize a few points.

First, everyone in evolutionary theory accepts that there is a difference between mechanisms and functions. Genetic mutation produces mechanisms—simple causal sequences, such as being frightened by certain sorts of unexpected movement. These mechanisms are adaptive to the degree that they *approximate* certain functions—for example, avoiding dangerous things. (Note that this is not the same as the functions being “ultimate” rather than “proximal” causes. Functions are not causes at all. The only causes are the mechanisms.) Mechanisms never actually have these functions. They only come more or less close to producing the same results. A certain sort of unexpected movement may be produced by either dangerous or benign events, but our recoil response will be triggered mechanically in either case. Conversely, a dangerous event may or may not produce the right sort of unexpected movement. In short, there is always some

degree of mismatch between the mechanism and the function. Again, everyone recognizes this. However, writers in EP seem often to forget this in practice, treating the approximated functions as if they were the mechanisms. This is why it is at best misleading for Carroll to say that “Natural selection operates . . . so as to *maximize* the chances that an organism will propagate its genes” (my emphasis). I realize that this is probably just loose phrasing on Carroll’s part. He could explain that it merely means “maximize relative to other options in the gene pool.” However, this sort of loose phrasing often appears in EP writings and can have consequences for our understanding of human psychology.

The second point I wish to emphasize is again widely accepted by writers in EP. Adaptation is a matter of complex systems and these systems are neurobiological. To determine just what is adaptive and what is not, we generally need to look at the interaction of many features, rather than considering features in isolation. Put differently, in order for a feature to be adaptive, it needs to be adaptive *in the context of other features*. Moreover, that complex of interacting features needs to operate in accordance with the biological processes that characterize the human brain. While acknowledging all this, EP has a tendency to consider features in isolation from one another and from the neurological substrate. In some ways, this is inevitable. One has to begin somewhere. On the other hand, the massive modularity hypothesis is, in some ways, a manifestation of just this tendency. In connection with this, it is not clear to me that the hypothesis is as readily eliminable from EP as Carroll suggests. It may be true that writers in EP are now less likely to affirm that modularity is massive. But it is less clear that they have, in fact, greatly diminished their reliance on the multiplication of distinct, pre-dedicated, functionally defined systems (modules).

Finally, there is a tendency among writers in EP to treat human nature as given by a set of genetically determined traits that are more or less uniform across the species. Here, too, everyone accepts that this need not be true. But the acceptance of this qualification in principle does not seem to have had great effects in practice. Much of my own work has been on literary universals (see *The Mind*). However, when faced with EP writings, I often feel that they overstate universality—not so much in assuming excessive uniformity across cultures as in assuming excessive uniformity across individuals (e.g., in terms of kin preference or various sorts of gender difference). I would like, therefore, to point toward some ways in which diversity arises, even from genetic bases.

We, of course, begin with genetic predispositions. Some of these genetic predispositions do specify traits. However, others are better thought of in terms of

parameters—options that are selected by experience—or ranges. Language is the area in which parametric genetic predisposition has been most thoroughly discussed. Not everyone speaks a head-first or head-last language. That is a parameter set by experience. Moreover, it is qualified by the setting of other parameters in specifiable ways. Working memory provides a simple example of a range. Not all of us have working memories of precisely the same span, though our different spans all fall within certain limits.

In addition, the presence of a genetic trait, parameter, or range, may be more or less constant across all people or it may be in complementary distribution with some other feature. More simply, even if it turns out that people generally have a certain property, it may not be the case that everyone has that property. For example, most people have certain sorts of left-hemisphere dominance. However, that is not entirely uniform across the species. In some people, that form of dominance is shifted to the right hemisphere. Moreover, there are degrees of dominance.

Again, genetic predispositions are affected by experience. In many cases, the specific content of the experience affects the manner in which the predisposition is expressed. There are two ways in which this occurs—indifferently across the life span and in critical period development. In the case of emotion, for example, emotional memories are formed across the human life span. Emotional memories affect our emotional responses beyond any particular, innate predispositions (e.g., they may add new fear triggers to any that might be given genetically). More significantly, critical period experiences form enduring propensities that are not genetically specified as such. This may be a matter of setting parameters (as in language, according to one account). But it need not be. For example, early childhood experiences of parenting appear to have long-lasting effects on a person's tendency toward security or insecurity in attachment relations. Note that both sorts of experiences may give rise to cultural differences, if they are uniform within societies but different across societies, as occurs to some extent with languages. Perhaps more consistently, they give rise to differences within cultures, since experiences are idiosyncratic. Finally, they also give rise to cross-cultural patterns, since some experiences are likely to occur to any human or to at least some people in any society.

In connection with this, it is important to recognize that there are ideological and other factors leading people to behave in ways that may go against spontaneous dispositions. These may increase the uniformity of behavior in ways that occlude individual diversity. Moreover, they may affect people's judgments about

behavior (thus survey results, literary representations, etc.), increasing the perception of uniformity. For example, suppose that literary works consistently praise men for military accomplishment and women for beauty and nurturance. This is what one would expect from class and gender bias in narrative production along with class and gender ideology. It need not result from uniform spontaneous dispositions across men and women. Indeed, if praise is required to foster these attributes, that suggests they are not entirely spontaneous.

In sum, evolutionary psychology is a valuable addition to literary theory and criticism. Joseph Carroll's essay brings out this value nicely. On the other hand, we should not consider evolutionary psychology as some sort of master discipline, even in the study of universals. Finally, it is important that we recognize some of the problems with the current practice of Evolutionary Psychology, particularly its tendency toward a sort of hyper-functionalism, its tendency to occlude substrate complexity by multiplying discrete modules, its tendency to present genetic predispositions as overly uniform, and its general insensitivity to ideological effects.

The Unkempt Art

Joseph Carroll, in his broad, hopeful panoramic snapshot, reveals a burgeoning field, albeit one at the fringes of the literary establishment. The Literary Darwinists' status as a "robust guerilla band" is not necessarily a bad thing; arguably one galvanizing force within the humanities themselves is their embattlement with respect to mainstream culture. By this logic, literary Darwinists, doubly-embattled, ought to work with redoubled urgency. As for evolutionary psychology itself, though, it has already leached its way thoroughly into mainstream culture and continues to spread like Dennett's "universal acid." It remains to be seen whether Literary Darwinism can ignite the imaginations of scientists and readers, can adequately and compellingly grasp the reasons we are continually drawn to literary experience—to consume written stories, huddle together under their auspices to argue or commiserate, conjure them in secret solitude or in public, get upset and outraged by them (when they threaten religious beliefs, when they're billed as "true" and "exposed" as fictions). Evolutionary psychology has caught on in the mainstream largely thanks to the way it so routinely cuts to the core of certain aspects of human behavior. Take mating—which happens to be the title of my favorite novel, by Norman Rush. Through EP's lenses, parts of the eye-chart come suddenly into sharp relief—the obsessiveness with which we pursue, agonize over and gibber and jabber over relationships; the monstrous, betimes murderous nature of jealousy; the prevailing folk wisdom that men and women hail from different parts of the psychological solar system; the quirks of personal ads; the widespread appeal of and audience for pornography; the persistence of adultery and its temptations; the inescapable relevance of "looks"—in short, a whole slew of phenomena that previously seemed like loosely-linked fodder for a season of *Sex in the City* come suddenly into crystalline focus.

Does peering at literature—at *Mating* rather than mating—through these lenses yield equally dramatic insights? I'm willing to gamble on a yes, provided that literary Darwinists remain true to their interdisciplinary spirit and enlist the

services of neuroscientists, linguists, behavioral ecologists, ethologists, cognitive psychologists, and so forth. I've argued elsewhere ("By Sextants") for the necessity of such collaboration, but here I want to make a case for one indispensable set of invitees to the party—actual writers, such as myself, working in all the major literary modes: fiction, creative nonfiction, poetry, and drama. I want to go further and argue that if we study exclusively existing texts and ignore artists and the process by which the art comes into being, there will be a gaping hole in the puzzle. The Literary Darwinists have an opportunity, in their attempt to fundamentally alter the way literary study is conducted, to bring artists into the fold, or they may miss this opportunity, I think to the detriment of all concerned.

Currently, the relationship of so-called "creative writers" to literary scholars is a strained one, even though there are many who do both or who do one and aspire toward the other (I'm guessing that there are more literary scholars who dream of writing a novel than there are creative writers who fantasize about a definitive re-appraisal of literature, though I could be wrong). Creative Writing programs are generally nested within English Departments, and thus fight for the same funding and go to the same faculty meetings and picnics. With the surge in PhD programs in Creative Writing, as well as the number of students writing creative dissertations, there is certainly plenty of overlap. Nevertheless, there is a divide, marred by a mutual wariness and suspicion. Painting with broad brushstrokes, it can be said that writers are suspicious of academic jargon and conceptual systems that feel unwieldy, at odds with their visceral experience of narrative, and which they believe stifle the creative process. Literary scholars (again, broad strokes here) are in turn suspicious that creative writers are naïve bukowskis, shunning critical thought in favor of a mystical "writing process," drunk on language, among other things. There is a grain of truth, if only a grain, in these stereotypes. I've heard graduate students in literature complain that the demands and conventions of scholarship detract from the passion for reading that drove them to enroll in grad school to begin with. And as for the artists themselves, works-in-progress are indeed messy, amorphous, unscholarly, ungrounded in references and often lacking a sense of literary history. Even more polished, "publishable" works haven't yet proven themselves anywhere close to worthy of our ongoing scrutiny in the manner of Milton, Shakespeare, and the Brontës. Consider Harold Bloom's *The Western Canon*, with its four ages; there may be some dispute about what goes in the first three, but even Bloom admits that as far as his "Chaotic Age," i.e. the 20th century, goes, his selections are highly speculative, a veritable guessing-game (548). How much more chaotic, then, the work that is being saved and backed up

on a hard drive as we speak, characters springing Athena-like to life behind their morning newspaper and coffee, or cut out of the universe on instinct and whim, provisional endings to meet deadlines, scenes to be excised, rearranged, points of view upended, key lines of dialogue yet to be inserted because the writer has yet to overhear them in the café with Tobias Wolff's voice echoing in his head? In short, creative writing is horridly messy and incorrigibly contingent, as any honest writer will fess up, yet in the end it's where the stuff comes from.

As a fiction writer, it is not with the "production of new knowledge" that I am concerned, but with the generation of new stories, broadly speaking, and more specifically with the generation of new characters, new situations, new words and word-strings, new rhythmic and sonic possibilities, new ways of examining the world—perceiving it, challenging it, rearranging it, and making my way in it. Yet no matter how outlandish the situations, no matter how oblique or experimental or allusive the prose gets, some connection remains in it to basic underlying human wants, needs, and motivations. Even *Finnegans Wake*, pushing the edges of comprehensibility, might be partly decoded through an understanding of dreams, which themselves may be understood at least partly as a neuropsychological phenomenon in relation to waking states, as in the work of J. Allan Hobson (*Thirteen Dreams*). As neuropsychological events, dreams are subject to evolutionary explanations as is any behavior. This would be a good case where an interdisciplinary approach is necessary if the exploration of the subject is to be fruitful. Further, it ought to remind us that in the most radical formally and stylistically innovative text or meta-fiction, the evolutionary-minded can and ought to weigh in.

So much the more so for more conventional forms of contemporary writing, which still, lo and behold, rely on characters (!) in settings (!) who face conflicts (!), undergo events, and arrive at some resolution, however open to interpretation the latter may be. Those basic technical terms, which have persisted in creative writing since its inception as a "discipline," might sound simplistic next to *différance*, *deixis* and their ilk, but they are the working writer's toolkit. It also happens that they dovetail rather nicely with many evolutionary, cognitive, and neuroscientific concepts. Writers, for instance, talk unabashedly about their characters, and tend to think of them as individuals. Carroll underscores a point which should be glaringly obvious but isn't—that "motivations, actions, and interpretive responses all originate in the neurological events in individual brains," and that "novelists and playwrights are individual persons who construct intentional meanings about those characters." Sage advice it is at the outset of the storywriting process to develop a

verbal character-sketch. Once one has rendered a *someone* that piques one's interest enough, a concatenation of traits and circumstances worth running ahead with, *then* allow the plot to emerge. In evolutionary psychology, in spite of controversies about group selection, the dominant paradigm has it that the phenotypic individual is the entity directly subject to selection pressures. Without suggesting that poststructuralist, historical and culture-centered theory have nothing to offer to writers, how refreshing to find a field that argues strenuously for individual selves. When our characters hound and haunt us at our desks, when we grow to care about them, when they seem to wrest control from us and take charge of their own destinies, maybe we aren't being merely naïve and delusional; maybe such phenomena reveal something important about literature.

When it comes to conflict, writers also find sympathetic ears from the Literary Darwinists. It is a truism that for a story to be compelling and take wing, conflict is the engine that drives the narrative—it's not enough for everything to be okay, pretty and wonderful. Darwinism insists on a universe teeming with conflict on a variety of levels, more interesting and variegated than either those of tooth-and-claw caricature or those of Dr. Freud. To cite examples, parent-offspring conflict and sibling rivalry are explained by evolutionary thinking as a natural outgrowth of psychological factors given the algorithmic logic of survival demands under conditions that would have persisted from the EEA to today. Parents and their offspring, crudely, have overlapping interests but also distinct and competing ones, conscious and otherwise. The same applies to siblings. And evolutionary psychology has shown us most appositely why men and women are drawn into a continuous dance of attraction and rejection, admiration and hostility, thanks to distinct psychological mechanisms that are a consequence of different fitness demands. In short, evolutionary thinking reveals a world where conflict runs rampant, and just as creative writers can benefit from appreciating the underlying sources of such conflicts, evolutionary thinkers can learn from the types of conflicts in literature that "work," that fulfill some inner need, those which tweak our pleasure circuits or get under our skin.

There are plenty of other concepts that I could adduce from Carroll's work and elsewhere which continue this theme that writers and evolutionary-minded literary thinkers have a lot of common ground. I could talk about life-history theory and the stories of Alice Munro, which often trace the decisions her characters make over the course of lifetimes. I could discuss Geoffrey Miller's fitness displays and the gaudy linguistic fireworks of David Foster Wallace—Miller's theory need not apply equally to all artistic endeavors to have some validity. I could connect the

work Lisa Zunshine is doing with Theory of Mind to the writer's mantra to "show rather than telling" or the gentle art of ending effectively, the subtle implication that much more sublime than the point hammered home. But I'd rather close by bringing things back to why literary critics in general, and thus Literary Darwinists in particular, ought to seek out the company of writers.

At least in my lifetime, literary study has taken place as if texts came straight off the shelves in Borges's Library of Babel, natural and/or cultural objects to be scrutinized, critiqued, understood, and so forth. The mind, body, and life of the writer (with some exceptions, feminists among the dissenters) have been deemed irrelevant at best, and at worst distracting. Yet, is it crazy to suggest that the minds of writers—their imaginations, motivations, ways of approaching and solving problems, etc., might be helpful, even crucial, to investigate? Our knowledge is growing, as amply documented by Carroll, about the relationship between characters in literature and actual behavior, about how art reconceives such behavior, about art's role in human behavior, whether it is adaptive or not, etc. Through Literary Darwinist lenses, we may even have begun to understand readers and texts better than ever before. But as for the unkempt, at once exhilarating and agonizing endeavor of inventing characters and scenarios and bringing them to some end, satisfactory or otherwise, literary critics and scientists alike as yet know very little. Will the Literary Darwinists, along with their neurocognitive brethren, take the time to find out more?

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A Response to Joseph Carroll

Joseph Carroll's essay, "An Evolutionary Paradigm for Literary Study," gives us a solid overview of evolutionary psychology and literary study. In my response I will address a few major points in hopes of spurring yet more written conversation.

Carroll wants to institute, not *just* another paradigm, but in fact *the* paradigm for literary study. (More specifically, he wants to undo the continuing reign of poststructuralist-derived theory.) A Darwinian approach, he writes, should "ultimately...subsume all other approaches to literary study." Taking this even further: 'if evolutionary psychology can give a true and comprehensive account of human nature, it can ultimately encompass, subsume, or supplant the explanatory systems that currently prevail in the humanities' in general. On the one hand this seems true. If the brain is the result of natural selection, and if the mind is a function of the brain, then evolutionary psychology would seem to be a rock-bottom explanatory paradigm for all things mental. But on the other hand this fact does not justify the kind of necessity that Darwinian critics often want to establish.

Carroll wants to make the case that any literary-interpretive practice that does not overtly stake itself on evolutionary-psychological theory will be at least inadequate, if not simply invalid. Even work that emphasizes cognitive-scientific ideas over evolutionary-psychological ideas does not pass muster. For instance, Carroll rejects attempts to theorize a 'cognitive poetics' that is not plainly also evolutionary psychology. "Efforts to segregate cognitive poetics from evolutionary literary study are doomed to failure." This is necessarily the case, he claims, because the "human mind has functional cognitive mechanisms for precisely the same reason that the human organism has complex functional structures in other organ systems—because it has evolved through an adaptive process by means of natural selection." Of course it's true that knowing the ultimate function of an object of investigation matters for fully understanding the nature of that object. But I don't see how it follows that all discussions of that object must feature a discussion of its ultimate function; and in particular why a discussion

of whatever element of a living organism must feature a discussion of evolution. Would this also mean, for instance, that a non-evolutionary explanation of the way the liver works is doomed to failure?

Carroll's comments on Lisa Zunshine's use of Theory of Mind (ToM) in her *Why We Read Fiction* make this even clearer. "Despite her appeal to selected bits of evolutionary psychology," he writes, "Zunshine strongly emphasizes the 'cognitive' aspect of her views, muting and minimizing their sociobiological affiliations. Beyond 'ToM,' she declines to attribute any very specific structure to the adapted mind." As Carroll admits, Zunshine does not ignore evolutionary psychology; still, by not making it the focus of her work, she has segregated herself from *the* explanation that matters. But Theory of Mind is an element of our cognitive apparatus whether or not we discuss it directly in terms of evolution. Zunshine's book—based on the notion that 'cognitive psychology' and 'evolutionary psychology' are not simply different names for the same thing—chooses to make the case about the specific cognitive function(s) of ToM in relation to fiction. To fault examples of cognitive literary study as Carroll does here is, as Lawrence Shapiro observes, to be "overly zealous" in "applying evolutionary theory to psychological questions" (253).

For literary study that in no way includes evolutionary psychology, the situation is worse, for Carroll seems to take it that leaving out evolution will necessarily render a given explanation somehow false. We see this when he addresses the recurrent question of whether the Darwinists have actually produced any new readings of literature. Carroll claims that the real question is: "Can the Darwinists produce formulations that are not only new but true?": the implication being that the other side is constantly making new, but false, claims. There are at least two responses to this. First, it's hard to see how any new paradigm can succeed if it does not generate new knowledge. Second, it is possible to make valid claims in spite of beginning from false or incoherent grounding positions. Many post-structuralist-derived literary-critical claims about the unconscious operations of race, class, and gender, for instance, have been straightforwardly true of our actual world, whether or not their understanding of human nature is valid.

I want to be clear that I'm not saying professional scholars should be satisfied to make claims based on false logical grounds. They should not. To my mind any serious scholar should be willing and able to deal seriously with the most serious challenges to his or her own positions. But if such challenges are to stand a chance of being seriously attended to, it will matter how they are made. Carroll tends

regularly to overstate his case, and this works to antagonize the very audience he most wants to persuade.

I turn now to another issue—anthropomorphism—which is a regularly occurring problem with evolutionary-psychological approaches to literary study. Darwinism is revolutionary because of its incorporation of chance and determinism. The always mind-wrenching, ordinary fact is that the order of life happened by chance. In the most general event-scenario, a random genetic mutation occurs in an organism; and if by chance the environment favors the outcome of that mutation, then that mutation will have a likelihood of becoming part of a changed order of living things. The process, like all natural processes, is entirely mechanistic. Given this foundational fact, we must constantly be on our guard not to impute some anthropomorphic, decision-making power to nature. And yet this regularly happens.

I'll consider two quick, related examples: design and problem-solving. Carroll, like so many other writers on evolution, speaks of “the adaptive problem [a given] behavioral disposition would have solved in ancestral environments.” Even more telling is phrasing about “the adaptive problem these complex structures [ie, the arts] are *designed* to solve” (italics added). Now, the idea of ‘design’ has always been necessarily contentious in evolutionary theory, because we have to speak of order arising by chance. In my opinion we should not use the word ‘design’ because in normal usage it entails a conscious designer, and these normative entailments of specific words matter, especially in the context of evolutionary theory. We see this also with the idea of evolution as ‘problem-solving.’ To characterize evolution as a problem-solving process is necessarily to assume some unproblematic, right kind of being toward which the natural process must be moving. In fact it assumes what I have to see as a covert form of intelligent design. Of course it is hard not to use our everyday words, and therefore hard not to anthropomorphize in this way. But, again, especially in the context of explaining culture and psychology in terms of evolution, this kind of usage needs to be avoided, or at least qualified.

With anthropomorphism we have a case of natural processes being understood as if they were somehow human in a general sense. Now we turn to a case of elements of nature being understood as if they were elements of a specific culture. This tendency shows up when Carroll makes the key generalization that literature “embodies an intuitive folk psychology at its highest level of articulation.” What is the standard by which such a judgment can be made? From what neutral, non-culturally-biased perspective could we assess—actually we would be evaluating—

a given articulation of folk psychology as higher or lower than another? Why wouldn't the visual arts be highest? With respect to literature in particular, as soon as we make such a judgment, we automatically institute a similar kind of evaluation with respect to specific examples of literature. If literature is the highest articulation of folk psychology, then there will necessarily be some examples of literature that more highly articulate that psychology than do others. To make claims like this is to read, unwittingly I assume, natural phenomena as cultural phenomena. Darwinists deeply undercut their own authority if they fail to realize, or at least to acknowledge, when they are doing this.

To this point I have addressed what I take to be crucial, if largely rhetorical, problems that are common both to Carroll's essay and to the interdisciplinary use of evolutionary psychology more generally. Now I'll address a more substantive issue. Carroll wants to make the case for the adaptive nature of the arts, and of literature in particular. To this end, he turns to ideas put forth by E. O. Wilson in *Consilience*. Both Wilson and Carroll claim that the arts appeared in human life because of a downside to the evolution of our specifically human intelligence. Higher intelligence enabled the human animal to detach itself from purely automatic, instinctive responses to the world, and to deal with "contingent circumstances and hypothetical situations" in ways that no other creature can. But the proliferation of 'mental scenarios' detached from instinct produces a potential chaos in organizing motives and regulating behavior. The arts produce images of the world and of our experience in the world. Those images mediate our behavior and the elemental passions that derive from human history. The arts are thus an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence.

In another phrasing we read that the "disposition for creating [literary] images would have solved an adaptive problem that, like art itself, is unique for the human species: organizing motivational systems disconnected from the immediate promptings of instinct." Now, unless I just entirely misunderstand, I don't see how this could reasonably explain the ultimate function of literature and the arts. We have an initial evolutionary change: the increase of intelligence. But that intelligence cannot function without what comes after it: the arts. So, without the arts the change in intelligence will evidently have no organization, or at least not the kind of organization that will make it functional. In fact disorganized, proliferating mental scenarios sound to me like a state of dream or hallucination. How could such a change ever be adaptive in the first place? How could such a creature ever effectively deal with the world at all? How can this be squared with

any usual notion of cause and effect? Carroll seems to be aware of this problem later when he writes that the “capacity for producing emotionally charged imaginative artifacts developed in tandem with the capacity for producing an imaginative virtual world.” Now, we have intelligence and its organization happening, not in sequence, but at the same time. I still don’t see how this could work.

To conclude, I’ll say that I feel fairly confident about my comments on anthropomorphism and value-judgments. But in criticizing Carroll’s explanation of the adaptive function of art, I wonder if I have gone past my own knowledge. Maybe I just don’t know the evolutionary-psychological theory well enough to understand what Carroll, who is much more broadly-educated in evolutionary psychology than I am, actually intends. This is an unavoidable risk in getting involved in interdisciplinarity. But of course Carroll has taken on the much larger risk. A scholar who crosses disciplinary lines as he has done, risks not only failing to know the other field (evolutionary psychology) adequately enough to satisfy scholars in that other field, but also of failing to explain ideas from the other field in such a way that the relatively un-educated in his or her own original field (literary studies) can understand them. One way or the other a significant portion of both audiences must be satisfied if there is to be a successful interdiscipline.

To conclude, whether or not the new paradigm emerges as Carroll hopes, I am glad that there are scholars like him, who are willing to take these kinds of risks.

Evolutionary Psychology and Literary Studies

In the cognitive sciences and evolutionary psychology there are now complex models of human nature on offer, and it is a frequently-discussed question whether these models can be made useful for the humanities too.⁸¹ One of the central issues in this debate is the question of whether there is something like a definable human nature at all or just a blank slate ready to be shaped by totally different forms of culture. Obviously humans are not determined in their behaviour by the clear cut genetic programs found in many animals. Does this mean that human behaviour is not determined at all by any genetic disposition? Is the only biological heritage humans have – in relation to their behaviour and the way their minds operate – a boundless plasticity for culture? The evidence brought forward in the last few years has caused many observers to assume that the answer to this question is ‘no’. Most models explaining the evidence agree on the point that in the course of evolution humans adapted to culture and in ontogeny humans need culture in order to develop, while culture in itself is always evolving. Therefore we can speak of a coevolution of biological dispositions and human culture. In contrast to Joseph Carroll (“Human Nature and Literary Meaning”), it seems to me that it is still very unclear what kind of human universals there are, and how their interaction with culture can be modelled; likewise, it is uncertain how the interaction between dispositions, cultural traditions and individual variances of dispositions, and of the experience of culture, ultimately comes together. Nevertheless everyone interested in human culture is asked to take these assumptions about human nature into account and that includes humanists who are interested in the study of art and literature.

Joseph Carroll considers that the best way of doing this is to include art in the set of phenomena explained by evolutionary psychology. In his view art has to fulfil an adaptive function—therefore it can be explained by evolutionary psychology—and he defines three criteria which any explanation has to satisfy:

(a) Define art in a way that identifies what is peculiar and essential to it – thus isolating the behavioural disposition in question; (b) identify the adaptive problem this behavioural disposition would have solved in ancestral environments; and (c) identify design features that would efficiently have mediated this solution.

In the following I will argue that (1) his basic assumption, that art fulfils an adaptive function, is problematic and (2) therefore the function he ascribes to evolutionary psychology has to be reconsidered.

(1) The Adaptive Function of Art

Talking about the adaptive function of art presupposes that there is something like ‘art’: not a culturally specific set of activities grouped by this culture under one label and understood as belonging together, but something which can be seen on the analytical level as an activity or a set of activities all conforming to one definition. Carroll proposes such a definition: [Art is] “the disposition for creating artefacts that are emotionally charged and aesthetically shaped in such a way that they evoke or depict subjective, qualitative sensations, images, or ideas.” I am not sure why Carroll is talking about the ‘disposition for creating artefacts’ and not the artefacts themselves, because obviously they are at the centre of his definition. On a closer view it becomes clear that it is a very broad definition and encompasses many artefacts we do not usually classify as art, like the speeches of ancient orators, the Christian cross, advertisements, the ceremonies at baroque courts, cars or haircuts, to name just a few.

In the text following his definition Carroll cites studies which see humans as a ‘story-telling species,’ or see a ‘species-typical need for finding and making meaning’ prototypically found in the rhythmic and emotionally modulated interactions of mothers and infants, or see stories as a means to organize our lives, etc. He tries to keep this fast expanding little universe together by claiming that “narrative and verse and emotionally modulated musical and visual patterns” are really “design features” of art. Actually this is a strong claim. It is one thing to argue that we find stories where we find humans – which is really an empirical question – but it is a totally different claim to link this story-telling capacity and need to a general module called art with its own adaptive function.

So in my opinion there are two problems with Carroll’s definition: first, the general definition of art is too wide and unspecific, and second, the activities and capacities he sees as design features are not part of art by any empirical argument but rather by our contemporary understanding of art. It is common knowledge that ‘art’ (Shiner) or ‘literature’ (Wellek) are comparatively new concepts. Many activities and texts which are nowadays understood as self-evidently classified into

these rather abstract categories would have been viewed as different and unconnected in earlier times. This historical argument doesn't imply that it is impossible to find something which all entities nowadays classified as art or literature have uniquely in common, but it becomes obvious that this is rather an improbable project. The concept of art is so abstract that objects in very different media are classified under this label, like pictures or sculptures, movies and photographs, dance and music. The same is true for literature, which subsumes texts written to be read alone like most novels from the 20th century; texts meant to be performed, like songs and plays; texts which are strictly metrically organized; and texts which have no metrical organisation at all, etc. The perception and processing of these artefacts is based on different senses and demands very different abilities. It is the result of our cultural history that we subsume all these different artefacts under one label. The way Carroll takes literature to be a form of art is a product of this history. To assume that this complex concept is not only a modern institution bundling together very different activities and artefacts, but at the same time something that re-establishes an order which had been formed 100,000 years ago when art was supposedly formed as an adaptive module, is quite a leap of faith. Someone who bases his argument on the assumed unity of this concept has quite a burden of proof—a proof which in Carroll's essay, with his expansive definition of art, is missing. In short: there is no adaptive function of art or literature because these are modern concepts. Carroll and other Darwinian literary critics have still to make a convincing argument that there is a definition of these concepts which can be applied to all human cultures, and one which is not an anachronistic projection.

In this perspective it seems much more plausible to decouple specific adaptations and these modern concepts. Then we can assume that there are adaptations like an organizational mode for human abilities or a scope syntax (Tooby and Cosmides, "Does Beauty Build?") and a cultural evolution in which the organisational mode for some abilities is the basis for our aesthetic appraisal in the context of art, while others are classified as sports, others as games, etc.

(2) The Function of Evolutionary Psychology in Literary Studies

Even if there is no adaptive function of art we shouldn't assume that art or literature—and I will concentrate on the latter—is an independent realm untouched by those aspects of 'human nature' evolutionary psychology is discussing. On the contrary, we have to assume that most aspects of literature in some way or other

relate to genetic dispositions acquired in the process of evolution. How do humans process signs, how do they attribute intentions, etc.? Organizing information in the form of story telling, for example, seems to be a good candidate for such an explanation, as are the other 'design features' Carroll discusses. So generally I agree with Carroll's claim that literary studies depend in many ways on anthropological assumptions. We need these assumptions or models on which we base our understanding of texts. In other words a theory of interpretation, for example, interfaces with a general theory of human language and sign usage, with a theory of attributing human intentions, etc.

But this doesn't really answer the question of what role evolutionary psychology can play in literary theory. Carroll views it as the most important discipline for us, which I doubt for a couple of reasons:

1) Evolutionary psychology doesn't offer specific theories which are crucial for literary theory. Whether human language use is based on a specific grammar module or not is not important for evolutionary psychology, because it is compatible with both positions—and, more importantly, it doesn't have a language theory of its own. The same is true for sign use.

2) Most aspects of evolutionary psychology are relevant for literary theory in two ways: a) as part of a general anthropological framework, b) to explain the fascination of literary themes and motives which can be found in different cultures and times. But I cannot see how to apply it to the study of a single text. A literary text is first of all an intentional artefact and even if the ability to read intentions is the result of an evolutionary adaption, the procedure of reading the intention and the content of these intentions depends very heavily on cultural knowledge (so much so, indeed, that it is easier to ignore the fact that this ability is a human universal and to make successful use of it all the time—as much of the humanities are doing at the moment—than the other way around).

3) A practical reason: Evolutionary psychology is in itself a complex and fast evolving research field and it is impossible to have a firm grasp of it in its current and developing state and be a specialist in literary studies at the same time. If one aims at doing more in one's own research field than to popularize evolutionary psychology to a specific group of scholars one has to organize the way the information interchange between the two fields is managed. One way would be to rely on the stabilized information alone which can be found in handbooks, which isn't a very useful approach for new research fields. Another way is to insert a level of abstraction which describes something in a domain independent language and is compatible with the state of knowledge in

evolutionary psychology. For example one can describe the way intention is at work in human language usage using concepts from Grice (*Studies*) or Sperber's and Wilson's relevance theory (*Relevance*) and this can be seen as compatible with an evolutionary account.⁸²

So I advocate the use of evolutionary psychology not as a research paradigm for literary criticism but as a framing theory. Even then it is very useful and quite important, as are other results from cognitive science. If, for example, the theory of mind is taken into consideration in literary criticism it radically changes the discussion of character, which has been dominated by anti-mimetic attitudes, or of authorial intentions, where literary theory has been dominated by anti-intentionalist stances while the practice was and is a wild mix of intentionalist and anti-intentionalist arguments. Attaining compatibility with the findings of the human sciences is the least we can, and should, expect to achieve in literary studies.

This is true even if most of the main content of our subject area cannot be understood using the tools of evolutionary psychology. This seems to me especially the case for the analysis of intentions. The content of an intention can even go against everything we know about human abilities and limits. So if an author devises a novel which can be read in its entirety in twenty-four hours, and which tells a story covering the same length of time in such a way that the ideal reader has to have a perfect memory to understand and resolve all intra- and intertextual relations, we can safely assume that an empirical test would show us that very few readers are able to read the novel in that way. But as textual scholars we are usually not so much interested in what readers really do with a text but what the texts want them to do. This is in no way meant to deprecate the empirical study of literature, which is an important field of social science, but to lump it together with the completely different field of literary studies as Carroll does seems to me to be a category error. Empirical analysis of texts using text mining procedures or stylometry can be a useful strategy in literary studies because the object of research is not the empirical reader but the text.

All this critique aside, Carroll's essay is one of his many contributions to redesigning literary studies in such a way that it is compatible with the human sciences and incorporates their knowledge into our field of research. To my mind this is much more fruitful than all these attempts to establish culture as an area totally independent of human history—because that is what evolution is also about.

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Complex Realities, Adequate Reductions: A Reply to Joseph Carroll

Let us suppose, because we have good reason to, that everything that exists and happens on this earth has natural causes. If true, this supposition rules out ontological discontinuities in the process of hominization and in the evolution of human culture. Joseph Carroll wants us to believe that this conclusion is a privileged insight—indeed, a distinguishing mark—of the neo-naturalist turn he envisions for the humanities. It is not. Excluding supernatural explanations from rational inquiries is the foundational operation of all post-theological scholarship and science. Hence, naturalist and culturalist methodologies in the humanities rarely disagree about human culture's basic dependence on natural givens. What they disagree about are the epistemological implications of this dependence.

Joseph Carroll's essay is a good example of how neo-naturalists tend to frame this disagreement. According to the underlying logic of Carroll's argument, the natural existence of human beings ("human nature") requires us to understand culture—i.e., human reflections on, and modifications of, their natural needs, capacities, and environments—as a linear derivation of our animal nature: a derivation that has little, if any, qualitative impact on the natural processes it is otherwise able to objectify. Thus, whoever argues that human culture has produced environments and life-ways whose complexity is frequently at odds with the first, pre-cultural mode of nature from which they evolved risks being termed a supernaturalist. In a more polite but no less severe binary, literary Darwinists like to describe their critics as "traditional humanists," "epistemological and metaphysical dualists," or idealistic celebrators of "the spiritual power of humanistic experience." Following a critical essay on neo-naturalist theory and practice, I myself was labeled an "aesthete" by Karl Eibl. In the said essay and the ensuing debate with Eibl, I laid out my reservations concerning the kind of research program now summarized by Carroll.⁸³ I will not repeat the particulars of my critique here but shall concentrate on one single issue raised by Carroll: the issue of reductionism.

Neo-naturalists typically feel that reductionism is the major charge leveled against them by “traditional humanists.” So they think that if this charge can be neutralized, all external opposition is bound to collapse. Much rhetorical force is therefore invested in branding reductionism as a taboo argument that betrays the theoretical naivety of those who bring it up. Reductionism, we are told (and rightly so), is not a bad word in the theory of science and scholarship because any type of rational knowledge in one way or another seeks to reduce observed phenomena to “underlying regularities” (Carroll) or to an anterior level of argument in a logical system of description. So far, so true. Does it follow that all types of rational reduction provide apt knowledge about the thing thus reduced? Carroll himself is doubtful: in traditional humanist criticism and in postmodern criticism (his chief adversaries), he identifies certain “thematic reductions,” of which he disapproves. In both cases, Carroll observes, literary characters appear as “allegorical embodiments” of humanist norms or of key terms within the respective “source theories.” Apparently, then, Carroll distinguishes between good and bad forms of reductionism—and the criterion of distinction is whether a given reduction produces *adequate* knowledge or not. In the same manner, Carroll addresses scientists whose philological speculations he finds insufficient and notes that their theories “fail to give an adequate account of [their] subject”: “the arts cannot adequately be reduced to didactic lessons and pleasurable fantasy.” And toward the end of his essay, when we read that both groups—scientists and philologists—need to learn from the other paradigm, Carroll speaks of “concepts and modes of thinking characteristic of the humanities and *appropriate to them*” (my emphasis).

I sympathize with Carroll’s insistence on mutuality in interdisciplinary endeavors, and I consider as crucial his concern with *appropriate* reductions. But I believe that this principle needs to be applied to neo-naturalist approaches as well. If done so, the field surveyed by Carroll begins to look a good deal less exciting than its practitioners like to claim. In fact, judged by their own standards and ambitions, neo-naturalist approaches have been rather unsuccessful in their campaign to “ultimately encompass, subsume, or supplant the explanatory systems that currently prevail in the humanities” (as Carroll predicts). If bio-philology so far has been unable to deliver on such promises, this is not because the field is still young and beginnings are always modest, but because most of those promises are immodestly unrealistic. Alarming, even the more humble projects risk failure as long as they do not confront their methodological self-involvement and their tendency towards institutional partisanship.

Concerning methodological self-involvement, Carroll leaves little doubt that he prefers a maverick type of naturalism to one that would try to integrate its perspective within “currently prevailing” culturalist approaches. This is so because Carroll and other contributors to *The Literary Animal* regard those established approaches as diametrically opposed to their own. They claim that the prevailing methods in the humanities are marred by “constructivist” stances, which allegedly “attribute exclusive shaping power to culture.” Social constructivists, in other words, deny the existence of human nature. Carroll and his fellow combatants never consider if their chosen antagonists have already transcended the dichotomous distinction of nature and culture that is so troublesome to neo-naturalists—or whether they are at least trying to do so, and this in a manner highly appropriate to their objects of research. For while literary Darwinists want to get rid of the nature/culture divide by effectively collapsing the concept of culture into the concept of nature, constructivists more often than not attempt to do justice to the unique, hence distinct, traits and regularities that set this realm of existence apart from all other natural orders, without positing an ontological rupture.

Of course, Carroll does not deny that human culture is a special part of the natural world and that it requires special tools of description and understanding. “Most human interactions,” he writes, “are organized within cultural systems, and cultural systems profoundly influence most individual experience.” There are consequences to be drawn and taken from this insight. I am not sure if our current bio-philologists are willing to draw and take them. At the very least, it would be worth recognizing that the “profound influences” of “cultural systems” are exactly what cultural studies methodologies, even with poststructuralist pedigrees, are interested in. Far from denying that culture is an evolved part of nature (albeit one that in turn affects the reality of natural processes), those methodologies have been working hard to develop research tools and descriptive systems that are appropriate to the distinctiveness of their objects.

We could enter now into an extended debate on what constitutes adequate knowledge about human culture. Elsewhere, I have tried to outline some basic thoughts on this question.⁸⁴ At this point, I merely want to emphasize that all such knowledge needs to acknowledge that human culture emerges from what neuroscientists call “meta-representations.” While being part of nature, humans are capable of reflecting on their own natural existence and even on these acts of reflection themselves. I maintain that the reality and results of such meta-representations require us to complicate the application of evolutionary principles to issues of human inter-subjectivity and human history. Undoubtedly, one can

question the utility of this or that postmodern theory in this regard as well. But this need not stop us from analyzing culture as “a historical process of differentiation, involving intentions, non-intended determinations of intentions, misunderstandings, appropriations, and contingencies” (Kelleter, “Tale” 176). Contemporary cultural theory illustrates that we can do so without resorting to supernatural or metaphysical explanations. So, while I share Carroll’s uneasiness about the vagueness of much humanist scholarship today, I feel that any alternative research program needs to enter into a serious dialogue with established approaches that have been dealing with these issues for quite some time now. Instead of dismissing them as anti-scientific, simply because interpretive methods are part of their tool kit, one can perhaps learn something from their interest in human representations and conceptualizations of nature. Bio-philologists, for instance, could clarify for themselves what image of nature informs their own data discussions.

Joseph Carroll, for one, subscribes to a paradigm that sees nature as “an unbroken chain of material causation from the lowest level of subatomic particles to the highest levels of cultural imagination.” I am not a scientist, but based on my studies of cultural and literary history, it seems unlikely to me that a causal chain model of culture is able to replace systemic network models of culture, as they are suggested by advanced social and praxeological theories in the humanities (from Pierre Bourdieu to Niklas Luhmann, their individual limits notwithstanding). It seems unlikely to me that a linear chain model can replace such object-attuned studies in complexity, because the most complex natural object on this earth itself seems unfit for structural explanations of a straightly causal kind. Neuroscientists have just begun to conceptualize the human brain as a social organ of unique “plasticity”: a biological organ structurally receptive to environmental changes, including human actions, communications, and artifacts. Already, these investigations suggest that the brain in its higher cognitive functions (i.e., in those functions that are pivotal to the process of hominization) has no center of operational congruence, no hub of linear distribution. Why would human culture be adequately reducible to unified causal explanations, if the human brain is not? From what I understand, the neuronal construction of individual knowledge in its most advanced forms does not occur through hierarchical chain reactions but through parallel processing, self-organizing structuration, and often unanticipated feedback loops.⁸⁵ Add to this the emergence of human culture, not as the causal result of neuronal activities within individual brains but as the systematic result of interactions *between* human brains, and it becomes difficult to think of meta-

representations as something other than structure-building communications, not only in the brains involved but in the complex system of culture at large.

To put it less abstractly, humans alone among species can communicatively shape and to a certain extent become the environmental factors that express their biological dispositions. Humans are not only able to gather individual information about the world and to share this information with other members of the species, but these acts of information-sharing can reach self-awareness. By this, they become acts of making meaning: they bring into existence a self-organizing, self-developing system of information called culture, which amazingly lacks a nervous system of its own. Among all social orders in the natural world, human culture is exceptional because it allows information to be redirected and systematized through contact with other observers and reflectors; it allows knowledge to be discussed, modified, organized, interpreted, and stored outside individual brains, making possible self-critique, role play, social and gender identities, imagination and performance, thought and emotion experiments, and competing cultures in the plural (rather than just rivaling populations). In this sense, humans are capable of transcending their animal nature without becoming unnatural. It has always been tempting to idealize this capacity of communicative self-objectification by ascribing a divine cause or a metaphysical telos to it. Carroll's discontent with such idealisms is well founded. But theories that seek to replace complex accounts of culture with explanations of "a single, unified causal structure" are badly equipped for the task at hand.⁸⁶ Like ever so many 19th-century novels, they find consolation in describing the human species as basically just another animal. In so doing, neo-naturalists certainly find something that is "there" (and in this sense "true")—but their single, unified truth keeps missing the point.

This is why zoomorphic readings of literature are often so disappointing, despite their methodological sophistication. It is not their reductionism that is bothersome but their way of being reductive. Just like the postmodern master theories criticized, for example, Darwinian approaches tend to read literary texts as allegories of themselves, always discovering that this or that novel, poem, or drama is really *about* basic biological universals (mate selection, physical survival, status fights, etc.). And while all of this is true in some way—in fact, it would be surprising if such elements were lacking in narratives produced by humans—these basic insights remain spectacularly incapable of explaining the (historical, cultural, aesthetic) complexities that constitute our objects of research when we study culture. "Human females," Carroll writes, "are . . . distinctive in having menopause and thus a period of life that extends beyond the reproductive years. That period

enables older women to raise their latest offspring to maturity and to aid in caring for grandchildren.” While this rings convincingly in evolutionary terms, it illustrates that evolutionary theory is sometimes of little help, to put it cautiously, when we mean to make sense of the complex realities of, say, gender identities as they are actually lived in historical societies.

Essentially, I am suggesting that the human species’ “psychological exile,” of which E. O. Wilson speaks (*Consilience* 224), is more drastic than sociobiologists and their followers in the humanities are willing to recognize. Carroll and other philologists working in this field have significantly contributed to our knowledge of human evolution by describing the arts as “an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence.” But the excessive invocation of “adaptive” explanations in this sentence obscures the epistemological demands of studying “high intelligence.” If we, as humanists, are crucially concerned with “the social skills required by living in *exceptionally* complex social environments” (as Carroll phrases it, my emphasis), and if the complexity of these environments has something to do with the emergence of types of sociability and meaning-making that can objectify themselves, thus qualitatively transcending other natural orders and turning evolution into history, we are probably well advised to take seriously social, historiographical, and literary theories that have understood something about the limits of biological perspectives and empirical methods for the study of culture.

As Carroll says, common sense is a good antidote to many of the scholastic excesses in contemporary literary theory. But there is a point where common sense can turn into a resentful ideology. I find this to be the case in the institutional posturing of much neo-naturalist scholarship: there is a sense of camp mentality in these writings, a sense of bringing about a backlash against the omnipresent evil of “constructivism,” a sense of being unfairly left behind and left out in academia, a sense of being beleaguered by powerful enemies with conspiratorial power interests. Such partisanship will do a disservice to anyone’s research agenda—it will do so all the more if one makes exalted claims about one’s own scientific neutrality.

Having been invited by Joseph Carroll to compose this critique, I add with some hesitation that I find this camp mentality particularly pronounced in the Anglo-American sphere, where discussions of science and attendant scientific self-definitions have been determined by the larger context of ongoing culture wars. It is probably no coincidence that many American neo-naturalists take their cue from utopian visionaries like E. O. Wilson or from gifted polemicists and popularizers

like Steven Pinker. Carroll's essay, too, mainly refers to American sources, and quotes Wilson's agenda of "consilience" as if it was an uncontroversial, almost self-evident program. I think it would have been profitable to consider outside perspectives, including European variants of neo-naturalist scholarship. Karl Eibl's book *Animal Poeta*, with its qualms about Wilsonian sociobiology, would have been an obvious candidate (although Eibl disagrees with most of my points here).⁸⁷ In any case, to bring in reflections from different cultures and languages is, once more, a particularly appropriate strategy of studying culture, because it facilitates awareness of the fact that even and especially the most self-assured universals are shot through with historical and local knowledge. In this regard, what is remarkable about Wilson and Pinker from a philological (and perhaps a European) perspective is not that they are insensitive to fine aesthetics, as we are sometimes told, but that their partisan ideal of trans-disciplinarity and their hostility to cultural studies derives to a considerable degree from their self-understanding as cultural warriors: from a social and institutional rather than a purely scientific position.

In sum, there is of course nothing inherently wrong with programs such as EvoS at SUNY Binghamton. And Carroll does a good job outlining the promises of such and similar interdisciplinary endeavors. But as long as neo-naturalist approaches refuse to engage genuinely with contemporary theories of culture in the humanities, and instead prefer to cast themselves in the cliquish, perhaps resentful role of iconoclastic truth-sayers, their scholarly practices will continue to fall short of their scientific ambitions. I wish they could become more equanimous about their epistemological position and less assuming in their methodological self-image. Not only would this improve their rhetoric; it would also benefit their scholarship. Who knows, they might even begin to gain something from reading, with sensitivity to cultural and disciplinary contexts, fellow theoreticians of the human such as Foucault and Derrida.

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The Bottlenecks of Literary Darwinism

In his book, *Literary Darwinism*, Professor Carroll observes that “the professional advantages of poststructuralist doctrine should be obvious. It enables literature professors to adopt a prefabricated critical stance that depends in no way on the empirical validity of their findings” (16). Couldn’t literary Darwinism afford its practitioners similar “professional advantages”? With the corporatization of the academy in full swing, empirical studies on literature, in their pursuit of “practical” and/or “valid” claims, wish to make literary criticism into a more “marketable” field. By transforming the literary arm of the humanities into an increasingly scientific or factual realm, empiricism irrevocably defeats one of literary studies’ greatest attributes: its ability to exist as something other than scientific. In other words, if English majors want to construct empirical studies, then perhaps they should major in Sociology, not Literature.

Phillip Barrish, whose 1991 article on the confluence between Darwinism and contemporary theory Carroll has called a strained effort “to depict Darwin himself as a proto-deconstructive exemplar of irrationalism and indeterminacy” (*Literary Darwinism* 27) remarks that “deconstructive, psychoanalytic, and Marxist models can be linked by their ‘family resemblance’ to Darwin’s description of a category of random variation that is accumulated in ‘certain definite directions’ to produce what appears as a natural order. In addition, the ethical imperative of Darwin’s theory, which entails that our conception of God be replaced by an acknowledgement of variation and of the mechanism of natural selection, prepares for the ethical dimensions of each of these contemporary theories” (441). Though many scholars have combined deconstructive, psychoanalytic, and Marxist approaches, doing the same with literary Darwinism appears to be undesirable by Carroll, though he admits that “evolutionary literary study [...] is one more ‘approach’ or ‘school’ that merits inclusion in casebooks and theoretical surveys” and that “a Darwinian ‘reading’ of this or that text” is certainly plausible. However, elsewhere he argues that the “more ambitious adherents” to literary Darwinism aim at “fundamentally altering the paradigm within which literary study is now

conducted.” The goal for “consilience” is certainly laudable. Nevertheless, does consilience, in Carroll’s view, simply stamp out the uniqueness of literary study? Are we to assume that literature should merely be subsumed by the sciences? Again, though the idea of a harmonious, balanced, and interdisciplinary relationship between the sciences and humanities seems to exist as an ideal, the universalization of all academic disciplines, as with the universalization of humanity (a goal of colonialism and globalization), could ultimately lead to homogeneity rather than innovation.

In his defense of humanism entitled *Humanism and Democratic Criticism*, Edward Said criticizes “all the supposedly neoconservative philosophy condemning whole classes and races to eternal backwardness, proving—if that’s the right word—in *the worst Darwinian sense* that some people deserve ignorance, poverty, ill health, and backwardness” (22; emphasis added). Let’s counter this statement with Darwin’s own words. Writing to William Graham in July 1881, he remarks, “I could show fight on natural selection having done and doing more for the progress of civilization than you seem inclined to admit. Remember what risk the nations of Europe ran, not so many centuries ago of being overwhelmed by the Turks, and how ridiculous such an idea now is! The more civilized so-called Caucasian races have beaten the Turkish hollow in the struggle for existence. Looking to the world at no very distant date, what an endless number of the lower races will have been eliminated by the higher civilized races throughout the world” (F. Darwin 316). Sadly, though “Darwin’s theory of the evolution of the species represented a genuine advance for science” and has become the basis for scientific study into the twenty first century, “it was used to bolster ideas of racial supremacy: in his *Descent of Man* (1871), Darwin wrote: ‘Extinction follows chiefly from the competition of tribe with tribe, and race with race. [...] When civilized nations come into contact with barbarians the struggle is short’” (qtd. in Loomba 57). Who determines which nations are civilized and which are barbarous?⁸⁸ What happens when humans take the laws of natural selection into their own hands? It is no surprise that a critic of postcolonialism and imperialism like Said views Darwinism in a negative light. Colonialism aimed to make “barbarians” more “civilized” by making them more “English,” “French,” “German,” etc. The colonialist efforts to make “inferior” nations more “acceptable” by transforming their citizens into imperfect subjects of this or that empire is certainly not natural. Is the oppression of humans by other humans part and parcel of human nature? Certainly, both evolutionary theory and imperialism encompass many more complexities. However, is it even possible to compose a Darwinist “reading” of a postcolonial

and/or colonial text? How do Darwin's position as a white, imperialist male and the appropriation of his ideas for colonial supremacy affect an analysis of a "classic" postcolonial work like Chinua Achebe's *Things Fall Apart* or Buchi Emecheta's *The Joys of Motherhood*? We can also extend these questions to works in which issues of feminism or homosexuality are extant. If "human females have evolved a need to secure the bonded attachment of a male willing to invest resources in them and their offspring," then where is the space for sexualities that deviate from this aspect of "human nature"? By depending on heterosexual procreation, natural selection and its ancillary theories seemingly exclude individuals who are "other" to the dominant norm. Judging from his extensive bibliography and our own research, neither Carroll nor any of the other prominent literary Darwinists have produced an effective Darwinist reading of a postcolonial or feminist text. Can it be done? Here is where an intersection among deconstruction, Marxism, postcolonialism, and Darwinism might be useful and, indeed, quite interesting. In this way, implementing literary Darwinism into the sphere of contemporary critical theory, combining it with one or many of the other critical approaches to literature already circulating, could truly add something ingenious to the discipline. To invoke the words of Gayatri Spivak, whose own critical combinations of deconstruction, feminism, Marxism, and subaltern studies have added much to the field over the past four decades:

I propose to overwrite the globe. Globalization is the imposition of the same system of exchange everywhere. [...] The planet is in the species of alterity, belonging to another system; and yet we inhabit it, on loan. [...] To be human is to be intended toward the other. We provide for ourselves what we think is the origin of this animating gift: mother, nation, god, nature. These are names of alterity, some more radical than others. Planet-thought opens up to embrace an inexhaustible taxonomy of such names, including but not identical with the whole range of human universals: aboriginal animism as well as the spectral white mythology of post-rational science. If we imagine ourselves as planetary subjects rather than global agents, planter creatures rather than global entities, alterity remains underived from us; it is not our dialectical negation, it contains us as much as it flings us away. (72-73)

Take note of Spivak's language. She uses terms such as "species," "taxonomy," "creatures," and "human universals," with each evoking discursive elements of evolutionary science.⁸⁹ Whereas globalization appears to unite cultures, nations, and individuals, it does so through homogenization rather than alterity. Here, the shared "ethical imperative" of Darwinism and contemporary critical thought about which Barrish writes figures prominently. Rethinking humans as planetary subjects, as part of a species, requires a giving of agency to all people.

And doesn't this aspect of literary Darwinism account for its greatest strengths and possibilities as an interpretive paradigm? Why apologize—why mince words about the efficacy of adaptationist literary analysis—when we can readily intuit that well-founded literary characters must surely demonstrate distinctly *human* traits in order to exist as round (as opposed to flat) characterological specimens? Thanks to the groundbreaking work conducted by Carroll and others, we can point to adaptationist criticism as one of the most viable interpretive tools available in contemporary literary study. Indeed, adaptationist criticism assists us in understanding the foundations of literary character by virtue of its attention to the manner in which human beings respond to change, as well as by how they attempt to survive and presumably flourish under their new conditions. Adaptationist criticism recognizes the ceaseless conflict between biological and environmental influences upon the nature of human development and individuation. Carroll asserts that adaptationist criticism is “fundamentally opposed to poststructuralist theories” and suggests a wholly distinctive way of reading texts, one valuing the notion that “humans in all ages and cultures display a common, basic set of motives, feelings, and ways of thinking. [Adaptationist literary scholars] believe further that literature commonly depicts human nature, that it is produced by human nature, and that it satisfies the needs of human nature” (“Adaptationist Literary Study” 19). Adaptationist criticism is already unique in its ability to bridge the sciences and the humanities, fashioning a critical methodology that envelops biology and textuality. As an analytical tool, adaptationist criticism swerves away from the poststructuralist belief that literary characters are simply autonomous textual creations and favors a reassessment of literary personages as reflections of genuine human beings, who—consistently confronted with conflict and choice—must make decisions that impact their capacity for survival. Additionally, these human characters quite often contend with genetic predispositions that disable their ability to make certain choices. Human nature is most frequently responsible for the positions in which many humans (and literary characters) find themselves; driven by their natural instincts, human characters decide to subsist or expire, although their environments may or may not facilitate their desired outcomes. “Literary representations are not disconnected from the material world,” David P. Barash and Nanelle Barash write. “Even the loftiest products of human imagination are, first, emanations of that breathing, eating, sleeping, defecating, reproducing, evolving critter known as *Homo sapiens*” (B8).

In *Evolution and Literary Theory* (1995), Carroll ascertains three levels of interaction between literary criticism and evolutionary psychology, including

human nature, cultural order, and individual identity. He argues that human nature involves a wide range of cultural productions, and these “cultural forms are themselves the product of a complex interaction among various innate dispositions and between innate dispositions and variable environmental conditions” (150, 152). Given that much of Darwin’s philosophy recognizes that in order for civilization to advance, human beings must adapt, we can usefully understand the nature of effective character construction in terms of the inextricable relationship that exists between human beings and the ceaseless forces of evolution. With Carroll’s levels of interaction, human nature functions as the determining factor in a given character’s capacity for adapting or maladapting—for living well and flourishing or, conversely, slipping into the oblivion of status quo. Carroll defines human nature in terms of two essential propositions: firstly, that “innate human dispositions exercise a powerful shaping force on all forms of cultural order,” and secondly, that “all such forces operate in a tight web of systemic interdependency such that the modification of any one element has a distinct effect on all the other elements within the system” (153).

With its deft mergence of evolutionary thought and textual analysis, literary Darwinism affords us with a keen understanding of the makeup of literary characters—of their “innate human dispositions,” their human nature—and the attendant agency, moreover, that they require as distinct human representational forms. Interpretive structures like adaptationist criticism provide us with an expansive means for assessing literary characters in terms of all of their profundity and idiosyncrasies. Yet, by not engaging with representative texts from other theoretical paradigms in order to foment debate and forge alliances with them, literary Darwinism closes itself off from the truly radical dialogue that might ensue. And this is a shame, given that literary Darwinism remains one of the most liberating, progressive, and challenging of analytic modes. One way or another, we owe a great debt to pioneering scholars like Professor Carroll for leading the way.

Completing the Paradigm: In Pursuit of Evidence

Why do we need an evolutionary theory of literature? Apart from its intrinsic interest and significance (of which more in a moment), does it make literature more accessible? Does it enhance our experience of reading (or hearing) it? Does it provide us with new knowledge about the human characteristics that are at the core of literature? Does it tell us anything about what may be distinctive to literary texts? Is the claim to scientific rigour that it brings to the field a credible or useful one? Is it likely to resolve the “crisis of morale in the humanities,” as Carroll puts it, following several decades of poststructuralist hegemony?

In his target paper Professor Carroll insists that evolutionary literary theory has the potential to reorganize the whole field of literary scholarship. The more boldly and comprehensively this claim is made, the more these and other questions press themselves upon us for answers. In my comments I will consider how far Carroll’s approach can answer these specific questions: they are the questions that interest me, but I assume that literary scholars who don’t simply dismiss evolutionary thinking out of hand would also wish to raise them.

Intrinsically, the arguments for the significance of an evolutionary approach to literature seem undeniable. That human beings have evolved and, along with our other capacities, have developed facilities for producing and responding to literature, suggests that we will understand ourselves and literature better by considering what those facilities might be. If Carroll is right, such inquiry should help create new perspectives on our cognitive and emotional capacities, on formal aspects of texts, and on their social and historical functioning. So what has been achieved so far? In his paper Carroll lays out the agenda for the evolutionary paradigm, as he sees it, with theoretical clarity and in some detail, but he includes little by way of example showing what evolutionary literary criticism can accomplish. What might we expect? Here are some comments drawn from Carroll’s paper.

Literature is important for “organizing motivational systems disconnected from the immediate promptings of instinct.” Carroll has in mind here the value of narrative in enabling us to imagine and rehearse situations offline, thus human beings with such a capacity are more adaptive and resilient. Similarly, he mentions Pinker’s notion that “literary plots provide game plan models.” The power of such models comes in part from the emotions they evoke. The arts, Carroll says, “fashion an imaginative universe in which the forces at work in the environment and inside the mind are brought into emotionally meaningful relations to one another.” How do such claims illuminate an evolutionary reading of a literary text? Take Brian Boyd’s account of *Mansfield Park*.

In Boyd’s evolutionary view “literature arises out of deep-rooted human needs and capacities,” not from the codes of structuralism or the ideologies of historicism (Boyd, “Jane” 13). Thus the central concern of Austen’s novel is with mating strategies. In particular it “focuses overwhelmingly on female choice,” where “females choose males as partners on the basis of their ability to support the offspring” (16). This helps account for Maria’s impulse to marry the first eligible suitor she sees, Mr. Rushworth; it suggests why, against powerful family pressures, Fanny Price firmly declines to marry the philandering Henry Crawford – she has detected him to be a cheat; and it explains the sense of rightness at the end with her marriage to Edmund. This reading reminds us that despite a highly patriarchal culture, the apparently weakest character, Fanny Price, turns out to be the most successful. As Boyd notes, much about the novel “can be interpreted in terms of biologically evolved characteristics of human life, rather than as no more than the product of a particular cultural moment” (23). In this perspective, the novel teaches us how to read its “game plan model” through the universalizing power of its cultural specificity. “No action or event is, for humans, ever just itself,” as Carroll puts it (28). Thus we have to puzzle out why the evasion of the locked gate in Rushworth’s garden by Henry and Maria seems such a transgression; or why, later, Fanny resolutely resists taking part in the theatricals. At such moments an evolutionary reading like Boyd’s helps us to see particularly clearly the nexus of emotion and environment—what is at stake for Fanny and the characters around her—and why Fanny’s judgements at such predicaments are so exigent (and always right!).

As Boyd acknowledges, however, his reading of *Mansfield Park* says little about Austen’s “artistic powers and problems” (23)—her tone, her language, her characterization, and other features of the text. His approach reads the text, albeit eloquently and tactfully, and with appropriate regard for its historical specificity, as

a case study of human mating strategies (female in particular). Put in this light, we can see that *Pride and Prejudice* affords a similar reading – a successful mating strategy in which the heroine pulls off a marriage with a higher status suitor. Indeed, this is the theme of a number of other novels, including a slew of modern romance fictions with little literary pretension. If the value of fiction for us, then, could be explained only in terms of its disconnected “motivational systems” and its “game plan models,” this would surely fall short of accounting for what is specifically literary in a text such as Austen’s. Is this as far as an evolutionary approach can go?

What is literary? How should we define “art” in order to bring it within the scope of an evolutionary approach? Here Carroll might benefit from an important point made by Ellen Dissanayake (“Making” 28-29): that to account for the evolution of art we should consider the art practised communally over the last 30,000 years or more, not just the fine or rare art that we tend to associate with the term now. What qualities made it adaptive? In the light of Carroll’s criteria, what “adaptive problem” did it resolve in the ancestral environment (26)?

Without going back to the tribal environment, which I am not qualified to examine (but see Dissanayake, *Homo*), here are two clues. First, consider Jonathan Rose’s findings on working class readers from the nineteenth century. Through surviving memoirs and letters, Rose found that a number of impoverished readers with only the most basic elementary education, and with no literary education or prior familiarity with literature, were able to pick up literary texts by authors ranging from Homer, through Dickens, to Hardy, and to read them immediately and with understanding and pleasure. These were not readers who had acquired the conventions of literary reading, supposed to be essential by theorists such as Culler or Rabinowitz. In addition, these were readers who, when in a position to choose, preferred to read what we now regard as canonical texts rather than texts written and published in penny editions specifically for working class readers. What was the source of their interest? Rose points to the engagement with character and what we have called the “game plan models,” whereby readers learned about a different world and, in some cases, how to become a part of it. A reading of their comments also shows that some readers were enthralled by the language of the literary texts they read, by its sounds and texture, by the novelty of unfamiliar words. This suggests a second clue.

In our empirical work (Miall and Kuiken) on readers’ responses to foregrounding (striking stylistic features in texts) we have found that all readers tend to be sensitive to it, at least to its presence in the modernist short stories we

asked them to read. This was shown in several ways: by longer reading times for sentences rich in foregrounding, by higher ratings on a strikingness scale for such sentences, and by higher ratings for feeling. We and others have replicated this effect whether working with readers with an advanced literary education, or with readers with little interest in or experience of literary reading.

What appears to be at issue here is what he have called defamiliarization, following the theoretical work of the Russian Formalist critics such as Shklovsky and the British Romantic writers such as Coleridge and Shelley. In the evolutionary framework, however, we can situate this in a wider context: elsewhere (Miall 190) I have classed the response to foregrounding as one type of dehabituating. Given the complexity of our responses to the natural and social environment and the rapidity with which our (mature) cognitive system identifies and evaluates the world around us, here is the value of a system that, within a prescribed space, calls our existing schemas into question: literary art offers us new perceptions, unfamiliar feelings, fresh evaluations. Through literary experience dehabituating provides a flexibility in feeling and thinking that is almost certainly adaptive. It is a solution to the problem of stereotyped, stock responses to the world which, in everyday terms, enable us to perform so efficiently. As Patrick Hogan has shown (“Literary Universals”), foregrounding, being found in the literature of every culture, can be considered a universal, a defining feature of literariness, and is thus a strong candidate for being analysed in evolutionary terms.

This leads to two further considerations. First, although in his target paper Carroll has placed a good deal of emphasis on contributing fields, arguing for the benefits of “scientific method,” such as “a rigorous empirical analysis of cognitive mechanisms,” the importation of theories and approaches from outside the field of literature itself brings the risk that the distinctively literary qualities of literature will be misrepresented or overlooked—a danger that “Humanistic sensitivity to the fine shades of tone and style” will likely not be effective enough to avert. As with dehabituating, with theoretical roots going back to Coleridge, literary theories that arise within and are inherent to the literary domain must be regarded just as seriously as those from the social sciences. If there is a distinctive quality to literature, here is where we might expect to find some of its elements. An evolutionary role for literature, we might hypothesize, only developed as it did for this reason, that human beings turned to literature for experiences unavailable elsewhere. Thus literary theories, drawn from the literary domain (regarding such matters as style, narrative structure, genre), must be regarded as central to the

evolutionary endeavour, if they can illuminate what is inherent to literary experience from the Pleistocene up to Jane Austen and beyond.

Second, remembering that most of the history of art occurred before the development of the high art with which we are now (in the West, at least) most familiar, we should work with ordinary readers as far as possible to help validate our proposals. Like the readers in Rose's study, these will be readers who turn to literature primarily for the experience it has to offer—for compelling narratives, for the pleasures of literary style—not, as we see practiced in literature departments, reading for the sake of interpreting a text—pursuing the Rule of Abstract Displacement, as Rabinowitz (139) has put it. Systematic empirical study of real readers, with effective experimental controls where appropriate, will do more than any other innovation we can envisage to bring together “the humanities and the evolutionary social sciences,” the consummation that Carroll wishes for. This approach, to return to my opening questions, should in the long run elicit or confirm the values that are central to the literary experience: thus, literature will become more accessible (with education making fewer inappropriate demands). Knowing better why we read may enhance our future literary experiences; and this, in turn, will teach us to know ourselves better.

Response to Joseph Carroll

As a member of the interdisciplinary program mentioned by Carroll in closing (Binghamton University's Evolutionary Studies Program (EvoS)), I have no reservations with the claim that evolutionary theory as it pertains to human psychology and culture has strong predictive and synthesizing powers that can be of value to literary scholars. Evolutionary theory does provide a powerful, integrated framework for predicting what will be of short- and long-term interest to human beings. Moreover, it is a valuable theoretical tool, as Carroll suggests, not only because it can tell us something about regularities in humans' cognitive, perceptual, and affective systems (which are engaged during the reading process) but also because it provides a life-history framework. Life history theory predicts at a very basic level of organization that at different points in an individual's species-typical development, different motivations and goals will, on average, predominate. Imaginative representations of people, places, and situations surrounding such motivations and goals unquestionably recur in popular literary genres. The most notable examples are the romance novel, adventure and survival stories, and the bulk of world folklore. Clearly, though, conflicts surrounding life-history motivations and goals are present to some degree in virtually all literature by nature of their inevitability in life. No theories other than those stemming from evolutionary theory can presently explain such regularities in content across literary traditions. As such, there is no question, in my mind, that evolutionary theory deserves literary scholars' greater attention if only for the larger picture it can provide of how regularities in the human life cycle reflect basic, recurrent concerns in literature.

Importantly, however, finding biologically-based regularities in content or theme is not the limit of evolutionary literary theory as developed by Carroll. The model presented in Carroll's article is fundamentally an interactionist model that can assist in understanding the production and reception of literary meaning in specific cultural contexts. In this model, authors' or readers' literary meaning can

be analyzed and interpreted as the product of how their species typical characteristics are shaped by unique cultural values, and further colored by the vicissitudes of individual identities. Style and form, to put it simply, are the aesthetic delivery mechanisms for such meaning. And, as noted by Carroll, humans' shared perceptual and cognitive predispositions provide useful starting points for theorizing about how human's unique mental style so effortlessly constructs narratives with considerable cross-cultural regularities. Thus, there is evident effort in Carroll's paradigm to examine how literature comes into being, how humans derive meaning from it, and how such meaning is dependent on cognitive and cultural constraints.

Critics of the evolutionary paradigm, however, have often ignored the breadth of Carroll's evolutionary framework. Despite the considerable space dedicated to Carroll's formulation that all realist and symbolic figuration necessarily involves human universals, cultural particularities, and the colorings of individual identity, his project, and those who have followed him, has been critically reduced to a naïve search and find exercise involving biologically based human universals. Evolutionists have been accused of being "biological through and through" (Benzon) "ignoring the cultural and technological extensions of human knowledge" (Richardson 12) and in danger of becoming "nothing more than a latter-day Freudianism, performing its ritual unveilings of psychic secrets in hunter-gatherer dress" (Easterlin, "Hans" 256).

These criticisms do represent legitimate concerns. At least two such simplistic readings have been published (see Perchan and Barash and Barash). One of these was used recently, and rather selectively I might add, to criticize the adequacy of an evolutionary approach for attending to the complexity of literary expression and reception (Goodheart). While I don't share such criticisms, evolutionists should be more openly critical of any simplistic effort to reduce literary meaning to behavioral universals rather than openly accept them as kindred efforts in an upstart field.

Nevertheless, by and large, accusations that the limit of the evolutionary approach is biological theme-finding do not obtain at the theoretical or interpretive level of most work done by those who associate themselves with Carroll's paradigm. The interactionist model for understanding literary meaning has been employed fruitfully in many published interpretations for some time now. Interpretations of specific literary works by Brian Boyd, Judith Saunders, Ian Jobling, Marcus Nordlund, and Brett Cooke, among others, are never mentioned by those who brand the field "biological through and through" for the simple

reason that such interpretations amount to inconvenient counterevidence for those who seem bent on diminishing the theoretical importance of representations of behavior in literary analysis.

This being said, even if one appreciates the interactionist core of the evolutionary paradigm, I think Carroll is still open to criticism, to some degree, for the primacy he places on life-history universals. Specifically, this regards his claim that “the *governing* terms in an evolutionary critique are not metaphysical abstractions, mid-level social and psychological concepts, or formalist principles. The governing terms are the urgent needs and driving forces in life—survival, reproduction, kinship, social affiliation, dominance, aggression, and the needs of the imagination...the rhythms of the life cycle shape the analytic categories through which Darwinians make sense of literary depictions.” This may seem contradictory to some: an interactionist model that grants primacy to biological regularities.

I agree with this primacy to some degree because I do not see a reason for exempting human preferences and motivations, on average, from the logic of inclusive fitness. While the frequency of such universals in world literature remains to be studied in any significant depth, most stories do seem centered around some issue pertaining to humans’ species typical life-history cycle. Jonathan Gottschall’s work on world folklore and Patrick Colm Hogan’s work on literary universals speaks to the fruitfulness of starting with such regularities. As a preliminary starting point for literary analysis, a focus on evolutionary content seems sound if only for the frequency of such representations and for the emotional receptivity most people have for such topics.

This being said, I think that the prospects of getting more people on board with the evolutionary paradigm will require more significant empirical demonstrations that the presence of “the driving forces of life” in literary texts affects real world thought and behavior in predictable and significant ways. This will prove difficult. It is one thing—and no small thing, granted—to create an interpretive model based upon evolutionary theory that grounds analysis within life history categories and supplements it with attention to style, form and the pertinent cognitive mechanisms involved. It is quite another challenge to demonstrate that readers attend to and incorporate most saliently in their mind the evolutionarily relevant behavior that is represented in texts. It may be the case that stories, as Carroll suggests, function in some way to organize and fine-tune the cognitive-behavioral predispositions of individual minds. However, empirically, we have a long way to go before we can

isolate the impact of specific behavioral representations from specific stories on the specific behaviors of readers.

Empirically establishing the primacy of “the driving forces of life” is central, I think, to the success of the evolutionary paradigm because a critic can ask: don’t all textual elements that impinge upon meaning stimulate and engage readers’ minds in an inextricable simultaneity? How do we pull apart the relative contributions of form, style, and content? And, if we place primacy on “the driving forces of life,” does it necessarily follow that the claimed “cognitive” aspects of literary experience such as levels of recursion in Theory of Mind, or the aptness and sophistication of metaphors and conceptual blends, play a secondary, and largely, attention-getting role in literary narratives? It very well could be the case that readers are not reading *for* metaphor or complex demonstrations of Theory of Mind as much as *through* them to get to emotionally evocative content that they internalize and perhaps later use in their everyday lives. But again, if it cannot be demonstrated empirically that “the driving forces of life” deserve the primacy that Carroll’s evolutionary paradigm grants them, then I fear that debates between evolutionists, cognitivists, and other scientifically oriented branches of literary study are likely to become mired in theoretical arguments of emphasis—not evidence—concerning what individual scholars and disciplinary sub-groups deem most important to the reading and interpretive process. Such arguments of emphasis are already evident in exchanges between evolutionary and cognitive literary scholars. Whereas Carroll seeks to subsume cognitive literary study within evolutionary literary study, Ellen Spolsky recently suggested that evolutionists “must build upon” (815) work done in cognitive literary theory in order for such work to be meaningful. Both evolutionists and cognitivists clearly feel that what they study is of vital importance to explaining the power of and our capacities for literary experience. The most precious future work will be that which can help adjudicate between the competing primacies that certain groups will want to place on their topics of study.

To produce quantitatively replicable, empirical knowledge within the field of literary studies is already being accomplished by some evolutionarily minded literary scholars (Carroll et al., *Graphing*; Gottschall, *Literature*; Miall, *Literary*). This is a fantastic achievement and deserves the highest praise. As more studies are done, we can begin to assess to what extent diverse samples of readers understand and perhaps privilege evolutionarily salient content in relation to other cultural, formal, and cognitive aspects of the reading process, and how this all affects their real-world thought and behavior.

Evolutionists might claim that what I am asking to be demonstrated empirically is accepted commonsense within evolutionary circles. The critics of the evolutionary paradigm and those who advocate the importance of some other facet of the reading process are not likely to concede the point easily. Questions about governing principles are empirical questions after all and they needn't linger for years to come as irreconcilable points of emphasis, which is what I fear they are turning into. The empirical arm of the evolutionary paradigm is especially important but so too is outlining a clear direction for future empirical research, one which will serve to put such central theoretical questions to the test.

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Reflections on Literary Darwinism

Joseph Carroll has done an excellent job outlining some of the accomplishments of this fresh approach to literature. Unsurprisingly, I approve of the endeavor, being a PhD in evolutionary psychology who started out majoring in biology with a minor in comparative literature. Back in the day, I loved those literature classes. Or at least, I loved the reading of Homer and Virgil, and later on the works of Shakespeare, Dostoyevsky, and Baudelaire. But I never quite understood the point of the types of analyses that the professors wanted. It wasn't that they were difficult to do (and the psychoanalytic ones were certainly fun) but I saw them as an intellectual exercise, not as something that provided enlightenment as to the "true" motives behind the characters or author(s) or the enduring appeal of certain plots or character types. In other words, I didn't "buy" them, and so I lost interest. Years later, during the last year or so of my PhD program, I developed an interest in studying erotic fiction and films from an evolutionary perspective with a particular focus on how differences in the sexual psychologies of men and women have shaped the market for erotica (romance and other erotic literature for women and largely pornography for men). I also began to read articles by Carroll, Brett Cooke, and Jon Gottschall which rekindled my interest in the study of literature. While in my own work I have largely viewed it as a source of data on human nature, the new Literary Darwinians have shown me the possibility of a study of literature that is not simply an intellectual exercise but something integrated with modern scientific psychology and anthropology.

In "An Evolutionary Paradigm for Literary Study," Carroll raises the issue of whether the arts are an adaptation in and of themselves. Clearly, involvement in the arts, defined broadly, is a human universal. However, the human desire to produce and consume fiction could have two possible explanations which he outlines. One is that our involvement in fiction is simply the byproduct of psychological adaptations that were designed by natural selection to serve other functions. We are not designed to engage in fictional experiences, we are susceptible to them. Pinker

has been one of the leading proponents of this perspective, which is sometimes explained with the image of the arts as something that “picks the locks” of our brains’ pleasure circuits.⁹⁰

The other explanation, first articulated by Tooby and Cosmides (“Does Beauty Build?”), is that our involvement in fictional experiences is an adaptation, something we are designed to do because of its’ fitness benefits.

With fiction unleashing our reactions to potential lives and realities, we feel more richly and adaptively about what we have not actually experienced. This allows us not only to understand others’ choices and inner lives better, but to feel our way more foresightfully to adaptively better choices ourselves. (23)

As Carroll noted, I believe both explanations may be correct and that different types of fiction may be successful because they tap into either the lock-picking pleasure circuits or engage organizing adaptations (Salmon and Symons, “Slash Fiction”). It may be that some of the most successful tap into both.

When raising the issue of empirical methodology, Carroll suggests that some literary scholars would argue that while science focuses on patterns in the physical world, the humanities focus on the qualitatively unique. Despite such claims, “Trying to isolate literary study from psychological and historical generalizations is a sophisticated maneuver that will not stand against the simplest appeal to factual evidence...literary critics cannot do without appeal to the regularities of human psychology.” Without such regularities, specific works would not have widespread appeal. The importing of methodology from the social sciences is one way to collect such empirical data and will, I expect, continue to be a fruitful endeavor for many in the field.

Related to the issue of methodology is the suggestion that cognitive neuroscience may have something to contribute to the question of the adaptive nature of the arts. If the arts have an adaptive function, participation in them should “be motivated as emotionally driven needs.” As such, they should be related to specific forms of neurological activity which could theoretically be identified. While I think this could be an interesting approach, I think the current state of cognitive neuroscience makes it very easy to see how parts of the brain light up when we ask people to do things/read/imagine/etc, what that activity really means, or its implications, are much harder to determine with any confidence. I might be more inclined to delve into the experiments of motivation researchers and see if insights might be found there to illuminate the question of the adaptive function of the arts.

“Can the Darwinists produce formulations that are not only new but true?” (in the target article). This is the important question. In my undergraduate years I didn’t feel that much of literary analysis had anything to do with truth. But a literary studies that examines the biological forces that dominate (or are suppressed in) different works is a comparative literature that would be a pleasure to experience, one consistent with our expanding knowledge of human nature and the forces that shape us, knowledge collected from a wide variety of evolutionary social sciences. One example is Robin Fox’s analysis of male bonding in the epics, focusing on the importance of bonds between males in terms of hunting and warfare (“Male Bonding”). He also notes more modern examples such as Patrick O’Brian’s *Master and Commander* series of novels, which also produced a motion picture with the same title. Many action-adventure movies are often analyzed in terms of violence, such as so called Asian “Gun-fu” films, ignoring the underlying themes of loyalty and betrayal among men that permeate them.

I would also suggest that the research Don Symons and I conducted on slash stories (romantic/erotic narrative, written almost exclusively by women and for women, in which both protagonists are expropriated male media characters, the stars of various cop, spy, and science fiction television shows and movies as well as literary works, think Sherlock Holmes and Dr. Watson, or Kirk and Spock from Star Trek) and their readers (Salmon and Symons, “Slash Fiction” and *Warrior Lovers*) demonstrates the new perspective that evolutionary minded thinking brings to a study of literature, reinforcing Carroll’s argument that the Darwinist framework is useful to literary studies. Most studies of this genre have focused on women’s dissatisfaction with their own lives/bodies/men/etc, ignoring the fact that these are basically a variant of the traditional romance novel. The setting may be different, and the couple may both be male, but the heart of the stories is still the trials and tribulations of finding and keeping one’s true love. And their heart is this way because their authors and readers are women and this particular adaptive problem is one that has been faced by women over our evolutionary history. It is not as interesting to men (and the reason why they aren’t voracious consumers of romances or chick flicks) because their adaptive problems in the mating arena have been a bit different. But from an evolutionary perspective slash fiction is not a surprise or freakishly odd, just a variation on the appeal of romance to women. For this sort of reason, I look forward to many future years of literary Darwinism.

Ideas of Order: Artists Describing the Arts

Discussing the adaptive functions of human art, Joseph Carroll highlights its role in organizing the capacity of the mind to envision circumstances beyond the immediate. Able to conceptualize future problems and pleasures, to anticipate a multiplicity of outcomes for any event, to speculate about individual motives or group dynamics, and even to foresee their own mortality, humans occupy a mental universe far larger than their actual physical and social environment. “The Brain—is wider than the sky—,” as Emily Dickinson observes (Poem 262). The uniquely anticipatory, creatively constructive characteristics of human psychology have proven to be a source of strength for the species, ensuring “behavioral flexibility” in handling “contingent circumstances” (122). At the same time, however, these abilities are the source of “potential chaos” and “psychological exile” for the restlessly hypothesizing individual mind (Wilson 224-25). By ordering and interpreting the welter of interior hopes, fears, and schemes, art counters psychic chaos and isolation: deliberately shaped artifacts—in paint, in music, in words—seek to teach, to console, to cheer, or to inspire.

The ordered completeness of the imagined worlds artists construct is underscored by their recognition of the fragmented, confusing character of human consciousness. Without assistance such as that supplied by art, individuals tend to become lost in the dismaying multiplicity of their own projections, memories, and hypotheses. The sometimes overpowering richness of the external environment is magnified, on a moment-by-moment basis, by an avalanche of interior responses to it. In consequence, as Wallace Stevens points out, “we live in a constellation / Of patches and of pitches, / Not in a single world” (“July Mountain”). No one has described the “thousand odd, disconnected fragments” comprising individual awareness better than Virginia Woolf: “hanging and bobbing and dipping and flaunting,” the contents of the “rag-bag of odds and ends within us” tease and exasperate (*Orlando* 78). Seeking to understand the self as “nothing but one self,” its life’s experience as “a single, downright, bluff piece of work,” the individual is confronted instead with a hodge-podge of interiority that recklessly overlays sense

impressions with the “capricious” effects of memory, apprehension, and desire (310, 78). The result, Woolf avers, is that “nothing [can] ever be seen whole”: “body and mind [are] like scraps of torn paper tumbling from a sack” (307). This “chopping up small of body and mind” threatens to annihilate identity: one feels “disassembled” by a myriad of “separate scraps” all simultaneously attempting to define the self and direct its thinking (307). Woolf goes so far as to speculate that consciousness is an amalgam of “many different people . . . all having lodgement . . . in the human spirit,” each manifesting its own eccentric “sympathies, little constitutions and rights” (308). Prufrock, T.S. Eliot’s famous antihero, poignantly illustrates the psychologically debilitating problem of the “proliferation of possibilities” Woolf so vividly evokes (in target article): he finds himself immobilized by his capacity to project negative outcomes. The frenzied activity of his mental operations (“a hundred indecisions . . . a hundred visions and revisions” which “a minute will reverse”) stands in ironic contrast to his social paralysis: “And how should I presume?” (“The Love Song of J. Alfred Prufrock”).

Artists seek to counteract the chaos within, Carroll points out, by fashioning “an imaginative universe,” an alternative “virtual world” in which the plethora of possibilities generated by the mind assumes a satisfyingly cohesive, coherent, and aesthetic form (target article). Literary artists have sought repeatedly to articulate this crucial feature of their work: the creation of a compelling parallel universe. They have employed powerful metaphors to describe the fictive realities into which they propel their readers. John Keats invests linguistic structures with spatial, political, and economic dimensions, for instance, when he likens the act of reading great literature to travel through “realms of gold” (“On First Looking into Chapman’s Homer”). Containing “states and kingdoms,” the virtual territory of books assumes materiality, further exalted by attributes of sovereignty and wealth. Artists themselves, it appears, are consciously aware that they are creating alternative environments in which hypotheses may be tested, pleasures tasted, plans revised, outcomes revisited, and dreams realized. Self-definition is a pervasive impulse in literature; its creators offer frequent and eloquent reminders of its unique benefits. Indeed, they frame explanations of their purposes that offer undeniable support for evolutionarily-based theories of art.

Artists stress the completeness, the unarguable self-sufficiency, of a successfully devised virtual world; its emotional and intellectual equivalency to any extra-textual reality depends in large part upon its ability to “Comprehend the Whole—” (Dickinson, Poem 236). In a notable example, Wallace Stevens identifies a book of poems as “the planet on the table,” granting astronomical

vastness and autonomy to the literary artifact (“The Planet on the Table”). His bold metaphor causes a volume of verse that fits in a reader’s hands to grow enormously in stature as well as in size: it becomes a recognizable, distinct entity in an overarching cosmic system. William Shakespeare similarly praises the “shaping fantasies” responsible for art in *A Midsummer Night’s Dream* (Harcourt edition, V.1: 5). Distinguishing the imaginative powers of the “poet” from those of “lover” and “lunatic,” he points out that the latter two are victims of their own imaginative constructs: the lover projects self-deceiving pictures of the beloved (“sees Helen’s beauty in a brow of Egypt”), while the lunatic is terrorized by images that derive from internal, rather than external, sources of apprehension (“how easy is a bush supposed a bear”) (V.1: 11, 22). The poet, in contrast, takes charge of imaginative processes to build a “strange and admirable” new world (V.1: 27). He converts mental images into “shapes, and gives to airy nothing / A local habitation and a name” (V.1: 16-17). Wielding seemingly magical, transformative powers, the artist lends detail and substance to the non-material universe of mind. The resulting artifact is far more compelling and valuable than “fancy’s images” (such as those misleading the lover or lunatic) because of the completeness of its aesthetic design (V.1: 25). The poet has invented a plausible, named *habitation*, an alternative living space. All its parts fit together, moreover, ensuring internal consistency, or “constancy” (V.1: 26).

The twentieth-century poet Charles Tomlinson echoes Shakespeare’s insight that art inexplicably creates spaces with “local” substance from the “airy nothing” of imaginative operations: “as if a whole landscape might be unrolled / out of the atmosphere” (“Second Song”). The mystery and paradox characterizing the seemingly habitable yet ultimately unreal places art builds are recurrent topics in literature. Writers invite readers into “a place always out of reach,” familiar yet alien (Tomlinson “The Stair”). Yeats’s “holy city” of Byzantium is special because it contains familiar elements but remains “out of nature” (“Sailing to Byzantium”). There the “golden bough” retains its tree-like form but is composed of inorganic materials; no matter how lifelike, it is the produce of “artifice.” In the ekphrastic poem “On a Collage of Marie José Paz,” Tomlinson explores this theme from the point of view of the visual arts. Noting that Paz has composed her picture from “patches,” he finds himself fascinated by one particular “scrap” in the design, one that serves two functions simultaneously. This portion of the collage is not a plain, opaque scrap of paper; rather, it is “a landscape photograph.” Even as it completes the surface design of a tree trunk, therefore, it appears to open a “window” into another place entirely. The artist has enlarged, indeed, doubled, the evocative

power of her picture, “clear[ing] a space / out of elements / neither here nor there.” The viewer is invited irresistibly into the tree and tumbles like Alice down a rabbit-hole entry into an exotic space: “this interior / turned inside out.”

Here Tomlinson provides a wonderful formulation of the surprises readers encounter in the Oz of art. They enter eccentrically crafted worlds in which physical, psychological, and social laws operate *inside out*, that is, in a fashion both like and unlike their operations in real time and space. The literary work provides an “outlook that would be right,” as Stevens expresses it, enabling readers to feel “complete in an unexplained completion” (“The Poem That Took the Place of a Mountain”). The simultaneous resemblance and difference juxtaposing imaginative space to real space fosters psychological distance, insight, and control: it is the source of the solace and understanding art so often yields. (The small-mindedness of eighteenth-century European politics reveals itself with splendid clarity, consequently, in the miniaturized empire of Lilliput.) Climbing, here, into the “scrap” that forms an entire “landscape” in Paz’s collage, Tomlinson’s poet-speaker discovers that he is “free / in this tiny confine.” Art confronts us with a “tiny” but complete version of ordinary reality, reducing its hugeness and complexity to manageable proportions. In this deliberately limited space, we are temporarily “free.” Like a topographical map, the story, poem, or play enables its audience to comprehend a larger whole to which its details correspond; in art, necessarily, the mapped country is always imaginary.

Metaphors stressing the miniaturizing effect of art recur frequently as a way of describing the sense of power readers gain in the carefully delineated environment of literary space. Another example by a contemporary writer is Mary Jo Salter’s “Cutlery,” a poem in which she attempts to describe the appeal of a lapel pin decorated with diminutive replicas of knife, fork, and spoon. These tiny implements delight the beholder “because they aren’t real” and, at the same time, “because they are.” They correspond to “life-sized” cutlery in every detail, but are too tiny to be of any practical use. “In the doll’s house of art,” Salter concludes, “the table is always set and a meal / deliciously out of question.” Art presents us with phenomena, sensations, emotions, and conflicts like those in our “life-sized” world but in a precisely bounded, risk-free environment. In this “doll’s house” world, we enjoy the illusion of being in control, in charge, far-seeing, even wise. The knowledge that this alternative world is as unreal as it is realistic (the meals it sets forth never to be enjoyed) lends a bittersweet but ultimately liberating flavor to our enjoyment.

“Deliciously,” art holds out for our inspection imaginary territories that promise to be superior to the burdensome complexities of the environments we actually inhabit: art ferries us to realms of *gold*. “Heard melodies are sweet, but those unheard / Are sweeter,” Keats assures his readers (“Ode on a Grecian Urn”). Art pipes “to the spirit” rather than to the merely “sensual ear,” therefore; having “no tone,” the “ditties” so composed remain gloriously “Exterior—to Time—” (Dickinson, Poem 176). With “small reason,” Stevens muses, we persist in thinking that “the world imagined is the ultimate good” (Final Soliloquy of the Interior Paramour). Nothing on the street where we live, certainly, can compete with a “pleasure dome” in Xanadu, that “savage” yet “enchanted” place of Coleridge’s imaginings (“Kubla Khan”). Marked by diametric oppositions (“a sunny pleasure-dome with caves of ice!”), Xanadu is unmistakably a realm of artifice, and for that very reason seductive and precious.

Persistently writers locate the value of literature in the escape it provides from oppressive forces in the reader’s immediate environment. The young David Copperfield, for example, ameliorates his wretchedness and that of his fellow pupils at a cruelly managed boarding school with narrations based on books by his “favorite authors” (88). His bedtime performances are dubbed a “regular Arabian Nights,” an allusion offering further evidence that the alternative realities a storyteller provides can serve as a refuge from intolerable circumstances (88). Woolf makes the same point in *Orlando* from an ironic perspective when she declares that reading will “substitute a phantom for reality” (74). “Orlando . . . had only to open a book for the whole vast accumulation [of his property] to turn to mist”: it all “vanish[es],” “disappear[s],” “evaporate[s]” as the protagonist loses himself in the temporarily more desirable space of artistic invention (74). Although Orlando is using books to escape what appears to be an enviable life—prosperous and aristocratic, replete with opportunity—he is no different from young David Copperfield in his tendency to use literature as a magic carpet: it carries him, wonderfully, to a different place. “There is no Frigate like a Book / To take us Lands away,” Dickinson tells us; it is a “chariot” that “bears the Human soul” (Poem 466). In another poem Dickinson explains, very like an Adaptationist, that the pleasure of literature lies in its capacity to engage anticipatory or speculative mechanisms in the human psyche: books “cheer . . . guests / With Banquettings to be—”; they “Enamor—in Prospective—” (Poem 249).

In fact, the visions designed by literary artists prove so alluring, so all-absorbing, that writers sometimes point to the perils inherent in their potency. The imaginary world of chivalry, preserved and disseminated in books, provides the

motivating impulse behind Don Quixote's mad questing. Forged in the world of mind, Don Quixote's ideals are as admirable as they are ridiculous, as inspiring in theory as they prove destructive in practice. In the character of his eccentric protagonist, Cervantes highlights the dangers of committing oneself with excessive zeal to a single fictional reality. As Carroll indicates, "we do not have the option of living outside our own imaginative constructs." For members of the human species, "life consists / Of propositions about life" (Stevens, "Men Made Out of Words"). Typically, however, we are "constantly forming and reforming" the imaginative structures that shape meaning for us (in target article). Don Quixote has become stuck in a single mental construct; he is resistant to influences that might modify or correct the vision of life transmitted by the one imagined world he has determined to prefer.

Stephen Crane illustrates the same problem in "A youth in apparel that glittered" (Poem 27). In this tiny narrative, a young man dazzled by tropes from tales of chivalric valor puts on the costume of knighthood and strolls into a "grim forest." Assaulted there by a dagger-wielding "assassin / attired all in garb of old days," the youth welcomes a death that corresponds so perfectly to his literature-fed fantasies: "I am enchanted, believe me, / To die, thus, / In this medieval fashion, / According to the best legends." Here an individual's dream of fictive glory proves antithetical to survival, a circumstance that Crane notes with ironic mockery. At the same time, however, he emphasizes the almost dumbfounding ability of the human imagination to shape significance and inspire action. Formed by both literary and folk traditions in art, the youth's ambitions override adaptations that ordinarily guide behavior. In depicting the situation as he does, divided between horror and derision, Crane offers a backhanded tribute to the psychological power inherent in imaginative and aesthetic constructs. Employing different imagery, Emily Dickinson makes a similar point about the force of literature in her poem "A Word dropped careless on a Page" (Poem 465). Art "may stimulate an eye" at a remove of "centuries," influencing thought, motivating action, and evoking emotion long after its "Maker" is dead. Comparing these long-lasting effects to "infection" that "breeds," Dickinson conjures up the image of an epidemic: art resembles a fast-spreading contagious disease. Carriers of infectious ideas and ideals, works of art are agents of unstoppable transmission. Like Cervantes's portrait of the idealistic but lunatic Don Quixote, or Crane's of a fatally romantic youth, Dickinson's metaphor elevates art by exploring its potentially sinister effects. Transmitting its messages with subtlety and swiftness, art builds alternative worlds so alluring that its audience occasionally may be drawn into

maladaptive modes of action. Because its influence operates in the arena of mind, moreover, art is not susceptible to physical challenge or repulsion.

If the effects of art typically proved deleterious to fitness, obviously, art-making activity long ago would have been eliminated from the human repertoire of behaviors. Writers who represent cases such as those just cited are using extreme instances to highlight the potency and the importance of art, individually and communally, in human life: “the whole race is a poet that writes down / The eccentric propositions of its fate” (Stevens, “Men Made Out of Words”). Soothing and organizing interior tumult, art helps to shape meaning and clarify options. To discover support for Darwinian theories of art in the very artifacts under analysis may seem solipsistic, but it is no different from using the insights of folk psychology as rough-and-ready confirmation of adaptationist theories of behavior. In and of itself, such confirming evidence is insufficient, but it is nonetheless useful in ongoing discussions of the evolutionary functions art may have served in a variety of human environments. Since the virtual world constructed by each work of art is in important ways unique, furthermore, fears that the introduction of “rigorous empirical analysis” into literary methodology will reduce the field to a mechanical gathering of statistics, or cognitive mapping, should be allayed (in target article). “Impersonal, objective scrutiny” of the psychological mechanisms to which art appeals will supplement, rather than replace, detailed attention to singularities of aesthetic design and cultural context shaping individual works—and the “phantom” but “sweeter” worlds those works conjure.

Information is the Stuff of Narrative

Implicit in all evolutionary hypotheses regarding the function of narrative is the assumption that stories transmit information. Despite this, Carroll argues that narrative is not “didactic” in function. The essence of his position is as follows: “The idea of art as a source of information or exemplary lessons in conduct has some merit, but information can be delivered in other ways more efficiently, and didacticism, like novelty, leaves out too much of what is peculiar and specific to art, while also excluding too many instances of art that could not plausibly be described as didactic.”

Webster’s dictionary defines *didactic* as “intended to convey instruction and information.” Storytelling clearly fits this definition: it conveys information and, as a communicative act, it is intentional (Sperber and Wilson). An inescapable conclusion follows: there are no instances of storytelling that are not didactic.

Thus, the argument against “didacticism” is largely semantic. For example, Carroll argues that “the arts fulfill a vital adaptive function” by creating “an imaginative universe in which the forces at work in the environment and inside the mind are brought into emotionally meaningful relations to one another.” He adds that this “is not the same thing as providing practically useful information or an objectively accurate map of the external environment.” However, if the arts bring “the forces at work *in the environment* and inside the mind into emotionally *meaningful* relations to one another” (italics added), then the arts provide “practically useful information” about “the external environment.” Meaning is information, and information that is “vital” is both practical and useful. Moreover, information need not be objective to be accurate or useful; it need only be reliable. If information provided by imaginative universes did not reliably correspond to the external environment, the arts could not “fulfill a vital adaptive function.” The evaluative criteria that Carroll presents in an earlier essay are grounded on just such a correspondence between the external environment and imaginative universes: he critiques Kurtén’s and Auel’s respective depictions of Neanderthals for being

inconsistent with archaeological evidence, arguing that “in fiction the rules of evidence and logic do count. They are important elements in the integrity of conception in the representation of the subject” (*Literary Darwinism* 173).

The conversation about didacticism is really a conversation about design, as evinced by Carroll’s claim that didacticism “leaves out too much of what is peculiar and specific to art.” He is referring here to the subjective, emotional, aesthetic, and qualitative aspects of art. I believe that conceptualizing narrative as a system for transmitting adaptively useful information includes all of these qualities. The remainder of this response will address these aspects of narrative design with respect to what Carroll calls *didacticism* and what I call the *information transmission hypothesis* (Scalise Sugiyama “Narrative as Social Mapping”). It should be noted that Carroll’s paradigm embraces both art and narrative, whereas my hypothesis refers exclusively to narrative.

There is no substantive conflict between Carroll’s claim that literature “produces subjectively modulated images of the world and of our experience in the world” and my claim that narrative is a system for storing and transmitting adaptively useful information by simulating the human environment. All information transmitted from one human to another is “subjectively modulated” in that it is filtered first through the transmitter’s and then through the receiver’s fitness interests, abilities, and experience (for example, beliefs, desires, feelings). Hence, it goes without saying that any adaptively useful information acquired through communication with a conspecific is also subjective. Storytelling is triply so: (1) story content is inherently biased by the priorities and prejudices of the storyteller (Scalise Sugiyama, “On the Origins”); (2) each character embodies a unique set of abilities, goals, and perspectives through which he/she views the world (Scalise Sugiyama “Feminine Nature”); and (3) *La Jalousie* notwithstanding, narrative gives us (subjectively modulated) access to the minds of others (Scalise Sugiyama, “Feminine Nature”). Thus, narrative paradoxically gives us access to subjective information (e.g., the “true” feelings, values, and opinions of others) that is mediated by the subjectivity of the narrator. Obviously, this information must be taken with a grain of salt because, to the extent that the narrator’s goals conflict with the audience’s, it is likely to be biased. With its multiple layers of subjectivity, then, narrative engages and may help calibrate mechanisms for “considering the source” (Tooby and Cosmides, “The Past”)—that is, for monitoring the conditions under which and the ways in which information may be biased.

More provocative is Carroll's claim that art functions to organize "motivational systems disconnected from the immediate promptings of instinct," which is based on Wilson's view of art as a response to uncertainty. Wilson argues that one of the distinguishing characteristics of humans is their "high intelligence" (*Consilience* 224) and that there has not been sufficient time for algorithms to evolve that would enable humans to "cope with the vastness of new contingent possibilities revealed by" this capacity (225). The arts remedied this situation by making our ancestors feel that they had control over the powerful, unpredictable forces that impinged on their daily survival: sickness, famine, predators, enemies, weather. Significantly, Wilson asks *whether*—but does not argue *that*—the arts are an adaptation: "If the arts are steered by inborn rules of mental development, they are end products not just of conventional history but also of genetic evolution. The question remains: Were the genetic guides mere byproducts—epiphenomena—of that evolution, or were they adaptations that directly improved survival and reproduction?" (224). He does not proffer an answer to this question, and speaks only of the arts as having "originated" (218), and having been "invented" (225) by humans.

Wilson's argument that the arts provided a remedy to the "confusion caused by intelligence" (225) hinges on high intelligence having evolved rather recently and rapidly, both of which are unlikely. Complex adaptations tend to evolve gradually (Dawkins, *The Blind Watchmaker*; and Williams), and the trend toward encephalization is no exception. It began roughly 2 mya with the emergence of *H. habilis* (mean endocranial volume 630 cc), and continued with the emergence 1.8 mya of *H. erectus* (mean endocranial volume 1000 cc), the emergence around 400,000 bp of archaic *H. sapiens* (mean endocranial volume 1200 cc), and the emergence around 130,000 bp of anatomically modern humans (mean endocranial volume 1560 cc) (Klein). Two million years is ample time for mechanisms mitigating the effects of high intelligence to co-evolve—which would be necessary if high intelligence did indeed impose severe fitness costs. (Strangely, in a rumination that contradicts his own argument, Wilson posits that human capacity to produce art might have been "perfected in small steps across millennia" [227].) An organism that became paralyzed by confusion due to its awareness of the uncontrollable forces of nature would simply not survive. This is the line that Carroll takes, arguing that the arts are an "adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence."

An alternative hypothesis, of course, is that high intelligence is not behaviorally paralyzing. This is the view articulated in the cognitive niche

hypothesis (Tooby and DeVore). Like Wilson, Tooby and DeVore argue that what distinguishes humans from other species is their highly developed ability to represent contingently true information, including hypothetical propositions. Tooby and DeVore refer to this ability as *instrumental intelligence*, by which they mean the ability to create and maintain cognitive cause-and-effect models of our environment. This view, like Wilson's, acknowledges that acquisition of this capacity was potentially costly, but characterizes the problem differently: the circumstances under which a contingently true proposition is valid may fluctuate; hence, the danger in using contingently true information lies in applying it to the wrong contingency. The solution to this problem is scope syntax—a sub-system for monitoring and updating the limits within which contingently true information is valid (Cosmides and Tooby; and Tooby and Cosmides, “Does Beauty Build?”). In contrast to Wilson, then, they see this capacity as empowering: cognitive models are used as guides for prejudging which courses of action will lead to which results. In short, instrumental intelligence enabled our ancestors to plan. Far from paralyzing them, this ability allowed our hominid forbears to tap hundreds of previously inaccessible resources—e.g., bone marrow, mollusks, burrowing animals, plants with toxic compounds—through the use of tools. Archaeological evidence supports the hypothesis that instrumental intelligence began developing early in hominid prehistory: humans were using and making stone tools by at least 2 mya.

Instrumental intelligence is also what enables humans to tell stories. A story is a set of cause-and-effect representations of possible human environments, possible human goals, possible strategies for pursuing them, and possible outcomes of those strategies (Scalise Sugiyama, “Food,” “Narrative as Social Mapping,” and “How an Interest”). In other words, narrative is planning: “Imagery is the representation of perceptual information in a format that resembles actual perceptual input” which “may serve to unlock, for the purposes of planning, the same evolved mechanisms that are triggered by an actual encounter with a situation displaying the imagined perceptual and situational cues” (Tooby and Cosmides, “The Past” 416). Narrative is not a solution to the problems inherent in representing contingently true information; rather, the ability to represent contingently true information is what makes narrative possible.

Also provocative is Carroll's proposition that “[m]eaning in art works through emotional and aesthetic impact.” This is a reasonable claim that is almost surely true of much of the meaning in art, but it is difficult to align with Carroll's earlier claim that art functions to organize “motivational systems disconnected from the

immediate promptings of instinct.” To see this, we need to understand how meaning is communicated through emotional and aesthetic impact. Emotional and aesthetic systems are motivational systems. Emotions respond to situational cues by signaling (i.e., conveying information to) cognitive structures relevant to addressing that situation. For example, catching one’s mate *in flagrante delicto* activates the emotion of sexual jealousy. This emotion, in turn, signals the suite of mechanisms that respond to infidelity: “physiological processes are prepared for violence; the goal of deterring, injuring, or murdering the rival emerges; the goal of punishing or deserting the mate appears; the desire to make oneself more competitively attractive appears” (Tooby and Cosmides, “The Past” 410), and so on.

Aesthetic systems work in a similar fashion, guiding behavior by causing us to experience pleasure when we do something that increases our chances of surviving and reproducing (e.g., sex, eating, sleeping). We find a given object, phenomenon, or behavior attractive (i.e., beautiful, interesting, fun) because it exhibits cues that, in ancestral environments, signaled that it would have been advantageous to pay attention to it (Tooby and Cosmides, “Does Beauty Build?”). Obviously, not all of the activities we find pleasurable (e.g., sex, eating, sleeping) function to convey meaning. But many do: activities such as babbling, chase play, and stargazing furnish the mind with information requisite to the development and/or calibration of specific adaptations (language, predator evasion, and perception systems, respectively). Engaging in these activities provides our brain circuitry “with the information, procedures, and representations it needs to behave adaptively when called upon to do so” (Tooby & Cosmides, “Does Beauty Build?” 16). Tooby and Cosmides argue that engaging in fictional worlds may serve a similar function. This is very different from arguing that the arts function to organize “motivational systems disconnected from the immediate promptings of instinct.” The former view posits that motivational systems prompt humans to engage in behaviors (e.g., fiction) that organize adaptations. The latter view reverses the causal order, positing that art behavior organizes motivational systems, presumably providing them with the information they lack due to being “disconnected from the immediate promptings of instinct.” This view begs the question, if motivational systems must be organized by art behavior, what motivates humans to engage in art behavior?

Additionally, it is not clear what it would mean for motivational systems to be “disconnected from the immediate promptings of instinct.” Motivational systems *are* instincts, if by “instinct” we mean cognitive mechanisms designed by natural

selection to solve an adaptive problem. If motivational systems somehow became disconnected from the “promptings of instinct”—that is, if they no longer responded to situational cues—then they wouldn’t respond to simulations of those cues (e.g., art) either.

Tooby and Cosmides’ discussion of the relationship between emotion and planning (“The Past”) bears on the evaluative aspect of narrative, by suggesting how engaging in narrative might calibrate adaptations. They argue that one function of emotion may be to recalibrate decision-rule weightings. Death, for example, “may involve guilt, grief, and depression because of the problem of recalibration of weights on courses of action. One may be haunted by guilt, meaning that courses of action retrospectively judged to be erroneous may be replayed in imagination over and over again, until the reweighting is accomplished” (“The Past” 416). They further suggest that imagined courses of action may have the same effect. Although they don’t mention narrative *per se*, imagined courses of action are, of course, the foundation of narrative. On this view, then, certain of the emotional responses evoked by a story may encourage us to replay the courses of action it depicts (i.e., tell/listen to it repeatedly), thereby recalibrating the weightings of the decision rules triggered by the story situation. This may very well be what Carroll means when he proposes that the arts constitute an “emotionally meaningful cognitive map [that] provides points of reference within which humans adjust their sense of the relative value and significance of things”: recalibrating can be likened to “adjusting,” and weightings can be likened to “a sense of the relative value and significance of things.”

The most parsimonious view at this point is that a story is a set of representations that mimic situational cues that our motivational systems are designed to respond to. Once engaged, these motivational systems trigger mechanisms dedicated to processing the information contained in the represented cues. Although hypothetical, these representations nevertheless contain reliable information about the physical and social environment—including motivational systems (e.g., human emotional responses). It doesn’t really matter whether we characterize this information as “objective” or “subjective.” What matters is whether or not the information is reliable—*can it be used as if it were true?* If so, and if possessing and using such information can increase an individual’s fitness, then it falls under the umbrella of “adaptively useful information.”

Given such an elegant system, Carroll’s claim that “information can be delivered in other ways more efficiently” is surprising—especially since ethnographic evidence suggests the opposite. Exploitation of the hunter-gather

niche demands exhaustive knowledge of a given habitat and its inhabitants, including humans. This information must be retained to be useful: a delivery system that does not embed this information in long-term memory cannot be said to be efficient. There may be quicker ways of delivering information than telling a story, but speed isn't everything, and in modern foraging societies, where there are no mass media, oral traditions are veritable repositories of information critical to survival and reproduction.⁹¹ The efficiency of such a system and the significance of the information it transmits may be hard to see through the informational effluents of recent modern environments. Nevertheless, oral traditions were quite likely the first information technology utilized by humans, and are the logical place to begin looking for narrative design and function.

Literary Darwinism as Science and Myth

The program of Darwinian literary study (DLS) that Joseph Carroll advances in “An Evolutionary Paradigm for Literary Study” encompasses a number of projects whose relationships are unclear, whose ambitions are unrealizable, and whose interpretive power is weak. However, the most disturbing aspect of the project is that it depends on misunderstanding the nature of literary study.

Literary study is not now, and never has been, a progressive science whose aim is “generating new knowledge” in the form of scientific theories; its purpose is to carry on a literary tradition, whose remoteness, of one kind or another, presents a barrier to that aim. The study of Latin and Greek literature is the model. Literary study establishes texts, tries to determine meanings in historical context, and produces narratives based on those meanings. The purpose of literary study is the transmission, transformation, and even creation of literary traditions—think of F. O. Matthiessen’s *American Renaissance*. Literary study is not “about” those traditions, it is a constitutive part of the them. The scholar thus has a very different relationship to literary works than a scientist has to nature. The latter offers causal explanations rather than interpretations and narratives. Literary scholarship is an enterprise that has long done its work more or less well, and the current danger to the field is not the absence of a unifying scientific theory but the replacement of classic literary works and major traditions with “cultural texts” that may not even be literature at all.

The crisis in literary study that Jonathan Gottschall traces to “a methodological failure to produce empirically valid and progressive forms of knowledge” (quoted by Carroll) is, in fact, a minor part of the tradition of literary study itself. When vernacular literatures were introduced to the curriculum of research universities in the late nineteenth century they had to overcome the objection that literature in one’s native language, unlike the classics, did not require disciplinary study. Since vernacular works were addressed to and readily understood by educated adults, what would one be tested on—one’s taste? To counter these objections the literary

scholars introduced and made central to the discipline the history of modern languages, which yielded “laws,” and Anglo-Saxon. As F. W. Bateson says: “When we came into being some seventy years ago the superimposition of Eng. Lang. on Eng. Lit. . . . was tactically necessary to meet the objection that Eng. Lit. *per se* would be a ‘soft option’” (222).

The worry that motivated this initial defensive effort has been felt ever since, and it is science that has usually been called to the rescue. In 1893 Richard Green Moulton published *Shakespeare as a Dramatic Artist; a Popular Illustration of the Principles of Scientific Criticism*, and New Criticism was based, in part, on the linguistic theories of Russian Formalism. Psychoanalytic theories, Marxism, structural linguistics and other alleged or actual sciences have also been used to make scientific claims for literary study. The case for making it a science was made most forcefully by Northrop Frye in the “Polemical Introduction” to his *Anatomy of Criticism*, and Frye offered his own archetypal theory. Three decades later Jonathan Culler said that structuralist literary theory was an attempt to “revitalize criticism and free it from an exclusively interpretive role[by] developing a programme which would justify it as a mode of knowledge” (viii). Nothing like a science of literature emerged from these efforts, and DLS will, I believe, meet the same fate as earlier efforts to make literary study a science.

What, then, is DLS? Consider Carroll’s claim that DLS has “social science, connecting local critical perceptions with general principles of literary theory, and integrating these principles with principles of psychology, linguistics, and anthropology” (129-130). That is a recipe for a hodge-podge of theories within theories, and is of a piece with the strange ambition that animates the project, to create “an integrated body of knowledge extending in an unbroken chain of material causation from the lowest level of subatomic particles to the highest levels of cultural imagination” (105). The cosmologists can’t yet get past the first few milliseconds, but never mind, it will soon smooth sailing from the big bang to James Joyce. Although this is absurd as a scientific project, there is an understandable ambition behind it.

Since the rise of science, non-believing intellectuals have produced grand narratives that claim to be based on, or compatible with, science, and which offer comprehensive accounts of human existence. These myths, as I shall call them, are meant to replace the Christian story. Hegel’s *Phenomenology of Spirit* is the earliest such myth; Marx and Freud followed in his wake, and that is what Carroll and others hope for from Darwin. Carroll wrote in 2002 that “we are on the verge of synthesizing [the] elements” necessary for a “full and adequate conception of

human nature” (“Emerging Research Program” 1). That is what myths do, but not science, since “human nature” is a folk psychological concept. However, if history is any guide, it is precisely as myth that DLS might find its way into the curriculum as part of what Carroll calls “the practical work of interpretive criticism.”

There are precedents for this. What happens is that literary scholars appropriate scientific vocabularies to offer *interpretations* rather than *scientific theories*, and, despite appearances, these are completely different enterprises. Let me explain.

Literary interpreters routinely talk about the themes of literary works, and these themes connect elements in the work to concerns that resonate with us and our students. Thus, we might speak of the theme of barbarism and civilization in *Othello*. Talking about literary works this way makes them mean something to us, whatever they may have meant to their original audience. But themes are, as it were, optional (one can understand *Othello* perfectly well without ever thinking about civilization and barbarism), and therefore weak academically in the research environment, and so academic literary interpreters have, since the 1930s, used vocabularies taken from various real or putative sciences as a way of making their interpretations look scientific and therefore necessary if one is to *really* understand literary works.⁹² Linguistics, psychology, anthropology, and sociology have been the main sources of these interpretations.⁹³ However, offering an explanation of *Othello*’s actions in Darwinian terms is not a scientific explanation but a rhetorical move whose aim is to enhance the value of both Shakespeare and Darwinism by showing that a masterpiece is intuitively deep about human nature and that Darwinian science is able to (finally) reveal a deep truth about a great work. Neither claim is true, but the method has worked for Marxists, Freudians, Jungians, structuralists and others, so why not for Darwinians? The answer to that question is bleak, but that is greatly to Darwinism’s credit. How so?

Darwinism, as an interpretive schema, has the virtue of being based on a true theory, but it will have a very short run in academia, because as an interpretation of life it is dull and empty of meaning. Freud offers a conflict-ridden account of individual development and its discontents, and Marx provides us with a brilliant story about how society develops through class struggle and how social injustice is maintained. There is a “fall” in both stories, which accounts for human suffering, and both offer a vision of the future to guide us, the admittedly modest replacement of some id by the ego and, much more grandly, a classless society.

What does Darwinism offer along these lines? The Darwinian vision is something like Eliot’s “birth, copulation, and death,” the universals that are part of

our animal inheritance plus a few of our own, although as we find language, song, and tool use in other animals, our uniqueness dims. Where is the drama that successful interpretations of human life offer, or even a distinctive human nature? Darwinism will fail as an interpretive schema because it is mythically impoverished. Darwin tells us an awful truth; we are headed nowhere special without a purpose or a compass.⁹⁴ That is why the Darwinians will be lucky even to achieve a place in those collections of approaches that Carroll sees as just a small step on the way to hegemony and which tend to be hospices for expiring interpretive schemas.

Perhaps the oddest of Carroll's claims for DLS is that in the consilient academy "humanistic sensitivity to the fine shades of tone and style in literary works will have blended seamlessly with a rigorous empirical analysis of cognitive mechanisms, and a facility in writing elegantly nuanced prose will mingle happily with the severe logic of a quantitative methodology. Scholars and scientists occupied with literary study will balance easy grace between impersonal, objective scrutiny of science and a passionate humanistic responsiveness" (32). This is bizarre—or perhaps a joke? It never has been, is not now, and never will be the case that academics will routinely produce elegantly nuanced prose (of course a few do). Indeed, such prose is usually deprecated as appropriate to what Northrop Frye called "public critics," whose job is to convey through lively plot summary and evocative language the feel of literary works so that the audience of common readers can get some sense of whether or not they might like the book. That scientists will become literary scholars and develop a talent that literary folk reject is an even wilder surmise. If this is the aim of the Darwinian program it is certain that it will not be achieved.

Nothing I have said denies that perhaps some day scientists will understand the brain mechanisms that underlie irony, metaphor and other aspects of literature, and why such aspects of language were adaptive (although that seems immensely more difficult). At the moment, however, there seems to be merely a plethora of speculations. Some think there is a story module, while William Ramsey says of what he calls narrative intelligence, "[t]he processing is highly distributed throughout the entire system, and there are no task specific modules, discrete symbols or explicit rules that govern the operations" (Herman 186). If the science is still so uncertain, many of Carroll's claims are very premature. But even were the scientists to find out what mechanisms enable us to tell and understand stories, and how that behavior is an adaptation, the theories would have no bearing on literary study, just as theories about the mechanisms that enable outfielders to track fly

balls do not shed any light on or enhance appreciation of baseball. And shedding light on and enhancing the appreciation of literary works and traditions are what literary study does and should do.

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Good and Bad Reductionism: Acknowledging the Power of Culture

As someone who has written at length on the need for vertical integration or consilience between the natural sciences and the humanities, I am obviously in agreement with the majority of Carroll's argument. I particularly think it is important to recognize, as Carroll notes, that any work in academia worth its salt is "reductive" in some respect—that is, seeks to explain a particular phenomenon in terms of more basic, general principles. The common tendency in the humanities to use "reductionistic" as a peremptory term of dismissal is therefore entirely unjustified. I do think, however, that it is important to distinguish between "good" and "bad" forms of reductionism, and to make it clear that consilience, properly understood, involves an ongoing respect for the relative autonomy of the levels of explanation studied by the humanities. I do not think that this is something with which Carroll would disagree, but at points in his essay his rhetoric suggests otherwise. If those of us who support evolutionary approaches to the humanities wish to win broader acceptance among our colleagues, it is incumbent upon us to make it clear that consilience does not entail—as many humanists fear it does—collapsing humanities departments into biology departments, denying the significance of human-level truths, or reducing human culture to a mechanistically-expressed phenotypic trait.

Carroll notes the existence of a group of scholars interested in cognitive approaches to literature who nonetheless seem determined to distance themselves from literary Darwinism. This is, on the face of it, rather puzzling: the human cognitive system is a product of evolution, so it is hard to imagine why someone interested in human cognition would have an allergy to evolutionary theory. No doubt some of this leering results from a visceral aversion liberal intellectuals tend to exhibit toward any mention of Darwinism or evolution: in my experience, the leap from "Darwinism" to "Nazism" or "eugenics" is an almost Pavlovian response for most humanists, and it takes some work to overcome this indefensible and intellectually lazy response. In addition, as I have argued elsewhere, a

powerful source of resistance to applying evolutionary theory to human beings is our innate mind-body dualism (a product of our Theory of Mind): we are comfortable talking about non-human animal behavior or “merely physical” aspects of human beings (our organs, our limbs) in evolutionary terms, but the mind and its products strike us as being qualitatively different in some way. In this sense, it could be said that we are built by evolution to have trouble believing in evolution as a universal explanatory framework. The combination of our innate resistance to physicalism and the historically-conditioned kneejerk reaction against Darwin means that any attempt to advance literary Darwinism is going to be an uphill battle.

One way to make progress in this battle is to make it clear that vertical integration does *not* entail eliminative or “greedy” reductionism, whereby the heuristic importance and relative autonomy of higher-level entities is denied. A glance at the natural sciences allows us to get a good grasp of what “good” reductionism looks like. Neuroscience is dependent upon organic chemistry, which in turn is dependent upon physical chemistry, which in turn is dependent on physics. The nature of this dependence is such that lower levels of explanation exert an important constraining function on the higher levels. A hypothesis in organic chemistry that violates everything that we think we know about physical chemistry is likely to be rejected out of hand; if not, it would require a complete rethinking of physical chemistry. The argument behind vertical integration is that the levels of explanation studied by the humanities need to be plugged into their proper place at the top of this hierarchy of explanation, and be subjected to the same constraint of overall “consilience.” At the same time, this does not entail the disappearance of human-level disciplines, or their absorption into lower levels, because as we move up the explanatory chain we witness the emergence of new heuristic entities, which possess their own novel organizational principles. Organic chemistry has not been replaced by quantum physics because organic molecules have a set of emergent properties, and are governed by a set of emergent principles, that are simply not predictable or tractable from the perspective of quantum physics. This is why biology and chemistry departments continue to enjoy autonomy from physics departments, and why humanities departments are not going anywhere even if the academy were to fully embrace vertical integration.

At many points in his essay, this seems to be what Carroll is arguing with regard to evolutionary psychology and the study of literature: theories that we propose about reader response or the functioning of particular rhetorical forms need to be informed and constrained by what we know about how the human mind

works. “Trying to isolate literary study from psychological and historical generalizations is a sophisticated maneuver,” he observes, “that will not stand against the simplest appeal to factual evidence.” He rightly points out that the key flaw common to most of the currently dominant approaches to literature is that they “emphasize the exclusively cultural character of symbolic constructs,” and therefore create an intellectual environment in which natural scientific knowledge about human nature or cognition “can exercise no constraining force on culture.” One immediate and important affect of adopting a vertically-integrated stance to the humanities would be the elimination of a variety of widely-believed but empirically indefensible views about human cognition and culture—such as the “blank slate” view of human nature or the ideal of disembodied reason—and Carroll notes that this is an important “negative” service to be performed by literary Darwinism: “If evolutionary literary study did nothing more than clear away...distorting theoretical impedimenta...[it] would have performed a valuable service.” In addition, of course, there is also an important positive dimension: once literature is placed in its proper relationship to lower levels of explanation, such as evolutionary theory or cognitive science, a plethora of new hypotheses about literature immediately suggest themselves, accompanied by a powerful new explanatory framework and set of vocabulary.

So far, so good. My one concern about Carroll’s presentation of his position, however, is that one sometimes gets the sense that he is advocating the stronger, “biology subsumes all” position that humanists rightly want nothing to do with. Examples of Carroll’s sometimes troubling rhetoric include his characterization of literary Darwinism’s goal as “sweep[ing] past inclusion” in traditional institutional structures and “subsum[ing] all other possible approaches to literary study,” as well as his metaphor of literary Darwinism as a city core “swallow[ing] up” outlying enclaves in an inexorable advance. Jettisoning strong forms of social constructivism would indeed mark an important “shift” in our “frame of interpretation,” and bringing evolutionary theory and cognitive science to bear on literary studies in an explicit and systematic way would mark a real revolution in literary studies methodology and rhetoric. However, because fields such as literary studies tend to concern themselves overwhelmingly with emergent structures and idiosyncratic cultural histories, it is not clear to me that adopting a vertically-integrated perspective would have such a global and dramatic effect on the day-to-day work of most literary scholars. This is particularly the case when one recognizes, as Carroll does, that many literary scholars in fact implicitly share many of the assumptions of a vertically-integrated approach—such as important

commonalities in human nature, universality in narrative forms, etc.—even if they deny these commonalities in their rhetorical and theoretical posturing.

I have a colleague whose research interest focuses on the intersection of poetics and political patronage, as manifested in the production of official poetry anthologies. She often asks me why someone like her would care about vertical integration. One answer is that adopting a vertically-integrated perspective—for instance, learning something about evolutionary psychology and cognitive science and taking it seriously in her work—might very well, as Carroll notes, involve an important shift in her overall interpretative framework. The typical Foucaultian framework we all imbibed in graduate school encourages her to see her work as documenting the manner in which aesthetics is primarily driven by politics and power, with “beauty” revealed as no more than culturally-specific construction. An evolutionary framework might lead her to focus more on coalition-formation, prosociality, and aesthetic forms as in-group markers—an important advance over Foucault because it would allow her to plug her work into a much broader and more powerful explanatory framework, one that also has the wonderful virtue of being empirically plausible.

However, it is also important to acknowledge that 90% of her work is concerned with the specifics of how *this* particular person commissioned *this* particular poetry anthology, and how this historical event influenced some very culturally- and linguistically-specific forms of poetic expression. Evolutionary theory does not speak directly to these issues. Carroll rightly criticizes Eugene Goodheart and the common move to metaphysical dualism that argues that, while science studies regularities of dumb nature, the humanities study the ontologically unique and unpredictable movements of the mysterious human *Geist*. If the humanities were only concerned with uniqueness they would not represent academic disciplines—literary study would be no more than an exercise in stamp collecting. Nevertheless, the task of explaining and understanding literature often operates at a such a high level of emergent specificity that evolutionary psychology is only marginally more relevant than quantum mechanics, and this is why traditional forms of literary study will continue to function more or less autonomously even within a vertically-integrated framework. Familiarity with the literature on coalition-formation and prosociality is not going to tell my colleague anything about the specific aesthetic choices made by competing factions of poets, and this is one of the central questions that she is interested in answering. Again, I don't think that Carroll would necessarily disagree with any of this, but it would behoove him to make it clearer to his colleagues that, while consilience would

provide an important new explanatory framework within which literary studies could operate, it does not necessarily entail radical alterations in one's everyday methodology, vocabulary or focus of interest. Literary scholars do not need to stop talking about history and genre, or confine themselves only to terms and concepts drawn from evolutionary psychology.

A related point is that Carroll also at times gives the impression that he views culture as a more-or-less direct expression of innate human psychological mechanisms—à la E.O. Wilson's (in)famous metaphor of the human brain as “an exposed negative waiting to be dipped in developer fluid” (*Sociobiology* 156)—rather than a potentially autonomous force in its own right. It is true that, as Carroll notes, “culture translates human nature in social norms and shared imaginative structures,” but it is also important to recognize that culture regularly *transforms* human nature and cognition in important ways. One doesn't have to be a wild-eyed social constructivist to acknowledge this point—much of the most interesting recent work in evolutionary psychology and embodied cognition has focused on the *co*-evolution of human cognition and culture—but the overall thrust of Carroll's argument leaves one with the impression that *all* significant structure comes from innate human nature, and that cultural variation is a mere epiphenomenon. I fear that one unfortunate effect of many recent attempts to bring a robust conception of human nature back to the fore is the creation—perhaps often unintended—of a false dichotomy between nature and nurture: that the only alternatives are embracing full-blown social constructivism or believing in a single, universal human nature that merely gets “translated” into various cultures. In fact, a vertically-integrated, embodied approach to human culture—one fundamentally informed by evolutionary theory and the latest discoveries in cognitive science—can take us beyond such dichotomies. The work of scholars such as Pete Richardson and Rob Boyd has shown how cultural forms themselves are subject to a kind of evolution, constrained by the structures of human cognition but also exerting their own independent force. In fact, cultural evolution may have driven human genetic evolution, favoring our big brains, linguistic skills, and ultra-sociality, the three hallmarks of our species. Similarly, conceptual metaphor and blending theory give us very specific models for understanding how universal, innate human cognitive patterns can get projected into new domains or combined to generate entirely novel, emergent structures. Human cognitive fluidity, ratcheted up over time by cultural entrenchment, can shape human emotions, desires and perception in quite novel and idiosyncratic ways—from the subtle

Japanese aesthetic sentiment of *mono no aware* (lit. “the sorrow of things”) to the sort of “cultivated needs” explored in depth by theorists such as Pierre Bourdieu.

Carroll does not explicitly deny the importance of such work, and does make passing reference to cognitive fluidity and cognitive linguistics. More of an acknowledgement of how culture can play an active role in reshaping human nature, however, would go a long way toward winning over skeptical humanists—for whom the dazzling variety of various human cultures and the nuances of specific cultural products are the most salient features of human beings—and help to bring the literary Darwinians in from the jungles of their guerilla war.

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Literature as Self-Engineering: An Evolutionary Hypothesis

“Literature always anticipates life. It does not copy it, but moulds it to its purpose”

—Oscar Wilde

Joseph Carroll points out in his target article that there is not yet a consensus about the role of literature and the other arts in human evolution. It is not even clear whether or not the art has an adaptive function. If art is adaptive, there must be a reproductively significant problem for which it was, and perhaps still is, a solution. But what is this problem, and how does art provide a solution for it? Answering this question should be at the top of the agenda of anyone seriously interested in a Darwinian approach to literary studies. Carroll takes up the challenge, and after surveying the main contenders—the hypotheses offered by Pinker, Miller, Dissanayake and Boyd—he concludes that Edward O. Wilson’s hypothesis about the evolution of art is the most promising option currently on the table. While I am sympathetic with Carroll’s aim, I have doubts about the adequacy and coherence of Wilson’s hypothesis. In this commentary, I will set out what I think is wrong with Wilson’s approach, and then go on to gesture towards an alternative that promises to give a more adequate account of the adaptive function of literature.

Wilson holds art is an adaptation: a solution to a problem in living rather than a mere byproduct of evolution, and that as such, it contributed directly to the survival and reproductive success of our prehistoric ancestors. On this view, the adaptive problem for which art supplied a solution was a consequence of the evolution of the human brain. Our “extremely high intelligence, language, culture, and reliance on long-term social contracts...gave early *Homo sapiens* a decisive edge over all competing animal species, but they also extracted a price we continue to pay, composed of a shocking recognition of the self, of the finiteness of personal existence, and of the chaos of the environment” thus rendering us “psychological exiles” (224-25). In response to this crisis of awareness, early human beings invented the arts to “express and control through *magic* the abundance of the

environment, the power of solidarity, and other forces in their lives that mattered most to survival and reproduction. . . . *The arts still perform this primal function, and in much the same ancient way*" (225-26, emphasis added).

As enticing as this hypothesis may seem, it is difficult, if not impossible, to reconcile Wilson's claim that art is an adaptation with his subsequent claim that art is magic. Magic does not enhance reproductive success, nor does it help us to live longer, attract more fertile mates, or have healthier offspring. Although one might argue that magical practices and beliefs provide a reproductive advantage by decreasing stress, this explanation does not seem credible. The costs of art—the time, resources and energy invested in artistic production—would have been unlikely to outweigh what is presumably a relatively small advantage provided by stress-reduction. Also, quite apart from its specifically biological shortcomings, the conjecture that art began and continues to function as a magical way to control the environment strikes me as implausible. It seems to me that most of us seem to be blissfully oblivious to the menacing shadow of mortality, and do not cling to art to soothe our existential pain or provide an illusion of control in a chaotic and hazardous world.

If imaginative culture is an adaptation it must have made a significant difference to the material conditions of the lives of prehistoric men and women. But how did it do this? Imaginary culture presupposes the capacity for imagination, so in order to answer this question we will need to understand the adaptive function of imagination *simpliciter*. There are a dozen or more conceptions of imagination scattered through the scientific and philosophical literature, but for the purpose of this analysis we can start with a conception of it as "*the ability to think of whatever one acknowledges as possible in the spatio-temporal world*" (Stevenson 241). Prior to the evolution of the capacity for imagination, our ancestors' minds must have been as rigidly bound to the deliverances of their sense organs as the minds of nonhuman primates are today. Presumably, there was a time when our ancestors believed only what they could see, touch, taste, smell or hear. However, once their brains evolved the cognitive horsepower to move across the landscape of thought from the observed to the unobserved, they became able to make inductive inferences about the world, and this newfound capacity enabled them to anticipate a whole range of dangers and opportunities that would otherwise have remained beyond their ken.

Cognitive traits are invisible to natural selection unless they have a reproductively significant impact on behavior, and thought produces behavior only if it is conjoined with belief. So, in order for imaginative thought to be selected

into their cognitive repertoire, early human beings had to negotiate the tricky transition from operating on the principle of “seeing is believing” to the principle of “seeing with the mind’s eye is believing.” How did this happen? It seems likely that the brain system responsible for inferential thought co-opted the representational systems previously dedicated to the sense organs. This would account for an important feature of imagination: its qualitative, quasi-sensory character. It is precisely this feature of imagination that supplies its special motivating power.

These considerations bring us to a second conception of imagination as “*the ability to entertain mental images*” (Stevenson 243). It is, as Aquinas put it almost eight hundred years ago, “a creative activity, whereby the imagination forms for itself an image of something absent, or something perhaps never seen” (I 85 *ad* 3). As useful as this ability was, it left the human mind with a critical vulnerability. From this point onward, fantasy and reality would compete for control of human behavior. The mind’s tendency to be swept along by fantasy was the price that our species paid for acquiring the ability to make inductive inferences.

Like all biological functions, imagination can either succeed or fail to achieve its adaptive purpose; it succeeds when an envisaged possibility turns out to be an actuality, and it fails when what is imagined does not mesh with how things really are. This brings us to a third definition of imagination as “*the ability to think of something which the subject believes to be real, but which is not real*” (Stevenson 242). There is an obvious connection between the failure of imagination to achieve its purpose and the literary enterprise. After all, literature traffics in fiction: literary narratives that do not represent the world precisely as it is. It was this contrast between reality and fiction that inspired Plato’s fulminations against poetry in *The Republic* and David Hume’s characterization of poets as “liars by profession” who “endeavor to give an air of truth to their fictions” in his *Treatise of Human Nature* (87). Shakespeare, too, was alert to the epistemically dissonant character of poetry:

The poet’s eye, in a fine frenzy rolling,
Doth glance from heaven to earth, from earth to heaven;
And as imagination bodies forth
The forms of things unknown, the poet’s pen
Turns them to shapes and gives to airy nothing
A local habitation and a name

(Wordsworth edition, V, 1.12-17)

These reflections seem to suggest that literature is nothing but a disease of imagination, but this conclusion would be too hasty. There is a clear distinction between the purpose of imagination and the purpose of literature. Imagination aims

to represent the world as it really is. But literature has a different aim: its purpose is to misrepresent the world. Just as imagination fails when it does not manage to represent the world accurately, literature fails when it represents the world too accurately. The point of literature is not to describe the world as it is, but to artfully misrepresent it in ways that transform our relationship with reality, and thereby transform our behavior. The function of literature is to shape human action.

To explore this conjecture further, we need to take seriously Hume's description of the poet-as-liar. Although lying is a distinctively human form of deception, non-verbal deception pervades the natural world. From the misleading chemical signals purveyed by the humble virus, to the sophisticated Machiavellian maneuvers of chimpanzees, living things seem intent on pulling the wool over one another's eyes. The purpose of deception is to manipulate the behavior of others to one's own advantage. Consequently, successful deceivers have an edge in the struggle for existence. We human animals are natural born liars too, and our lies have the same biological purpose as the deceptive strategies of non-human organisms (for a more detailed account see my book *Why We Lie: The Evolutionary Roots of Deception and the Unconscious Mind*).

Unlike other animals, human beings also have the ability to lie to themselves. Although self-deception appears disadvantageous, it may have a biological purpose. According to the hypothesis first advanced by the sociobiologist Robert Trivers "the overriding function of self-deception is the more fluid deception of *others*. That is, hiding aspects of reality from the conscious mind also hides these aspects more deeply from others" ("Introduction" vii). Self-deception is an adjunct to interpersonal deception, and helps us to reap the advantages accrued from deceiving our conspecifics. If Trivers is right, self-deception is a psychological trait that succeeds when it disrupts our contact with reality in the service of a more pressing goal—the goal of manipulating others to serve one's interests.

Deceiving others is not the only contribution that self-deception makes to our lives. I argued in *The Most Dangerous Animal* that prehistoric hominins almost certainly had an innate, biologically determined aversion to spilling the blood of community members, but no reservations about killing their neighbors to acquire their resources. However, thanks to the expansion of the human brain, our ancestors eventually became capable of entertaining concepts, including the concept of a human being. This dawning awareness precipitated a psychological conflict between the warlike urge to kill other human beings, bred into them by millions of years of evolution, and inhibitions against violence flowing from the recognition of the human status of their neighbors—their membership in an

extended human “community” (for a similar argument, see Roscoe). So, to be psychologically capable of butchering other human beings, our ancestors had to find a way to override their natural inhibitions against killing, and they seem to have accomplished this by exploiting the psychological vulnerability created by the evolution of imagination. They recruited the resources of imaginative culture to generate evocative images depicting their neighbors as less than human, and therefore as lying outside the moral universe. Although propaganda is regarded today as a degenerate form of literature, it may have once been a primary function of story telling. If I am right, literature originated as a form of *self-engineering*, a method for manipulating our own behavioral dispositions by canalizing deep, biologically rooted passions to produce novel forms of behavior. As we have seen from the case of war, some of these behaviors were adaptive. Others, such as voluntary celibacy, self-mutilation and human sacrifice, were not.

In conclusion, I think that Wilson correctly stressed the intimate tie between art and behavioral flexibility, but his account of that relationship needs to be inverted. Behavioral flexibility was the consequence rather than the cause of the evolution of art. Arguably, even today, the role of art is to structure human behavior, and when contemporary human beings find themselves moved by a poem, a novel or a fine theatrical performance, they experience a faint glimmer of the primal power of literature to move us to action.

The Evolutionary Paradigm: The View from Film Studies

In his commentary on the emerging paradigm of evolutionary literary studies, Joseph Carroll paints a compelling picture of a vibrant new field of enquiry. He presents a brilliant synthesis of key debates and positions within evolutionary theory, paying detailed attention to the advocates as well as the assailants of an evolutionary perspective on the arts, in a manner which is at once trenchant, lucid and nuanced. He also weaves in discussion of more general and central issues in literary theory, such as the relationship between generalization and the particular work, and the nature of “reduction.” For all these reasons, the essay ought to be of great interest not only to card-carrying evolutionists and fellow-travellers, but to anyone interested in literary theory as such. Carroll has done a service to literary studies in “cognitively mapping” evolutionary theory, to use one of his own central terms, in such clear and engaging terms.

But nobody is perfect. There are a number of issues raised by Carroll on which more needs to be said, as I am sure Carroll would be the first to acknowledge. One of the indirect virtues of the evolutionary paradigm is that it brings humanistic enquiry into the arts into closer dialogue with the social and natural sciences, and with the “naturalistic” strand of contemporary philosophy. This challenging and engaged interdisciplinarity—as distinct from the posse of tired concepts and formulaic arguments that too often flies under the flag of interdisciplinarity—imposes a lot of hard reflection on epistemological matters, and raises the standard of argument. Whatever the fate of evolutionary theory as a whole and the particular schools of thought within it, literary studies can only benefit from engagement with the ethos and methods of the sciences, in the spirit urged by Carroll, even as it retains a distinct identity.

In describing the current state of play within literary studies, Carroll discusses the relationship between the relatively well-established school of “cognitive poetics,” and the more recent wave of evolutionary literary theory. A parallel situation exists within film studies: “cognitive film theory” has established itself as

a minority but influential voice within the discipline, consolidating itself through an academic society, specialist conferences and journal issues, and a steady stream of publications (see <http://www.scsmi-online.org/>). “Evolutionary cognitivism” exists as a minority within that minority, and a controversial one to boot. As in literary so in film studies in this respect: all evolutionists are cognitivists, but not all cognitivists are evolutionists.

Nature and Culture

The most influential conception of the relationship between the natural and cultural, certainly within the humanities, is given usefully stark expression by Fredric Jameson in the passage quoted by Carroll: “nature is gone for good.” One of the more important philosophical expressions of this idea is due to Hegel, who conceives of human subjectivity (*Geist*) as in a state of “alienation” from the natural order (Hegel 294ff). Because human beings have the capacity to reflect upon their impulses and instinctive reactions, they become detached from the natural world in which no such reflection is found. This argument is echoed uncannily in the passages quoted by Carroll from E.O. Wilson’s *Consilience*, where Wilson speaks of the centrality of “instinct” to the behaviour of all animal species bar human beings, and the human “psychological exile” that this entails. Wilson’s formulation points the way towards a “naturalized” alternative to Hegelian “alienation,” an alternative developed by Carroll in his essay. On this alternative conception, culture is not alienated from or opposed to nature, but recognized as a part of nature—specifically a crucial part of that bit of the natural world we call “human nature.” As Carroll notes, humans can survive and develop physiologically outside of a cultural setting, as in the case of feral children, but such children are radically incomplete as human beings. The natural developmental course of a human child involves development and maturation through cultural practices, including language; it thus makes no sense to place culture outside of the domain of nature when it comes to humans.

Indeed, recent research shows that we are not the only species to possess culture, if by “culture” we mean practices or “suites of local traditions” (Whiten 52) which are specific to particular communities within a species, transmitted mimetically across generations within these communities rather than genetically. Chimpanzees display cultural variation across a wide range of behaviours, including termite harvesting and hand-clasping related to grooming (Whiten; de Waal, *The Ape*). Similarly, we ought to be cautious in how we use the concept of “instinct” to draw the line between humans and other animal species. Are all non-

human animals equally driven by instinct pure and simple? Don't some animals—primates and dolphins perhaps—possess powers of deliberation of a different order to, say, insects? Within philosophy of mind, a debate now exists over the notion of “animal rationality,” recognizing the possibility and reality that at least certain species possess sufficient mental complexity that their behaviour cannot be adequately understood through “instinct” alone (Hurley). Similarly, “proto-morality” has been identified among some non-human primates (de Waal, *Primates*). Thus in respect of culture, rationality and even morality there is greater continuity between humans and other species than traditional conceptions of human being have acknowledged; resistance to this idea only demonstrates the extent to which the implications of Darwin's theories have still not been properly digested.

It doesn't follow from these points about non-human culture and rationality, however, that there is not a gulf separating human and non-human psychology. Culture surely is fundamentally important to human development and flourishing in a way that it is not even for the most sophisticated non-human species. But the continuity of species underlines the fact that culture needs to be understood as an aspect of nature, one that plays an especially important role for the human species. Far from diminishing or undervaluing what makes humans distinctive in the animal world, approaching humans naturalistically—seeing our “species-typical” characteristics as a part of the natural world—allows us to obtain a more precise understanding of human nature and the human condition, of that “psychological exile” of which Wilson writes.

One upshot of this conclusion is that humans naturally understand the world from within a particular cultural perspective. Even that small community of humans we know as “scientists,” part of whose job it is to stand outside of any such perspective and obtain the “view from nowhere” (Nagel), will in their everyday dealings view the world in this fashion. They will view the world from some particular cultural place. And this is the stuff of the humanities—of literature, film, and the other arts, which all form part of and arise from the fabric of particular cultures: just as there are no fully-flourishing “non-cultural” humans, so there are no cases of genuinely non-cultural art works. (And logically speaking, why shouldn't there be? Donald Brown (*Human* 130-41) has conducted a thought experiment along these lines.) The questions which humanists are thus charged with asking—concerning the form, meaning and value of works of art—will thus never be answered in a fully satisfying manner at the universal level alone. It is thus crucial that Carroll's model for an evolutionary form of literary criticism involves

the *integration* of the universal, the cultural, and indeed the individual levels of analysis. Denuded of these more proximate and finer-grained layers, an analysis of a literary work distilling only its universal components will feel abstract and incomplete; a multi-level account, combining all three layers, promises the richest and most satisfying account of all.

Grand Theory and The “Middle Level”

In discussing the various modes of literary criticism of the last half-century or so, Carroll posits a continuum from impressionistic commentary to the systematic, theory-driven analysis of texts. Carroll is right to heap scorn on anti-theoretical particularism, at least as an all-encompassing account of literary studies; and elsewhere in his essay, equally justified in questioning the easy-going pluralism of a certain strain of cognitive poetics which seeks quick and comfortable reconciliation with other, more established, schools of theory (like deconstruction). (I don't rule out reconciliation and integration between apparently contradictory or incommensurate theories—rather I agree with Carroll that one cannot simply declare peaceful co-existence at the outset.) But in doing so, Carroll puts all his money on evolution as a new “grand theory,” albeit the *right* one. Carroll couldn't be more explicit about this. The trouble, of course, is that history is littered with the corpses of similarly righteous (and sincere) advocates of this or that True Theory of Everything. Carroll refers in passing to Frederick Crews' parody of evolutionary literary criticism, but without acknowledging the principled skepticism of Grand Theory as such underpinning Crews' various writings. Is there a danger that Darwinism will come to serve as still another “intellectual narcotic” (Crews, *Skeptical* xi), a dogma blinding us to the complexities of literature? Within film studies there has been special attention to this problem, not least among those most sympathetic to analysis informed by evolutionary and cognitive principles, who have argued for “middle-level” research and “piecemeal” theorizing in place of grand theorization (Bordwell, “Contemporary”; and N. Carroll, *Mystifying* 226-34, and “Prospects”).

The two problems with “grand theory” that I want to focus on briefly here are what I'll call the *problem of relevance* and the *problem of dependence*. The problem of relevance takes us back to Carroll's tripartite model of analysis—evolved universal attributes, culturally-specific instantiations of these attributes, and variations at the level of the individual—but now with a worry attached. What do we learn when we set a literary work against the backdrop of “ultimate” evolutionary explanations, as distinct from more proximate explanatory factors?

How informative is the level at which we identify the evolved universals at work within a text? Gregory Currie worries that “evolution can be of aesthetic relevance only to the biggest of big pictures,” and that with respect to the understanding of particular works, it “looks like a blunt instrument” (242). The related problem of dependence also bears upon the relations between ultimate and more proximate levels of analysis. If we forge our proximate explanations in a fashion such that they are neutral or agnostic with respect to larger and more distant questions, we insulate them from a problematic dependence on a particular account of the ultimate factors. If we tie our proximate explanations closely to a particular ultimate explanation and that explanation falls, the proximate explanations will go with them.

Consider the 2008 winner of the Oscar for Best Foreign Film, *The Counterfeiters* (Stefan Ruzowitzky, 2007), which tells the story of a group of (mostly) Jewish concentration camp inmates working on the large-scale counterfeiting of British and US currency, a strategy devised by the Nazis to undermine the Allied economies. Even in this most emotionally-charged and politicized of contexts, we can identify a range of evolved, universal factors which fundamentally structure the dramatic situation. Much of the film is concerned with the will to *survive* in the most invidious circumstances, and with the psychological and social tactics necessary for a chance of survival in them. The drama is played out in terms of social dominance and affiliation—leadership, followership, imprisonment, in-out group dynamics—both between the Nazi authorities and the prisoners, and within the community of prisoners, whose unity is under pressure continuously from the tensions between individual and collective interests, short- and long-term gains, and the interests of different prisoner groupings emerging from differential treatment by the Nazis. The entire drama might be understood as a complex elaboration of the kinds of scenario explored in game theory, like the Prisoner’s Dilemma. Unlike such models, however, the film dwells on the psychological and emotional costs of survival under such conditions, focussing on the dilemma faced by its central protagonist as he is forced to choose between individual, short-term survival on the one hand, and long-term goals and underlying commitments on the other.

Thus far, though, the fact that the film is a story based on a particular strand of the history of World War II and the concentration camps plays no essential role in the analysis. At the universal level, the story as I’ve described it shares much with Brett Cooke’s analysis of the dystopian fiction *We*, alluded to by Carroll. *The Counterfeiters* might be understood along similar lines as a fable about the

depersonalizing effects arising from the deprivation of basic, evolved human needs, psychological as well as physical. A more complete and satisfying understanding of the film thus necessitates attention to the level of cultural and historical specificity, concerning (most obviously) Nazi ideology, policy and practice. It also requires attention to the level of the individual work—considering, for example, the distinctiveness of *this* story as a story about the Holocaust, and the particular style and tone of the film's depiction of the death camps. The “grand theory” worry, as stated in the problem of relevance, is that it is only really at the levels of cultural and individual specificity that the truly informative explanations are forged (see Flesch 205 note 6). A level of analysis so abstract and “ultimate” that it cannot distinguish between an anti-communist dystopian fable and a Holocaust drama based on historical fact must indeed be a “blunt” instrument.

If I've understood this line of thinking correctly, it is not convincing, and Carroll's multi-level model of literary analysis stands. Why so? It is hard to see how incorporating the universal level of analysis in any way damages our sensitivity to the cultural and individual levels, even if it constrains them by limning the universal “pressure points” underpinning the drama. The three levels certainly aren't mutually exclusive, logically speaking. Nor need attention to the universal level distract us from the importance of the cultural and individual levels; criticism is not a zero-sum game. Indeed attention to the universal alongside the cultural and the individual surely enriches these more specific layers of analysis. The “common frame of reference” provided by evolutionary theory enables us to appreciate more sharply the distinct solutions to universal problems generated by particular cultural traditions, and individual agents (like artists and authors) working within them (M. Smith, “Darwin,” and “Wer hat Angst?”). The identification of recurrent, “broad and deep” motifs in literary form across cultures and history provides a plausible explanation for the common cross-cultural appeal of works of art and literature, which frequently escape the bounds of the particular cultural tradition in which they were created (Dutton “Aesthetic”). Indeed it is notable that, in the West at least, the “folk psychology” of criticism—everyday talk about films and works of literature—incorporates reference to many universalistic concepts, like “human nature” and “basic instinct,” just as much as it depends on culturally-specific concepts. As Carroll notes, this kind of convergence between the “common understanding” and the implications of evolutionary theory stands in its favor relative to other theories.

Finally, in relation to Crews' concerns about the dogmatic and ‘self-validating’ (Crews xi) tendency of theory as such, it is important to note that Carroll

argues for two distinct, if overlapping, programs in literary studies: the evolutionary project, and the empirical project. Bringing the ethos and methods of the empirical sciences into the study of literature need not be tied to any particular evolutionary theory, or even evolutionary theory at all. Where evolutionary theory is brought into play, however, it too is and must be subject to empirical scrutiny: note Carroll's exposition of the debate around 'massive modularity' within evolutionary psychology, as an instance of this kind of empirically-driven revision. Or again, my suggestion above that there might be a cross-cultural folk psychology of criticism, characterized by a variety of universal concepts, is an empirical question not foreclosed by theoretical fiat. This is the solution to the problem of dependence: no theory of a given phenomenon can insulate itself entirely from evidence and theoretical postulates concerning other phenomena. There is no escaping such dependence, but by maintaining a vigilant and self-skeptical stance, we can adapt and rebuild our theories as evidence and assumptions within our own and in other relevant fields change. So long as evo-lit, along with evolutionary theory more generally, can maintain this "open" and self-questioning character, there is hope that it will not turn into just another Theory of Everything heading for the trashcan of history.

Two other worries are worth briefly noting. First, Carroll's overview of literary Darwinism appears to be wholly organized around and driven by the interventions of evolutionary psychology. Carroll underlines the centrality of psychology to the evo-lit research program, and makes it plain that such psychology is genetically-mediated. There is at least one other branch of evolutionary theory, however, which deserves a hearing in the context of literary and art theory—the branch that concerns itself with cultural evolution, that is, with the variation and selection of ideas and practices within the sphere of culture. In contemporary debate, this question has mostly been debated under the banner of "memetics"—Richard Dawkins uncannily catchy name for a cultural equivalent to genetics, the term itself embodying the idea of an idea which spreads rapidly because of its fitness within a given cultural environment, in this case the environment of intellectual debate around evolution. The term itself is controversial, but we shouldn't allow that to blind us to the highly plausible notion that there is a dimension of cultural change at the "population-level," where patterns of change emerge from the aggregated choices of individuals, but without the goal-directedness of individual actions (see also Whiten). Such supraindividual, population-level patterns are thus "blind" in a

manner parallel to the operations of natural selection. Individual psychology is still part of the picture here, but not in the way envisaged by evolutionary psychology.

The second concern bears upon the adaptive function of literature that Carroll distills from his own work and that of other evolutionary theorists like Wilson: literature functions to regulate the potential chaos arising from human intelligence and the overcoming of purely instinctive behaviour, furnishing “an emotionally meaningful cognitive map provides points of reference within which humans adjust their sense of relative value and the significance of things.” This is an appealing formulation, proffering a plausible characterization of a “species-typical” evolutionary problem in terms that traditional humanists will recognize as their own—emotion, value, significance. Evolutionary theory and traditional literary enquiry appear to speak to one another on equal terms here. But I wonder if this definition encompasses too much, or rather more than Carroll has in mind. Doesn’t ideology perform this function too? Indeed, don’t all cultural phenomena serve this orientational and motivational function to some degree? A Coors beer ad orients us towards certain values and steers us motivationally as much as *Middlemarch* (indeed, the relative simplicity and directness of the ad may make it more effective with respect to this orientational function). Carroll’s account of the adaptive function of literature may point towards a surprising convergence with cultural studies, which delights in the levelling of cultural distinctions.

If these questions do hit upon a raw nerve, there may be more than one available response to them. Perhaps the adaptive function of literature—if such there is—needs to be recast to give more prominence to play and creativity (as in Brian Boyd’s evolutionary account of fiction, cited by Carroll). Or perhaps, at the level of adaptive function, literature, propaganda and other overtly ideological tools do form a natural kind. This wouldn’t stop us from making a principled distinction between literature and ideology; but it would prevent us from founding that distinction on the rock of adaptive function. Pinker may be right that much of what we value has emerged as a by-product rather than as a direct adaptation, but wrong to imply that this strips such phenomena of their value. The road from “is” to “ought” is never that direct.

The Centrality of the Exceptional in Literary Study

I am confused about Joseph Carroll's "we." Citing his own earlier work, Carroll notes that he once admitted that "*we* do not yet have a full and adequate conception of human nature." This *we* may be no more than a variation of "one"—anyone. But then I read that, time having passed, Carroll himself is now able to "lay out a model of human nature that incorporates the features on which most practitioners in the field would agree." He does this in 1600 words. Does he consider himself one of the community of "practitioners?" Or are they the community of scientists and social scientists who are trained in those fields? If the second, and that seems more likely, by what authority does he ask us to accept as accurate or useful his summary of a field that is neither his nor ours? Beyond my general ability to follow rational argument, how can I evaluate the claims made therein? The most surprising is the claim that he reports finding a "consensus" model. Am I being asked to believe that although my own academic area of literary theory is cross-hatched by contested claims, the field of evolution and evolutionary psychology is blissfully free of conflict and competition? Especially when it comes to a model (of all things!) of human nature? I am being asked to believe in Tinkerbell.

Speaking as one who is quite interested in the scientific fields of evolutionary biology and cognitive science, I must protest that it is entirely unreasonable for literary scholars to be asked to build their own work on a homogenized summary of a field they are not trained to critique, in which they are not trained to recognize overgeneralizations from data, to spot weak or faulty research assumptions, to notice the lack of or poorly defined control groups, or the misplaced use of statistical models. It is, indeed, ridiculous for literary scholars to include themselves within the "we" who now "have a model of human nature," since, as even an amateur reading of the weekly *New York Times* science page repeatedly demonstrates, claims about the universals of human nature remain well beyond consensus.

While I leave it to others to point out how much of Carroll's "model" consists of unproven, even unprovable hypotheses, most still actively in dispute, Carroll knows perfectly well that his summary is inadequate for any purpose beyond piquing the interest of the uninformed. He acknowledges this by providing an example of a "professional" use of these scientific fields for the study of literature, the work of Brian Boyd, whom he praises for "expertise in assimilating information from the social sciences;" Boyd, we are meant to understand, does his homework. With "explicit and detailed reference to evolutionary social science, Boyd demonstrates that the findings of cognitive psychology make sense ultimately because they are embedded in the findings of evolutionary psychology." To be professional, on this view, is to "assimilate" (which I take to mean accept and adopt) the claims of *two* fields in which you are not trained to be a critical reader! And Carroll hasn't even had time to mention the exciting developments in systems biology, clearly relevant as a third field underpinning whatever ultimately emerges as a description of human nature, but also a field in which competing hypotheses are vigorously argued.

I was about to submit, then, as my first complaint, that Carroll is asking us to adopt as guiding principles his versions of what two or three scientific fields are about, ignoring the quite reasonable and normal controversy within them about both basic principles and about details. We must do this, I infer, even though we as literary scholars have none of the training that would be needed for us to make properly critical use of their conclusions, because this is the way we will be able to generate "new" knowledge about literature. I am stopped from advancing this criticism, however, because just as he asks us to make this commitment, Carroll notes that there is "one crucial element of human nature [that] remains at least partially outside this consensus model and that is 'the disposition for producing and consuming literature and the other arts.'" Within evolutionary social science, divergent hypotheses have been formulated about the adaptive function of the arts." The good news here is that apparently when it comes to a part of social science that Carroll actually knows something about from his own professional training in literature, he does notice a fissure. And if he can notice an area of controversy here, I ask, shouldn't he be a bit more suspicious about the consensus he supposes to exist in the rest of the field? Carroll at this point seems almost on the verge of realizing that while he cannot advance that theory as an evolutionary psychologist or biologist, he himself is in possession of a vast amount of knowledge that the social scientists themselves are in no position to evaluate or use. He fails, however, to take this next step—to follow his own evidence. I would like,

then, to amplify the intimation he provides and claim that the position of an outsider to a field, a position we literary scholars inhabit in respect to evolutionary biology and psychology, is in fact a fine place from which to make a contribution to the clarification of the nexus of issues we may label as human nature, a subject in which many different fields have an interest, and none, I would add, a proprietary interest. Questions such as the putative adaptive function of the arts are not going to be answered only by questionnaires and statistics. We can, however, (and note the different *we*) bring our own expertise to the discussion of the hard question of the function of fiction and of apparently “useless” art work.

My revised complaint, then, is that Carroll has positioned himself, and asks us to join him, in a situation where he doesn’t belong—where he has no choice but to listen and to “assimilate,” and has only a weak and derivative power to critique. Why would we want to do this when we can bring to the discussion of the function of creative work our knowledge of a large range of texts stretching over many centuries of human creativity in many different cultural settings, and our own well-honed sensitivity to those texts? And in so doing, make our own contribution to the ongoing project of describing human nature through the study of literary texts and their functions. Indeed, Carroll does mention some of the projects already underway in this direction by literary scholars, but seems to measure them against the hypotheses of the sociobiologist, E.O. Wilson.

Why again the scientism? As scholars trained to read texts and study them in their flowering or evanescent cultural contexts, we have evidence that the scientists don’t know about and wouldn’t be able to learn much from if they did. We have centuries of evidence about human relationships and motivation, about economic, or motherly, or mating behavior. We have been trained in theoretical thinking about artwork and in historical methodologies that can make an enormous contribution to the interdisciplinary project which the study of human nature surely is. We already have very satisfying ways of studying the artifacts of art and literature, of philosophy and history so as to advance the understanding of the relationship of individuals to their world. Why, then, shouldn’t we continue to use our own familiar ways of understanding literary texts for the new job of challenging, refining, and calling attention to some of the oversimplifications produced by evolutionary and social scientists? The new perspective is provided by the questions posed by a Darwinian way of thinking, but not by any consensus of axioms, since that barely exists.

One of the crucial things we know as literary scholars is the price the social sciences pay for the reduction away from the unusual or rare occurrences in human

life. In his desire to be accepted as a practitioner (indeed as the founder) of the new social science of evolutionary literary theory, Carroll's production of a story about human nature fudges its crucial instabilities and gradience just when it gets interesting to us in the literature departments. On the description of human nature he provides, "human nature" is understood as something like a collection of "genetically mediated characteristics typical of the human species." He expands on the next page: "Evolution has shaped the anatomical, physiological, and neurological characteristics of the species, and . . . human behavior, feeling, and thought [so that they are] fundamentally constrained and informed by those characteristics." Here again, Carroll fails to notice important hints in his own discourse—here the important modifiers buried in the word "typical" and in the word "constraints." These words indicate general but not absolute control, and it is just here that a deep and wide familiarity with literary texts and other art forms is going to be the most useful in enriching the description of human nature. From where we stand as literary scholars, we should be working to argue and to demonstrate that the full project of understanding human nature is not going to succeed without an understanding of exceptionality. It is only through an account of the occasional, the unusual and the non-typical that change can be understood. It is somewhat ironic, then, that this hypothesis, so important to those of us who may spend years studying one text, is also central to evolutionary theory. Instead of arguing that we (all of us) are still constrained by the genetic limits that structured our existence on the Pleistocene savannah, some social scientists have already begun to work out the mechanics of co-evolution. They are beginning to find evidence about how culture interacts with biology to produce not only cultural but even genetic change.

It seems clear that an understanding of the exceptions which literature regularly describes—the "tellable" to use Mary Louise Pratt's word for those occurrences in which literature and art are focally interested—is what is needed for the interdisciplinary project of literature and cognitive science. It is, in fact, ludicrous to think that in the project of describing human nature, the novels of Jane Austen are needed to confirm the understanding that mating is crucial for the continuation of the species! Instead of rewriting our knowledge so that social scientists will find it comfortable—tabulating, for example, the percentages of male and female characters in folktales—we may ask, for example, what can be learned about gender and mating from the dyad of Puccini's *Madame Butterfly* (Milan, 1904) and the American playwright, David Henry Hwang's award winning drama of 1988, *M. Butterfly*? It is unfortunate that Carroll encourages projects he

calls literary, but which seem aimed at turning our knowledge into their kind of knowledge instead of using our knowledge to discuss mutually interesting questions.

Ultimately what Wilson called consilience is not going to be achieved by importing the methods appropriate to the laboratory or even to social science inquiry into the humanities. Consilience is more likely to come from a general recognition that there are different kinds of reduction—different methodologies that need to find out how to appreciate each other’s insights. It’s not consilience when I distort my subject matter so that it fits someone else’s analytical instruments. If “we” are going to be one community, we need to learn how to use each others’ deepest understanding by working in multiple directions at once.

Art and Religion: Co-evolved Phenomena

Carroll continues to show his superb mastery of the field here, and I can add little to his summary of the accomplishments, struggles, and schisms that mark that field's progress. Where I might hang a footnote is to his response to that "crucial element of human nature" that "remains at least partially outside [the] consensus model: the disposition for producing and consuming literature and the other arts" (103). Like Carroll, I believe that all the arts have adaptive value; in fact, I would go farther and affirm with Ellen Dissanayake that the arts give evidence in human beings for a "biologically endowed adaptive behavioral proclivity" ("Making" 27). I am in complete agreement with Carroll's objections to Pinker's relegation of the arts to pleasure-machines, as well as to Miller's characterization of them as "useless ornaments" (PAGE). His defense is quite strong. But I am uneasy with Carroll's own alternative hypothesis, at least as regards literature, the art that is at the focus of the essay. Here is Carroll's explanation:

The adaptive value of high intelligence is that it provides the means for behavioral flexibility, for dealing with contingent circumstances and hypothetical situations. That behavioral flexibility has made of the human species the most successful alpha predator of all time, but achieving dominance in this way has come with a cost. [E.O.] Wilson speaks of the "psychological exile" of the species. . . . The proliferation of possibilities in "mental scenarios" detached from instinct produces a potential chaos in organizing motives and regulating behavior and the elemental passions that derive from human life history. The arts are thus an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence.

The human being of "high intelligence" is no longer a creature of "instinct," true, but I would argue that it is not necessarily prey to "chaos" in its organizing and regulating skills, however numerous the "mental scenarios" it entertains. The "motives," "behavior," and "passions" that Carroll is referring to belong presumably to the human social world ("human life history"), and, for that world, the creature without instincts has evolved a finely tuned system of *emotions*. That system is more than adequate to the demands of social scenarios of both the immediate moment and the far-flung future, and it makes stabilizingly good sense

of the events of both the near and the distant past (if we give, of course, some allowance to the ways egotism always skews the results!). With Wilson, I agree that our species is psychologically exiled, but not, I think, from its once instinctively managed social skills. The nature of that exile will be addressed later in this response.

A second point of divergence between Carroll and me is the definition of art, specifically, here, of literary art. I agree strongly that to solve “the puzzle of adaptive function” (121), we must first “define art in a way that identifies what is peculiar and essential to it.” But I have difficulty in describing a definition of Carroll’s own in his essay. The closest we seem to come to it is in the remarks that Carroll quotes from the book he has co-authored with Gottschall, Johnson, and Kruger: “Literature and its oral antecedents derive from a uniquely human, species-typical disposition for producing and consuming imaginative verbal constructs.” The phrase “imaginative verbal constructs” can embrace much that is not art, of course. Gossip is often quite imaginative, but it is also often rambling, shapeless, tediously tendentious, and dull. We need, to set the stage, a sharper definition of art and a convincing account of the adaptive function that is unique to it.

I have found a no more compelling definition than that of Ellen Dissanayake, who has given it elaboration in three books and dozens of articles over the last twenty years or so. Art, she insists, should be linked not exclusively to artifacts but to a specific kind of behavior. That behavior she calls “making-special.”

Each of the arts can be viewed as ordinary behavior made special (or extra-ordinary). This is easy to see in dance, poetry, and song. In dance, ordinary bodily movements of everyday life are exaggerated, patterned, embellished, repeated—made special. In poetry, the usual syntactic and semantic aspects of everyday spoken language are patterned (by means of rhythmic meter, rhyme, alliteration, and assonance), inverted, exaggerated (using special vocabulary and unusual metaphorical analogies), and repeated (e.g., in refrains)—made special. In song, the prosodic (intonational and emotional) aspects of everyday language—the ups and downs of pitch, pauses or rests, stresses or accents, crescendos and diminuendos of dynamics, accelerandos and rallentandos of tempo—are exaggerated (lengthened and otherwise emphasized), patterned, repeated, varied, and so forth—made special. In the visual arts, ordinary objects like the human body, the natural surroundings, and common artifacts are made special by cultural shaping and elaboration to make them more than ordinary.

(“Making” 30-31)

Carroll has expressed reservations about such a definition, pointing out that prisoners’ striped uniforms are “special” garments but cannot be regarded as art (pers. comm.). But the example seems to me weak: The stripes in question are not

an elaboration upon the uniform but a simple code, like a traffic sign: “Prisoner Inside.” Dissanayake herself has conceded that both play and ritual are not excluded by the definition, but I think that our instincts rebel in admitting at least the first of those behaviors into the realm of art. As the early evolutionary aesthetician Felix Clay remarked: “No doubt there is a superficial resemblance between some of the forms of art and play; one important difference that we must note is that every manifestation of art produces something—the essence of it involves the alteration of matter in the creation of new forms [either in the concrete or, as with pantomime or dance, in the cultural memory]” (31). And, as for ritual, Dissanayake has in her latest book brought it comfortably within the fold: “Ceremony,” she writes, is “a one-word term for what is really a collection or assembly of elaborations (of words, voices, actions, movements, bodies, surroundings, and paraphernalia)—that is, of *arts* (chant or song, poetic language, ordered movement and gesture or dance, mime, and drama, along with considered and even spectacular visual display)” (*Art* 138).

But why does the human being “make special”? What adaptive function does such a behavior have? The usual answer is that, in its ceremonial form, it ensures group cohesiveness; in Dissanayake’s words, it promotes “communality and one-heartedness” (“Making” 33; for one of the earliest proponents of this view, see Grosse; for one of the latest, see N. Carroll, “Art”). But I suspect that cohesiveness is a spin-off—albeit an extremely valuable one—from the original function of the arts. To get at that function, we should reinsert the arts into the lives of their earliest creators. Steven Pinker thinks that, to understand art, “We need to begin with . . . paintings on black velvet” (*How* 523). But that is not where our ancestors began. They began apparently with displays associated with shock and pain and intensively deliberative labor—at least so the artifactual evidence indicates. (We have no way of knowing when dancing and chanting and singing and drumming evolved—or what exactly they were like at their inception.) The manipulation of red ochre (presumably to paint the body), cranial deformation, filed or ablated teeth, beads manufactured as ornaments: these are among the earliest surviving testimonials of human “making-special.” Each changed the reassuringly familiar human image in jarring, even grotesque ways, sometimes (as in the sharpening of teeth, still performed by some present-day tribal groups—with machetes) at the cost of great pain and precious time. (White notes that “Experiments conducted with elephant ivory at New York University [NYU], using faithful replicas of Aurignacian tool-forms, suggest an average time per basket-shaped bead of well in excess of an hour” [554].) Art for the peoples of the early Upper Paleolithic had

nothing to do with bare-breasted señoritas couched coyly against backgrounds of black velvet: Their art, as the anthropologist David Stout has argued about the art of modern “primitives,” was intended, not to push the “pleasure buttons” (Pinker, *How* 525), but most probably to evoke *awe*. Early art, I suggest, as Dissanayake does (*Art* 131), was inseparable from early religion; the two seem to have co-evolved. Art, in its “specialness,” served religion as a bridge to the sacred world.

This last point deserves considerable elaboration, not something that I have very much space for, so I must beg indulgence from the reader for my sketchiness. The chief proponents, among anthropologists, for the theory that religion evolved as an “adaptive complex” are Candace S. Alcorta and Richard Sosis, who argue that religion emerged in response to “increased competition between groups for patchy resources” (347): “Religious symbols . . . provided tools for creating cooperative coalitions across time” (348). In other words, religion evolved—as so many others before them have argued—“to differentiate and cohesify [human] groups” (348). But this explanation does not satisfy me. The purely material problem that they describe could easily have been met by a purely material solution. Why is it assumed that religion, and not, say, well-armed conscripts of zealous thugs, was best suited to “differentiate and cohesify human groups”? My own theory is that religion evolved to solve a *metaphysical* problem, one that could not have been solved in any other way. When Wilson speaks of the “psychological exile” of the species, he describes that exile in specific terms: “The great apes have the power of self-recognition, but there is no evidence that they can reflect on their own birth and eventual death” (245). I think it was the latter of those two mysteries that excited the most reflection (because it excited the most fear and anguish) among our early art-making ancestors. Religion was their response to that mystery, and the arts were the tools for gaining public access to its “special” deathless realm and, in the process, uniting initiates in their faith and thereby strengthening them in their convictions.

That religion was born of the consciousness of every individual’s inevitable death is argued most persuasively by Conrad Montell, who concedes that his position is “highly speculative” (1). But, for all its speculativeness, it addresses the problem of the emergence of religion with fiercely compelling force. How to confront or escape a predator—death—that, unlike every other predator, cannot apparently be defeated? And how live in the world in psychological comfort—which is to say, with robust inclusive fitness—with the daily knowledge of one’s own inevitable defeat?

What “tools” might be found or made to “reshape” death? Those who had the ability to think such questions were on their way to answers. Early humans who developed rituals to mourn the dead, and then developed magic or religion to make the apprehension of death “bearable,” would function better: would tend to be less debilitated by fear of death, as individuals and in community. (Montell 17)

Such humans used the newly acquired faculty of reflection (“imagination,” in Montell’s terminology) to amass redemptive evidence of a world beyond this material one and so beyond the jaws of death. In dreams, in drug- or trance- or dance-induced transports and hallucinations, and even in psychotic episodes (as when the schizophrenic is guided by “voices”), early reflective humanity undoubtedly found much that was suggestive of such a world. But only through art, deployed in ritual, could *public* access to that world be established and assured. Art was “special” to our early ancestors not only in sensory but also, more importantly, in ontological terms. Like holy water, which both is and is not H₂O, the artfully elaborated object, movement, or sound served as a portal between this world and the noumenal Other. And still does so for many today: “In the quasi-spiritual connotations of capital-A art,” writes Dissanayake, “it is as if there is a sort of archetypal memory of what the arts [once] did for us” (*What* 168). (In defense of which I quote the capital-A abstractionist Mark Rothko: “The people who weep before my pictures,” he once told an interviewer, “are having the same religious experience I had when I painted them” [May 119].)

And that experience produced—and still produces—enormous benefits. “Cohesiveness” is the most obvious of those benefits: Religion unites all its believers through its ideology and its ritual, and in their union is their strength. A growing body of research also indicates that individual believers, as could be expected, are better equipped physically in the “struggle for existence” than are those for whom death still bears a sting: “These studies,” write Alcorta and Sosis, “demonstrate decreased mental and physical health risks, faster recovery times for a wide variety of disorders, and greater longevity for those who regularly attend weekly Western religious services, even when social and lifestyle confounds are controlled (Hummer et al. 1999; Matthews et al. 1998; Murphy et al. 2000)” (324). And when the behaviors that were born of the religious impulse—the “making-special” that defines the arts—are visited upon unmistakably profane social scenarios, as in narrative, the artful and articulate acquire a powerful tool. Geoffrey Miller disagrees: “The best commands,” he writes in *The Mating Mind*, “are imperative sentences, not works of art” (263). In response, I direct the reader to a

recent Jane Smiley novel, in which a character asks his lover if she has ever been to an AA meeting:

“What they do at meetings is tell stories. You aren’t allowed to give advice or tell people what to do. You’re encouraged to tell your own story and leave it at that. The reason they do that is because alcoholics can be volatile and sometimes take offense. *Telling stories is the least offensive way to communicate because it’s the least coercive.* . . .”

(235, my italics)

And when a non-coercive behavior, like story-telling, is “made special” by a master, it acquires the authority and persuasiveness of all successful art. Artful narratives, as Brian Boyd observes, “command and *consecrate* shared attention” (“The Origin” 204, my italics). They carry the rapt listener out of the gossipy profane and into the imaginatively sacred. And, in doing so, they construct whole lives and cultures. Merlin Donald is the most eloquent on this theme:

Western religion, through its domination of the mythic resources of Europe, was able to influence every date on the calendar, every major architectural and engineering project, every library, and every philosophical and literary work. . . . Similarly, the Crusades were fought, and new continents conquered, largely because of an idea fixed in a narrative framework of what the world was like or should be like. Stories of imaginary places, like the kingdom of Prester John, or of the coming of the Apocalypse have inspired people to give up their roots to live in danger and often to die.

(296)

“We are dominated by our stories,” writes Donald: “They not only can spell out the project of a life but can provide a sense of group identification that drives people to attempt almost anything” (295, 296). And when “consecrated” by art, they achieve transcendent power. It was through art’s awesomeness that early humanity found succor in its exile from innocence. “We like the world because we do,” wrote Wallace Stevens (913). I propose that we like it because art, as the handmaid of religion, redeemed it for us from death.

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Four Ways to Skin a Cat: Evolution and Literary Study

Some disciplines are fortunate to find expositors who are as erudite as eloquent. Evolution had its Darwin, behaviourist psychology had Skinner, transformational linguistics had Chomsky—and Darwinian literary studies has Joseph Carroll. For almost two decades, he has done as much as anyone else to bring the discipline into being, then into focus. “An Evolutionary Paradigm for Literary Study” is but the latest effort to forge a consilient paradigm of literary study. In the spirit and the letter of the essay, I will therefore briefly outline several research avenues for literary study it touches on.

1. The Turing Test

“Underlying this inquiry is the assumption that the evolution of computing machines will lead to the point when they become able spontaneously to create works of literature.”

—Peter Swirski, *Between Literature and Science* (93)

In the version of evolutionary psychology that lies behind Steven Pinker’s view of the arts, writes Carroll, “the governing conception of the mind is computational, and the governing metaphor for the mind is that of the computer”. Significantly, until recently the AI optimists were still reluctant to concede the defeat of the top-down (GOFAI) approach that spoon-fed computers information which, at some point, was supposed to jumpstart independent thinking. Now we know it’s a dead-end. A thinking computer will not be built: rather, it will build itself by modifying its rulebook, erasing some pre-loaded instructions, adding new ones, and turning itself effectively into an intentional black box. In one word, it will evolve.

Generally speaking, survival-oriented behaviour comes in two flavours (in actuality it is hard to find them in isolation). The first is the genotypal homeostat whose hard-wired instincts guarantee a swift response to standard environmental stimuli. The other is the phenotypal homeostat—one that learns, i.e. organizes its behaviour on the basis of historically acquired knowledge. Learning is an ability to

acquire information and feed it back into its behaviour, including notably the learning process itself. The chronic absence of success in programming general problem-solving heuristics indicates that progress in that domain will come about only when computers will learn to learn. A learning system will be able to rewrite its program in the course of its operations, possibly changing its configuration to the point where it will become a categorically different, independently thinking, one.

There are principled ways of investigating whether computers can (be said to) think, and by far the most famous and controversial among them is the Turing test (TT). Most arguments about the evolution of thinking in computers end up being arguments about the validity and extension of the TT. Significantly, from the point of view of literary theorists, the heart of the matter is the subject's *verbal* performance during the TT, which warrants analysis in linguistic, narratological, rhetorical, and cognate terms. Even more significantly, from the point of view of literary *evolutionary* theorists, the variety of pragmatic Mutual Contextual Beliefs inherent in the TT entails the formulation of a Theory of Mind by the examiner—or, in the upgrade of the test I proposed in *Between Literature and Science*—by the computer itself. Research in literary studies might make a contribution to the analysis of the Turing test-framed dimension of evolving, thinking, and ultimately literature-creating (third-order) computers.

2. Game Theory

“Before drawing the two matrixes for the Mission Game, I must encourage readers to resist the feeling that this sort of analysis may be too arcane for them to understand.”

—Peter Swirski, *Of Literature and Knowledge* (142)

Evolution and game theory fuse directly in evolutionary game theory. Insofar as it makes little sense to treat animals as rational decision-makers, evolutionary game theory treats environmentally stable outcomes as survival strategies sustained by evolution, whereby the payoffs for animal populations are assumed to reflect their degree of environmental fitness. In a notable reversal, evolutionary game theory has lately become prospected by social scientists. Game theoretic calculus can, it turns out, be usefully applied to *dynamic* systems such as cultural formations, and the rationality assumptions of dynamic fitness are often better suited to reflect the *iterative* nature of sociocultural interactions.

Although matrix analysis is an effective tool to analyze multiplex decision nodes, it is by no means a universal panacea for literary scholars. For one, it offers no reprieve from textual indeterminacy inherent in fiction. Even more important,

identification of conflicts and players, enumeration of their strategic choices, and the (cardinal or merely ordinal) ranking of outcomes, can also be contentious. But this is where game theory comes into its own. Formally foregrounding its analytic assumptions, it invites alternative interpretations of events by offering an exact methodology to study personal—as well as interpersonal—aspects of character and plot. It makes explicit the psychological motivations and utilities of narrative agents, and when possible, suggests solutions to the games in question.

Given that most narratives are amenable to exploration along these lines, game theory can illuminate narrative conflicts as diverse as the beheading game in Sir Gawain, the tit-for-tat tug-of-war between Chaucer's Miller and Reeve, Jane Austen's parlour love "games", and the strategic nuance of geopolitical games in techno-thrillers. Indeed, this universality prompts Carroll to remark that the game theoretic framework can be usefully adopted "as a thematic filter for summarizing character interaction in a wide variety of literary works." Most novels, after all, feature complex characters and motivations, and most novelists intuitively employ game-theoretic principles to the extent that such principles are part of all human beings' innate psychological equipment. In this sense, bringing this tacit calculus to the surface in an explicit analytic (game theoretic) framework can offer literary theorists better access to the deep structures of human behavioural economy.

3. Thought Experiments

"The basic premise behind *Of Literature and Knowledge* is that the capacity of literary fictions for generating nonfictional knowledge owes to their capacity for doing what philosophy and science do—generating thought experiments."

—Peter Swirski, *Of Literature and Knowledge* (4)

Carroll draws attention to our capacity for thought experimenting by "contrasting instinct with the human capacity for considering counterfactual and hypothetical circumstances". Counterfactual reasoning confers a distinct adaptive advantage inasmuch as it is a cheap and efficient way of dealing with an infinity of historical alternatives and future possibilities. The payoffs are awesome in any environment whose instability exceeds the pace of natural selection to hard-wire organisms for behavioural contingencies.

In the twilight of the nineteenth century, William James's *Principles of Psychology* envisioned the mind as an all-purpose generator and selector of ideas best suited to deal with the world. In the twilight of the twentieth, E.O. Wilson's *Consilience* fleshed out such adaptive faculties in terms of a prodigious library of

scenarios. Not to be confused with Hollywood scripts, this technical term denotes mental coding networks—motion-picture engrams, if you like—that, processed in massive parallel, yield the decisions that we make in life. The cognitive element here should not be understood literally as a context-specific database of actions, but rather as a contingent library of behavioural attitudes and dispositions. Like everywhere else, variation and fierce selection determine the degree of fit to the environment in question.

Supporting a limitless array of responses, literary scenarios are a species of such cognitive truck with the world. The fundamental stumbling block about the cognitive proficiency of such scenarios—especially salient in narratives, those multipurpose generators and selectors of “decoupled” ideas—is the dilemma of informativeness. Where does the knowledge of the real world reside in the *prima facie* unreal fantasies? What are the cognitive mechanisms that allow *fictions* to generate *nonfictional* knowledge? The five narrative analogues to such cognitive mechanisms sketched in *Of Literature and Knowledge* are but the first steps on a road that beckons with a promise of putting literary studies on firmer footing in terms of evolutionary epistemology.

4. Aesthetics

“For the record, no one, not even E.O. Wilson, has ever claimed that placing literature and literary studies in the context of empirical science could ever tap the full aesthetic nuance, formal artistry, or symbolic and interpretive contingency of literary works—the traditional provenance of literary criticism.”

—Peter Swirski, *Literature, Aesthetically Speaking* (forthcoming)

Insofar, writes Carroll, as evolution is the ur discipline that unites the hard with the social sciences and the humanities, literary Darwinists envision “an integrated body of knowledge extending in an unbroken chain of material causation from the lowest level of subatomic particles to the highest levels of cultural imagination”. Although one outspoken critic of such a vision has recently accused evolutionary scholars, literary and not, of error and mystification, Eugene Goodheart’s critique is for the most part a rhetorical legerdemain perpetrated by a confusion of literary research with aesthetic criticism. Axiological interpretation is an inalienable part of literary-critical—or, more broadly, sociocultural—engagement with art. But evaluative *criticism* and interdisciplinary *research* are far from the same thing, for subjective and adventitious readings do not contribute to any cumulative research paradigm in any consilient sense of the word.

Even as he vociferates against reductionism in the humanities, Goodheart adopts a dismayingly reductionist view of literary research as a bipolar conflict of postmodern skepticism vs hardcore scientism. This caricature—which underpins his entire critique—could never do justice to the gamut of contemporary literary-critical responses to cognition and research. On the other hand, the critic's alarm at the impoverished translations of research data from one field into another goes to the heart of any interdisciplinary research program. Even in its short history, literary-evolutionary studies has been prone to cookie-cutter criticism, whereby literature has been used mainly as a dough from which critics cut out just the parts that confirm theories from other fields. Such scholarship has to be warded off, for art is more than a compelling illustration of established socio-biological theories.

By the same token, literary studies ought to aspire not merely to exemplify but also to complexify research in other disciplines. Within evolutionary studies, for instance, literary scholars can at a minimum ensure that the paradigm does not gloss over the adaptive function of human propensity for art. Literature multiplies models of reality that operate on the subjective and emotional level, organizing categories of human experience of the world. That is why, reading stories, readers often feel that they ring true, even as it may not be easy to articulate this feeling in propositional form. This intuitive, not to say instinctive, determination of the (folk psychological) truth of the story drives research into literary representations. Our brains and minds are hardwired to avoid dangers, distinguish friends from foes, spot cheaters or spot opportunities to advance our interests—in short, to form a passable picture of the world. And this behavioural baseline, expressed in the universal criteria for representational truth, can furnish literary studies with an interpretive yardstick for determining the accuracy of narrative models.

This research program feeds, in turn, into the argument that the adaptive function of literature is to create storyworlds within which to make (dispositional) sense of our own behavioural economy. Living in the imagination is a peculiarly human condition, whereby fictional events are synthesized into storyworlds that capture our sense of the total order of nature and human social relations extending in time. Much of the time, of course, readers do not think about those relations in abstract but rather experience the complex order of things in fictions supercharged with emotions. And because they are so supercharged and extend over time, these fictions acquire a dramatic character that makes us emote with imaginary people, which in turn helps us calibrate our own emotions, attitudes and behaviours—all of which is open not just to aesthetic interpretation, but to scientific analysis. As such,

I cannot do better than close with words that can serve as an epitaph for this whole section, article, special issue, and discipline:

Science can explain why and how art has come to matter, but that will not give science the emotional impact of art, nor allow it to find a formula for art, nor make art matter less. If anything, it will only clarify why and how art matters so much.

(Boyd, "Evolutionary" 172)

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Response to Joseph Carroll

Joseph Carroll's writing has been enormously important to me. Everything I say here is meant with the deepest appreciation for his energy, kindness, intelligence, and sheer dogged persistence in advancing the cause of literary Darwinism. My remarks are skeptical, but only because I think appreciating art and explaining it are two somewhat distinct activities. Darwinian literary study aims to improve the ways we explain art and to improve the content of our explanations. I heartily support this effort. I only doubt that it will make much difference to what English professors do, which is to help people touch the terrible danger and power of art.

When I started graduate school in 1990, we were required to take a course in literary methods. Most graduate programs offer such courses yet their contents are always changing, their syllabi shaped by the tastes of whoever is in charge. This would hardly be true in any other discipline—physics, say, or economics, or musicology. What does this tell us about literary methods? Years of pondering this question have led me to conclude that—to put it bluntly—there are no literary methods because literary study is not a discipline. Its practitioners are not scientists but members of a secular clerisy drawn to some branch or other of quasi-theological speculation. To say this is in no way to impugn my profession. In fact I rather like this state of affairs. I believe deeply in the transformative, inspirational, soul-shaking power of literature. I am enormously grateful that universities have, for reasons of their own, given a place to humanists to explore aesthetic power (even though nobody comes right out and admits that that's what we do). In my own intellectual life I am a committed Darwinian and a rabid anti-mysterian. But I've come to believe that literary study is a branch of human spiritual practice rather than human knowledge—spilt religion, if you like, rather than spilt science.

All of this makes the challenge from Joseph Carroll and the literary Darwinians especially intriguing. Carroll argues that taking a consilient approach to literary study holds out the hope of progress in the discipline. What does this challenge mean? Where will it lead? I am desperately rooting for it to succeed

simply out of intellectual loneliness. Theory is responsible for some of the deep eclecticism of today's humanities, having become, in its terminal stages, so unfalsifiable as to leave people with nothing to say to each other. Someone can make a specious claim, about language or gender, and nobody will try to refute it. Someone else can make another specious claim—and silence again. Pretty soon everyone is stuck in their own corner muttering to themselves—this is the university as Borges or Swift might have imagined it. Literary darwinism gives us a chance to speak with a common language, a language that runs with the grain of human nature rather than in any old direction. This will certainly improve the intellectual climate overall: more interesting conferences, fewer silly statements, less hair-tearing, less teeth-gnashing (I speak for myself).

So what are my doubts? Only that having a common, science-based language will make much difference to what English professors do. Aesthetic power—the love and appreciation of great art—taps into that old oceanic feeling. Humanists are tour guides to the ocean's depths as much as, and probably more than, we are oceanographers sitting on the surface and measuring the sea. The most successful members of our profession are not philosophers or historians but still even at this late date, critics—people who explain really well what artists are up to (about which more in a moment). Whether it is practiced on the page or in the classroom, good criticism is a fiendishly difficult craft. People crave explanations of art, insofar as they do, because knowing some context dramatically increases the pleasure art gives us. Just as challenges from science have not in the least lessened the grip of religious belief on people's psyches, so challenges from empiricist humanists are not going to lessen the grip of aesthetic power. And in the end, reaching towards those fragile works of mastery and genius is the work we're called on to do.

Let me give an analogy. In Richard Dawkins's documentary on religious faith, *The Root of All Evil*, Dawkins travels to Colorado Springs to meet Ted Haggard, the pastor of the New Life Church, a massive dominionist congregation. (Dawkins filmed this segment just before Haggard, a husband and father of four children, was found to be visiting male prostitutes in Denver and buying crystal meth). In the video, Dawkins buttonholes Haggard and they exchange sharp words. Dawkins asks Haggard, in effect, how he can mislead his congregation so badly. Eventually Haggard throws Dawkins and his camera crew off church property and accuses them of telling his parishioners that they are "apes." Watching the clip, all my sympathies lie with Dawkins. But I can't help thinking that his scolding rationalism, though fun to watch, simply misses the point. The New Life

congregants haven't come to church for the theology. If the theology helps get them in the right frame of mind, so much the better. But really they come for the emotional pleasure, pleasure that the swirling lights and the loud music and the us-versus-them rhetoric help to trigger.

Drawing an analogy between the New Life Church and university humanities departments may sound nihilistic and mysterian indeed (not to mention suicidal). But to me the analogy is apt. Theory has taken hold in humanities departments because it is (or was) a branch of theology, not science. Its explanatory aims are finally subordinate to its emotive ones: it gives people energy and the will to do the work. Theory has been more or less overtly driven by a liberationist agenda—and it has developed strong resemblances to religious cults, in which powerful gurus dispense dogma and their disciples disseminate it. Some theory-centered disciplines make this more or less explicit. Take feminist studies. Feminist studies has been driven explicitly by a liberationist agenda but it has signally refused to address—in fact has been entirely contemptuous of—the mounting evidence that there are significant hormonal, neurological, and cognitive differences between the sexes. If you can't admit the question, you aren't a discipline. Michel Foucault, in other words, was onto something when he drew his famous distinction between scientific discourses and discourses that were under the sway of the “author-function.” The latter are schools of thought in which the founder's charismatic presence determines what can be said or thought even many generations later (think Marxism, or Freudianism, or yes, Foucauldianism).

Many of the intellectual movements embraced by the humanities have this character, which should be a clue to their quasi-religious status. So will clearing them away in favor of science really make a difference to what English departments do? Here again I am skeptical. Let me go back to that course I took in 1990. The profession of literary studies was invented, sort of, in the late 19th century. It was reinvented several times since then, especially forcefully in the 1920's, the 1940's and the 1970's. In 1990 our literary methods course was divided into two parts. In the first part we learned some theory. English professors were still trying to make sense of what had happened in the 1970's, so the theory we learned was a rough blend of the ideas of Paul de Man and Michel Foucault. But the second part of the course had a more practical character. It consisted of a set of instructions. 1. Pick a well-known text. 2. Write three papers about it. The papers had to be in this order: the composition history; the reception history; a critical crux. To do the last one, we went to the library and looked up the recent criticism in the giant bound volumes of the MLA bibliography. Then we picked some issue that people had

found especially puzzling (like, say, why Robinson Crusoe finds only a single footprint on the sand of his island) and followed its trail back to its origins in the text. These instructions were quite useful and, as I recall, the papers I wrote were full of information. Information, facts, and some claims, too. Claims about what? When you get right down to it, the claims were simple. They were about what my author had thought he was up to, what he intended, what he meant.

When you strip out theory, the question of what an author intended is still, even now, at the core of the organized and professional study of literature. The question gets stretched this way and that, pulled on the rack of biography or mounted on the frame of historical narrative. But once you begin to parse the more elaborate claims, you realize that they can still be boiled down to authors and what they intended. Literary critics make claims about writers and artists, sometimes about the history of genre or the practice of literary forms. But these claims are usually meant to illuminate texts, writers, aesthetics.

Can evolutionary theory intersect with literary study at this level? I'm not sure it can, or if it does, whether the answers will yield anything much in the way of literary knowledge. Let me give an example. For a long time I've been interested in the South African novelist and Nobel Laureate J.M. Coetzee. One of his more persistent themes has been an older man's lust for young women. The story he tells over and over again is of a man in his middle-middle to older middle age who thinks sexual thoughts about much younger women, sexual thoughts for which he feels he may be punished. The old man makes much of his physical decline: "my thin shanks, my slack genitals, my flabby old man's breasts, the turkey skin of my throat" (*Waiting for the Barbarians*). He makes much of his sexual impotence, his unattractiveness to women. The younger woman taunts him with her sexual potency, with her fertility, her availability to other men, but she withholds herself from him sexually. Why will he be punished for having sexual thoughts about her? Well he—the Coetzee persona, embodied in various male characters of his—doesn't say directly but he leaves some clues. He thinks it is the condition of men to be punished by women, by feminists especially, for their desires. All of this is perfectly consilient with Darwin's theory of sexual selection, and indeed closely related themes can be found in the writings of Coetzee's contemporaries or near contemporaries—Philip Roth, Saul Bellow, V.S. Naipaul and others. But to explain why Coetzee chooses this theme, a critic would have to look into the role not of Darwin in his work nor of sexual selection on his psyche, but of his deep reverence for Tolstoy and Dostoyevsky, for Becket and Kafka. Coetzee has philosophical ambitions, ambitions having to do with his belief that reason is a

failed and failing implement. Whether he's right about this, and whether his beliefs are ultimately consistent with biology, is not finally the sort of question a critic gets to ask. At least not if she's trying to explain the writings of J.M. Coetzee and not to use his writing as a tool to some other unrelated ends.

Rejoinder to the Responses

Rejoinder to the Responses

1. The Range of Response

Before taking up particular issues raised in the responses, I shall sort them roughly into four groups distinguished by hypothetical ratings they might have assigned to the contentions in the target article: (1) Reject, (2) Revise and Resubmit, (3) Accept with Some Revision, and (4) Accept. In the “Reject” group, I would locate three responses, those by GOODHEART, SEAMON, and SPOLSKY. They aim at general, across-the-board repudiation. “Revise and Resubmit” could be defined as “cautious partial acceptance, with some substantial reservations.” This description could be applied to the responses by CREWS, HOGAN, JACKSON, JANNIDIS, and KELLETER. The third group contains commentaries by respondents who accept the idea of an evolutionary paradigm but concentrate on challenging one or more formulations in the target article: BOYD, BURGHARDT, EIBL AND MELLMANN, FOY AND GERRIG, FROMM, GRODAL, HARPHAM, MIALL, MICHELSON, SCALISE SUGIYAMA, SLINGERLAND, D. L. SMITH, MURRAY SMITH, STOREY, and VERMEULE. The fourth group consists of respondents who accept the idea of an evolutionary paradigm and occupy themselves chiefly with reflecting on its rationale, probing its conceptual structure, or extending its reach: COOKE, DISSANAYAKE, ESLINGER, GOTTSCHALL, HORVATH, SALMON, SAUNDERS, and SWIRSKI. (Part of the response co-authored by MALLORY-KANI AND WOMACK could be included in the second group, and part in the fourth.) The third and fourth groups overlap a good deal. Most of the respondents who challenge specific formulations in the target article also offer general reflections on evolutionary literary studies, and no respondent, presumably, agrees completely with every formulation in the target article. To all of those who have taken the target article seriously enough to feel that it merits a response, even if only a hostile response, my sincere thanks. To those who feel I have whittled their square responses to fit them into these four round holes, my apologies.

BRETT COOKE observes that “some readers might understandably quail at the prospect of an all-encompassing, apparently monolithic, critical perspective.”

They might, and they do. Under the general heading of “A Grand Theory,” below, I sort these reservations into several sub-headings. Some respondents raise the question as to whether the evolutionary social sciences themselves display any recognizable consensus. Others tacitly accept the findings of evolutionary social science but still question whether biological reductions can encompass all things human. The most important alternative to adaptationist views of human nature is cultural constructivism—the idea that culture exercises autonomous causal force in human thought, feeling, and behavior. Some theorists would explicitly repudiate cultural constructivism but still worry that an evolutionary approach will strip out specifically literary modes of thought. Others argue that evolutionary psychology might be true but is often not relevant to specifically literary concerns. Some respondents suggest limitations in the range of literary works that can be effectively brought within the interpretive rubric of evolutionary psychology.

More than half of the respondents believe that evolutionary social science can provide the basis for a Grand Theory of Literature and acknowledge the necessity of incorporating concepts that are specifically literary. They also recognize that theories about the adaptive function of literature form a necessary bridge between these two domains. For many respondents, that is where agreement stops. The amount of attention the respondents devoted to the adaptive function of literature signals that this issue is both crucially important and heavily disputed. In reflecting on these responses, I identify the chief competing hypotheses, assess their cogency, and point toward further research that could lead us toward a reasoned consensus.

2. A Grand Theory

There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

(C. Darwin, *Origin*, 398)

Along with Meyer Abrams, FREDERICK CREWS has been one of the most effective and sophisticated critics of poststructuralism and other “Follies of the Wise”—the title of a collection of his essays. MURRAY SMITH notes that a central theme in CREWS’s theoretical criticism is a “principled skepticism of Grand Theory as such.” SMITH also observes that “history is littered with the corpses” of “advocates of this or that True Theory of Everything.” Is literary Darwinism destined to become one of these unhallowed dead? ROGER SEAMON answers this question unequivocally in the affirmative. He likens literary Darwinism to Russian formalism, psychoanalysis, Marxism, structuralism, and Frye’s archetypal criticism. “Nothing like a science of

literature emerged from these efforts, and DLS [Darwinian literary studies] will, I believe, meet the same fate as earlier efforts to make literary study a science.” In his heaviest charge against the ethos of literary Darwinism, CREWS adopts an even more deprecating and dismissive stance. SEAMON merely consigns literary Darwinism to the dustheap of failed theoretical efforts prompted by a misguided scientism. CREWS treats of it as yet another manifestation of the cult of authority that has for so long been the intellectual shame of professional literary study. “Carroll writes as the chief evangelist for a single critical faction that comes near to claiming a monopoly on intellectual seriousness, and he looks forward to a day when we will all pay homage to Darwin as an earlier generation did to Foucault.”

If literary Darwinists were guilty of the kind of intellectual idolatry of which CREWS accuses them, they would be making the same kind of mistake Foucault himself makes with respect to Marx and Freud. In “What Is an Author?” Foucault defines “discursive practices” as matrix theories that transcend all empirical criticism and revision. Marx and Freud are his two chief examples for the founders of such practices. As CREWS suggests, in literary study over the past three decades, Foucault himself achieved the sort of apotheosis that ranks him, in this respect, with Marx and Freud. Is it fair to say that the advocates of evolutionary literary studies seek a similar status for Darwin? I think not. Quite apart from substantive concepts, the intellectual quality of the influence exercised by Foucault is strikingly different from that exercised by Darwin. Foucault champions an irrationalism that has deep affinities with doctrinaire authoritarianism. Darwin exemplifies a spirit of humble reverence before the authority of reason and evidence. CATHERINE SALMON gives personal testimony to this difference in intellectual ethos. She says that in her undergraduate literary training, “I didn’t feel that much of literary analysis had anything to do with truth.” In this respect, the evolutionary literary theorists represent in her mind a wholesome and refreshing change.

MURRAY SMITH anticipates the charge of dogmatism, weighs it carefully, and formulates the right response. “So long as evo-lit, along with evolutionary theory more generally, can maintain this ‘open’ and self-questioning character, there is hope that it will not turn into just another Theory of Everything heading for the trashcan of history.” Like CREWS and SMITH, HAROLD FROMM urges the virtues of “open-ended” inquiry. “‘Human nature’ as a concept needs to be open-ended, since its particular biological foundations will be subject to revision like all scientific truths.” The point is well taken but like all such simple maxims must be complemented with a countervailing maxim. “Look before you leap.” “He who hesitates is lost.” Keep an open mind, but not so open that your brains fall out. All

scientific hypotheses are provisional, but without some usable set of working hypotheses, one cannot think at all.

AS MURRAY SMITH observes, it is altogether possible to be “righteous” and “sincere” and still to be mistaken. The history of failed efforts at establishing a scientifically oriented paradigm for literary study must naturally give us pause. While contemplating this dreary history, though, we should locate it within a deeper intellectual history. The history of geology in the centuries before Lyell consisted in often fantastic speculative systems. Geologists became so disgusted with these fanciful speculations that in the decades immediately preceding the publication of Lyell’s *Principles of Geology*, they called a moratorium on general speculative accounts of geological change. Instead of speculating, they assiduously set about the practical business of establishing the relative historical position of strata across the world.⁹⁶ If Lyell had taken the history of failed speculations as a guarantee that no general theory could ever be true, he would not have written his *Principles* and would not have established the paradigm that still governs the science of geology. Consequently, he would not have prepared the ground for Darwin’s theory of natural selection. Had Darwin himself been sufficiently intimidated by the speculative inadequacies in the theories of Lamarck, Chambers, and Spencer, he would not have ventured to publish his views on natural selection. The list of such instances could be extended indefinitely. Mature theories do not typically spring full blown from nothing, nor are they always instantly recognized as basically correct. Darwin’s theory of natural selection had to wait another sixty or seventy years before it finally achieved paradigmatic status in the Modern Synthesis that integrated genetics with evolutionary biology. The point of these comparisons is not that any specific theory in evolutionary literary study has yet achieved or merited paradigmatic status. The point is only that every ultimately successful theory has to start somewhere. A history of previous failures is no cause for dismay. One has to assess any given theory on its merits.

The time is ripe for evolutionary literary study. Evolutionary social science has emerged into a mature discipline only within the past thirty or forty years, and it provides an indispensable intellectual context for the development of evolutionary literary study. In this respect, evolutionary social science is to literary study what Lyell’s geology was to Darwinian evolutionary biology, and what Darwin’s evolutionary biology was to evolutionary social science.

CREWS himself formulates the central proposition that supports a reasonable hope for the intellectual validity of evolutionary literary study. He quotes his own declaration that only a Darwinian perspective “can make general sense of

humankind and its works.” To be sure, he immediately qualifies this proposition. “But whether that perspective ought to become the guiding philosophy of academic literary studies is a different matter.” In subsequent sections, I shall consider in detail the reasons CREWS gives for this qualification. At the moment, I shall note only that the qualification is fundamentally inconsistent with the proposition it qualifies. Is literature not one of the “works” of humankind? The contradiction between proposition and qualification seems to betray an incoherence at the very heart of CREWS’s conceptual order. Later in his response, CREWS remarks apothegmatically, “The subject matter of literary study is not human nature; it is literature.” Literature is produced by human nature, depicted in it, and fulfilled by it. Can literature be neatly segregated from its source and subject? In subsequent sections, I give reasons for believing that a knowledge of human nature forms an indispensable context for studying literature along with other works of humankind.

In his synoptic evaluation of literary studies over the past thirty years or so, CREWS describes the poststructuralist phase as a mass public failure of intellectual character, a failure from which we are now, perhaps, he thinks, in the first phases of recovery. The causes of both the breakdown and the recovery remain mysterious, like an illness that is never diagnosed but that eventually passes of its own accord. I too believe in the importance of intellectual character, but attributing major phases of cultural change to purely moral causes, as if moral causes were absolute and irreducible, is the central theoretical deficiency in conservative forms of thought. The corresponding deficiency in progressive forms of thought is to attribute all causal force to structural features of the cultural system, assigning no efficacy, and hence no responsibility, to the agency of individuals. A more comprehensive and adequate form of cultural diagnosis, assimilating the insights of both conservative and progressive forms of thought, would examine the way individual dispositions and systemic cultural structures interact. Many literary theorists no doubt experienced decadent sensations of *jouissance* at the dissolution of the traditional humanistic paradigm, but if that paradigm had not suffered from inherent structural defects, it would not have been vulnerable to the intellectual pathologies of poststructuralism. Those defects include a radical division between science and literature and an obstinate commitment to purely discursive methods of inquiry.

CREWS, GOODHEART, and SEAMON wish to return us to the traditional humanistic paradigm. SPOLSKY, in contrast, is deeply sympathetic to poststructuralism. It is all the more telling then, that in her methodological *cri de coeur*, she speaks for the

humanists, too, most plangently: “Why, then, shouldn’t we continue to do what we are already doing?” Since SPOLSKY feels that “we already have very satisfying ways of studying the artifacts of art and literature,” she would presumably remain impervious to any arguments for reform. If she is happy with what she is doing, why should she change? For those who do not find current practices satisfying, it will not suffice merely to appeal, as CREWS appeals, to principles of intellectual integrity. It is necessary, rather, to do as GOTTSCHALL and others have done—to create a new organon, both conceptual and methodological, to correct the fundamental weaknesses in the system.

2.1. The Consensus Model in Evolutionary Social Science

In a widely disseminated model for the progression through which a new theory eventually achieves general acceptance, there are three chief phases: (a) it can’t be true; (b) it might be true, but it is trivial; and (c) it is both true and important, but everybody always knew that already. Collectively, CREWS, GOODHEART, and SPOLSKY cover the first two phases pretty thoroughly. In a seemingly magisterial remark that betrays ignorance about the actual state of research in the field, CREWS declares that evolutionary psychology “has been plagued by a scarcity of hard evidence that might substantiate one ‘Just-so Story’ about emergent dispositions at the expense of rival hypotheses.” Going still further in skepticism, SPOLSKY expresses doubt that a consensus model of human nature might even be possible. All fields, she seems to feel, must be like her own, “cross-hatched by contested claims.” GOODHEART had wondered whether we “know enough” to discern what is inscribed on human nature. He now cites several features in the model of human nature presented in the target article, and these features, he declares, are “striking in their banality.” CREWS too suggests that reduction to a “primordial level” can lead us only to “banal common denominators.” From these various observations, we can draw two chief conclusions: first, that human nature is impenetrably mysterious, and second, that the features of human nature are so well known that they scarcely bear mentioning. Eventually, perhaps, we shall see one or more of these theorists enter the third common phase in the development of new knowledge.

SPOLSKY wonders if she is “being asked to believe” that “the field of evolution and evolutionary psychology is blissfully free of conflict and competition?” The rhetorical device deployed in this question is to force a choice between two bad alternatives. Either there is no model at all, or there is no conflict and competition in the model that exists. We need not take such ploys very seriously. The target article identifies a coordinated suite of species-typical features about which most evolutionary social scientists would now agree. Taken singly, each of these claims

has interest and value. If each could be contested, as CREWS, SPOLSKY, and GOODHEART suggest, none could simply be taken for granted, as CREWS and GOODHEART suggest. More importantly, individual findings, interesting as they might be, take their full value only in their systemic relations with one another. Life history theory—the cycle of birth, growth, reproduction, and death—provides a framework within which we can compare human nature with the nature of other species and can also make biological sense of the interdependence among the elements of human nature.⁹⁷ The basic outlines of specifically human life history are well known. Those outlines impose constraints on plausible explanations about each of the specific features of human nature mentioned in the target article. Hence the consensus model.

Within the consensus model, as in any healthy field of research, there are unsolved problems. That is why research exists. Possible solutions to each problem consist in alternative, competing hypotheses. In the target article, I identify one central problem that is of particular importance both for evolutionary literary study and for evolutionary social science in general: the adaptive function of literature and the other arts. AS MURRAY SMITH observes, I locate this issue within an account of a broad theoretical conflict over “massive modularity” and the nature of the EEA or “environment of evolutionary adaptedness.” Evidence bearing on that conflict derives from multiple areas of research, each of which itself contains important unsolved problems.

A detailed survey of current problems in evolutionary psychology would include the following issues: the pace and nature of the evolution of language; the role of sexual selection in the development of higher cognitive faculties; homosexuality as adaptation, by-product, or dysfunction; the relative causal force of foraging, innovation, group size, and social interaction in the evolution of the enlarged human brain; the relative causal force of male provisioning and female coalitions in the evolution of human family structures; the adaptive significance of individual differences in personality; the relation between cognitive “modules” and “general intelligence”; the number and character of “basic emotions”; the interactions between basic emotions and Theory of Mind in the formation of more complex emotions; the limits of plasticity in the correlation between adaptively conditioned motive structures and affective responses; the exact character of the interactions between evolved cognitive mechanisms and fitness maximizing algorithms in human nature; the origin and nature of “altruism”; the existence of “tribal instincts” or social dispositions extending beyond kin but not restricted to direct social exchange; the exact nature of the interaction among multiple levels of

selection (the gene, the individual, the kin group, and the larger social group); interactions among dominance, cooperation, and symbolic thinking in the evolution of elementary political dynamics; the way elementary political dynamics constrain complex social formations that contain advanced functional specialization and elaborate status hierarchies; the precise nature of gene-culture co-evolution; the adaptive function of religion; and the adaptive function of literature and the other arts.⁹⁸

Several of these research problems bear directly on a crucial historical issue: the emergence of symbolic culture and complex, multi-part tools somewhere between 100,000 and 30,000 years ago. One group of scientists and scholars argues that the emergence of “modern” human behavior was gradual and cumulative, offering no evidence of any relatively sudden alteration in the organization of the brain (Deacon 374-75; Henshilwood and Marean; McBrearty and Brooks; Sterelny, *Thought* 115-16). Another group argues that the epochal transition from the culture of the old stone age was in fact a “revolution,” that it was relatively sudden, and that it was probably precipitated by some tipover mutational event in the brain, most likely an event involving language (Bickerton; Carroll, “The Human”; Currie, “Revolution”; Enard et al.; Klein; Mithen, “Mind” and *The Prehistory*; Smail 195).

As important as these various problems are, the alternative hypotheses put forward as possible solutions offer no serious threat to the consensus model of human life history delineated in the target article. As research progresses, we shall no doubt continue to refine our understanding of the elements in the model. It is virtually certain that the elements will be incorporated within ever deeper and more integrated levels of causal explanation.

Over the past several years, evolutionary social science has been undergoing two substantial paradigmatic corrections. One is in the gradual convergence between the idea of fitness maximization, associated with sociobiology and “behavioral ecology,” and the idea of “proximate mechanisms,” associated with early evolutionary psychology.⁹⁹ This correction is closely connected with theoretical debates over “massive modularity” and the EEA. The other correction, concerning “levels of selection,” is potentially even more important. In the eighties and early nineties, the idea that “selection” worked only at the level of genes and individual organisms, not at the level of social groups, limited and distorted our understanding of the evolution of specifically human adaptations for social life. Social adaptations for humans, like those for other primates, were understood to consist solely in dispositions for nepotism, direct exchange or reciprocation, and

dominance/submission. A large body of the most prominent theorists in the field have now come to recognize the importance of “multi-level selection.” For humans, that includes selection at the level of social groups not closely related by kinship. Adaptations for group life above the level of the “band” solve the puzzles of “altruism” in a way that direct reciprocation never could.¹⁰⁰

By gradually correcting the selectionist paradigm to include group-level processes for humans, evolutionary theorists have almost inadvertently also prepared the ground for developing more adequate evolutionary concepts of culture. Most evolutionary thinking about culture has thus far focused on mechanisms for developing technology and enforcing social norms. I anticipate that the next phase in the development of an evolutionary theory of culture will include the dissemination of a more complete and adequate understanding of the adaptive function of literature and the other arts. That phase has already begun. In the target article and in section three of this present commentary, I describe a collective theoretical effort to formulate an adaptive theory of the arts that includes social functions but that also identifies a psychological function at a more basic level—the level at which humans achieve cognitive and affective orientation to their total environment, physical as well as social.

For each of the features of human nature identified in the target article, I offer extensive documentation, often citing articles that summarize and give references to hundreds of other studies in the areas under discussion. SPOLSKY suggests that I ask readers to accept my own versions of “what two or three scientific fields are about.” The documentation in the target article has a different purpose. The references tacitly issue an invitation to readers to go to these fields and find out for themselves. SPOLSKY does not wish to take my word for what goes on in evolutionary psychology, nor would I wish her to, but neither does she wish to go and find out for herself. She has not been trained to assess information in these fields, she explains, and she feels helpless before the task of making reasonable judgments about the information available in them. This profession of helplessness appears to be a tactic designed to close off access to areas in which SPOLSKY does not care to inquire. In areas she finds more congenial, she evinces no such intellectual timidity. For instance, she mentions “the exciting developments in systems biology,” a difficult technical field in which she presumably has no more specialized training than in evolutionary psychology. She also declares that one of her projects is to “call attention to some of the oversimplifications produced by evolutionary and social science.” On the one hand, then, she is indignant that she is being called upon to make use of information from fields she is “not trained to

critique,” and on the other hand, she feels qualified to announce that the conclusions from these fields, though ostensibly inaccessible to her, display endemic tendencies to oversimplification.

The contradictions in SPOLSKY’s stance on the difficulties of interdisciplinary research extend well beyond the special case of evolutionary psychology. Her particular area of theoretical specialization is the intersection between cognitive psychology and poststructuralism. The central components of poststructuralism are deconstruction, Marxism, and psychoanalysis. To deploy her special forms of expertise, then, SPOLSKY must exercise critical judgment on cognitive science, deconstructive linguistic philosophy, Marxist political economy, and Freudian psychology. Cognitive science is a technical field no more easy of access than evolutionary psychology. Literary scholars are now so familiar with the rhetorical formulas derived from the source theories of poststructuralism that they often fail to recognize the appropriate empirical contexts for these theories. Saussure is hardly the last word in linguistics. Marxist economic theory has virtually no serious adherents among professional economists. And Freudian psychoanalysis has long ceased to be regarded as an efficacious alternative within clinical psychotherapy. Many of the chief conceptual elements in both Marxist sociology and Freudian psychology have been massively disconfirmed in subsequent empirical research.

Declaring that literary study is somehow exempt from the advance of empirical knowledge licenses literary scholars to restrict their professional expertise to producing rhetorical variations on theoretical formulas derived from obsolete versions of linguistics, economics, sociology, and psychology. The truth is, we cannot do without contextual knowledge. We can cordon off our own obsolete versions of that knowledge, as SPOLSKY does, cherry-picking the science that offers superficial verbal correlatives to our theoretical formulas. Or we can take seriously the challenges of responsible interdisciplinary research, gain the expertise we need to make reasonable judgments in the field, and accept the responsibility of producing knowledge that can meet at least minimally adequate standards of empirical validity.

Given the nature of disciplinary specialization in anthropology, archaeology, and psychology, it is hardly surprising that evolutionary social science has thus far concentrated heavily on “deep history”—on history extending millions of years into the past—and on contemporary human behavior. The task of integrating this kind of knowledge with cultural history at the middle range, from the beginnings of recorded history to the present, would almost necessarily fall to the lot of scholars in the humanities. Taking up that task presents an immense challenge, and it offers an unparalleled opportunity.

2.2. Evolutionary Cultural Theory

The evolutionary anthropologist Kim Hill identifies hitherto inadequate conceptions of culture as the chief obstacle inhibiting more rapid development in evolutionary social science (351). Assimilating theoretical work by Richerson and Boyd, among others, Hill identifies essential elements of specifically human culture that distinguish it from the kind of “culture” sometimes ascribed to non-human primates and a few other species. Human culture involves information that is not just socially transmitted but also cumulative, advancing through successive phases of innovation.¹⁰¹ Chimpanzee bands develop distinctive styles of cracking nuts or fishing for termites, but they do not develop technological traditions in which one invention piggy-backs on another. In addition to the cumulative production of innovation, Hill identifies two other distinctive features of specifically human forms of culture: norms or rules of behavior that are reinforced by punishments and rewards; and “signaling” that perpetuates the rules and communicates group identity (353). With respect to technology and the evolution of cooperative group behavior, the principles succinctly delineated by Hill represent the state of the art in evolutionary theories of culture. So far as they go, these principles seem sound and can serve as guidelines for considering reflections on culture in the responses to the target article. The most substantial statements on this issue come from SLINGERLAND, MURRAY SMITH, GOODHEART, HOGAN, BURGHARDT, and KELLETER.

To think effectively about culture from an evolutionary perspective, one has to thread one’s way between two faulty extremes. One extreme consists in the belief that human cultural capabilities display no significant differences from the cultural capabilities of other species. The other extreme consists in the belief that human culture has kicked itself loose from human nature and now operates independently of genetically conditioned behavioral dispositions. EDWARD SLINGERLAND avoids the first of these two extremes, but in dodging Scylla he drifts dangerously close to the vortex of Charybdis. He argues that we should regard culture as “a potentially autonomous force in its own right,” and he urges us “to recognize that culture regularly *transforms* human nature and cognition in important ways.” These formulations seem ambiguous, admitting of interpretation in both hard and soft versions. The hard version would attribute “autonomy” to culture. The soft version would claim only that cognitive adaptations for culture interact with other features in human life history in reciprocally causal ways. In its soft version, SLINGERLAND’S formulations would correspond to those of Hill, who argues that culture is the product of “evolved cognitive mechanisms” but that the emergence of culture has itself probably “uniquely shaped evolved human cognition and emotion” (351).

In elaborating on the “potentially autonomous” force of culture, SLINGERLAND conflates two ideas that would be better kept distinct. One idea is “gene-culture co-evolution.” Lactose tolerance is frequently used as an illustration for gene-culture co-evolution. Through natural selection, herding peoples have evolved enzymes that enable adults to digest milk. The cultural practice of keeping cattle serves as a selective force that alters the gene pool in a given population, and in turn the altered gene pool encourages the expansion of a pastoral economy. The idea that needs to be kept distinct from gene-culture co-evolution is “cultural evolution.” This is the idea that certain cultural forms can be “selected” and “inherited” independently of their effect on natural selection. In the second of the two sentences quoted below, SLINGERLAND conflates these two ideas:

The work of scholars such as Pete Richardson and Robert Boyd has shown how cultural forms themselves are subject to a kind of evolution constrained by the structures of human cognition but also exerting their own independent force. In fact, cultural evolution may have driven human genetic evolution, favoring our big brains, linguistic skills, and ultra-sociality.

The argument for “cultural evolution,” as distinct from gene-culture co-evolution, is that certain cultural practices (“memes”) can work against reproductive success and nonetheless persist within limited parts of a population for a few generations (Richardson and Boyd, *Not by Genes* 180). Cultural evolution in this sense did not drive the evolutionary process that produced big brains, linguistic skills, and ultra-sociality. All three of those traits contribute directly to inclusive fitness. The evolutionary process that produced them is ordinary natural selection.

If we separate the two ideas SLINGERLAND has conflated, we could say that the capacity for culture consists in big brains, linguistic skills, and ultra-sociality. As with lactose tolerance, the genes supporting these characteristics enter into a feedback loop with culture. Natural selection favors genes that produce big brains, language, and sociality in humans; these characteristics produce culture; and culture, in turn, acts as a selective force that alters the gene pool, further developing the capacity for culture. This kind of feedback loop constitutes gene-culture co-evolution. To explain the evolution of culture, then, we need make no appeal to “cultural evolution” as a causal force that has “potentially autonomous” power to direct the course of evolution.

Any theory of quasi-independent “cultural evolution” necessarily involves some kind of non-genetic “replicator.” The most familiar version of such replicators, Dawkins’ notion of “memes,” is deeply problematic and has never

achieved general acceptance among evolutionary thinkers. In Dawkins' conception, memes are ideas or cultural practices that supposedly function in ways parallel to but independent of genetic evolution. This supposed parallel will not stand inspection. No idea or cultural practice contains a molecular mechanism adapted by natural selection to replicate itself. Ideas and cultural practices can be disseminated and perpetuated only by activating psychological responses that affect behavior. Those psychological responses are themselves constrained by dispositions that have evolved through natural selection. Memes could thus not be "autonomous" in the way that genes are autonomous. Ideas and cultural practices are secondary and subordinate, causally, to the proximate mechanisms produced by natural selection.

Richerson and Boyd develop arguments both for gene-culture co-evolution and for cultural evolution, but they identify no significant cultural structure that is not constrained by evolved dispositions. Their views on gene-culture co-evolution are widely shared by other evolutionary theorists. Their arguments for "cultural evolution" remain more speculative and controversial.¹⁰²

MURRAY SMITH takes up the issue of culture in two separate passages. In one passage, he threads his way safely between Scylla and Charybdis, but in another, like SLINGERLAND, he drifts into the vortex of Charybdis. In the safely negotiated passage, SMITH declares that "it makes no sense to place culture outside the domain of nature"; he gives due attention to continuities between humans and other species; and he also registers the evident "gulf separating human and non-human psychology." He argues that "culture surely is fundamentally important to human development and flourishing in a way that it is not even for the most sophisticated non-human species." The difference in degree between human and animal "culture" is so large as to count as a difference in quality. Hill too declares that speaking of animal groups as separate cultures "undermines our ability to understand why *Homo sapiens* is a special case with special cognitive abilities" (352-53).

In the passage not so safely negotiated, SMITH invokes "memes" and "cultural evolution." He urges that we give due heed to "the highly plausible notion that there is a dimension of cultural change at the 'population-level,' where patterns of change emerge from the aggregated choices of individuals, but without the goal-directedness of individual actions." This is no doubt true. Biologists are now recognizing the importance of "group selection," and literary and cultural historians, already disposed to give a strong emphasis to collective cultural meaning, need to work out in detail the way individuals and collective cultural

forces interact. But “patterns of change” are not at all the same thing as the blind variation and selective retention of self-replicating mechanisms. “Patterns of change” constitute a much looser and vaguer concept. Dawkins’ gift for glib and catchy formulation has in this case, as in that of “the selfish gene,” done a deep disservice to the cause of coherent thinking about evolutionary processes.

We should by no means neglect group-level processes. The common lexicon, to take an obvious example, contains the collective and shared intelligence of untold generations, a wealth of “knowledge” that could not possibly be generated in the life of any individual or even any succession of individuals. Culture extends the imaginative life of each of us far beyond the boundaries of individual experience, and in that crucial respect, it separates us from the other animals, even those animals that are capable of empathy for the other animals with which they come directly into contact. Even so, in taking due heed of the collective cultural mind, we need to be careful not to make the simple mistake of supposing that Dawkins’ notion of memes offers the best available way of thinking about culture. Dawkins’ notion is catchy in part because of the term itself, selected, for that purpose, with all the shrewd care an advertising executive gives to the selection of words in a jingle. At a deeper level, the notion of “memes” is catchy because it appeals to our natural cognitive disposition to handle difficult theoretical issues by thinking in analogies. Genes vary and are selected and inherited. So then might also “memes,” we think, and in so thinking are led down many a blind alley shrouded in mist.

Memes possess no internal replicative mechanism, and no one has yet been able to identify structural principles for memes that would approximate to the sharply demarcated molecular structure of genes. Moreover, genes and organisms are tightly locked into functional interdependence. The organization of physiological processes in organisms displays a deep systemic coherence regulated by astonishingly complex genetic interactions. Specific genes are functionally organized to replicate organisms of a specific type, and specific types of organisms are functionally organized to replicate specific genes. The relation between memes and human organisms constitutes no such functionally integrated structure in a replicative process. Specific ideas and cultural practices (memes) might or might not contribute to the inclusive fitness of individual human organisms, but human organisms are not functionally organized to replicate specific memes. Throughout its life, an individual human organism retains the same genetic makeup but can undergo many profound changes in ideas and cultural practices. In these various ways, then, genes and memes display

fundamental structural differences. As a result, using the analogy between genes and memes as a general heuristic for thinking about culture is almost certain to lure theorists into problematic speculation.

GOODHEART, like MURRAY SMITH, describes Dawkins' notion of memes and suggests that it comprises the whole of evolutionary cultural theory. Generalizing from reflections on Dawkins' theory, he declares that evolutionary cultural theory as a whole is "rudimentary." Judging from the research referenced in GOODHEART'S recent book on Darwinism in the humanities, it seems safe to conclude that he has read very little in evolutionary theory. In the little he has read, he seems chiefly to have sought occasions for registering objections and thus confirming a predetermined stance of dismissal.

PATRICK HOGAN advocates a concept of "cultural universals" divorced from "biology." He thus proposes a concept of cultural autonomy that makes explicit the assumptions operating in the hard version of SLINGERLAND'S formulations. HOGAN chiefly wishes to dispute the claim that evolutionary theory can provide an all-encompassing matrix for literary explanation. To discountenance this claim, he cites various "explanatory systems" that he says are not "evolutionary." He also argues that "literary universals" can be produced "in many ways" and that, consequently, "our explanatory principles should not be confined to biology." He acknowledges that "ideological effects cannot operate on cognitive mechanisms that have not evolved" but feels that this observation, though true, is "trivial." In contrast to HOGAN, I think this observation both true and crucially important.

One needs to be careful about mistaking the "fundamental" for the "trivial" or the "banal." That mistake is both a result and a cause of shallow thinking. Summarizing developments in ethology over several decades, GORDON BURGHARDT observes that we now "appreciate more fully that innate or instinctive mechanisms underlie even much learned and cultural behavior, from what we fear to what we like to eat to how we fight, love, and play." There is nothing trivial about explanations that illuminate the way basic biological dispositions arborize into our most complex and refined cultural practices.

HOGAN'S arguments against the explanatory power of "biology" and "evolution" tacitly dichotomize biology and environment in ways that are conceptually untenable. He argues, for instance, that "cross-cultural patterns may arise from regularities in the physical environment, recurring developmental experiences that are not genetically programmed, emergent features of the phenomenology of self-consciousness . . . convergent results of group dynamics, network patterns, etc." All phenotypes—all manifest behavior—result from

interactions between innate genetic potentials and environmental conditions. No biologist thinks of phenotypes as purely the result of genetic programming. “Recurrent developmental experiences” recur precisely because some given set of genetic potentials interacts in predictable ways with some given set of environmental conditions. So also, “group dynamics” in humans involve predictable interactions between species-typical dispositions and given forms of social organization. The “phenomenology of self-consciousness” does not spring from nothing. “Emergent” characteristics are not the same thing as characteristics that are “autonomous” or self-creating. This whole set of oppositions, then, is factitious. Over the past few decades, the conceptual error that animates these oppositions—dichotomizing “biology” and “environment” as alternative and mutually exclusive causal forces—has appeared often in public discussions, and it has been often exposed and corrected.

The “explanatory systems” to which HOGAN contrasts “biology” and “evolution” include ideology, political economy, education, and colonialism. Ideology is a sub-category of culture. It is the aspect of culture most directly concerned with social and political value. Ideologies offer explanations, but they are themselves also the subject of a larger explanatory system, that of social psychology. Human social behavior is constrained fundamentally by the evolved and adapted characteristics of human nature. Political economy has its own emergent principles of organization and in its technical detail is less obviously constrained than ideology by evolved human psychology, but evolutionary psychology has provided a perspective from which theorists have identified basic limitations in the psychology undergirding classical political economy. Classical economy is based on the concept of individuals as mechanisms motivated exclusively by desire to maximize profit. Extensive research has demonstrated that this model of human economic behavior is incorrect. Evolved dispositions for social exchange involve principles of equity that often lead people to make decisions against their own practical advantage. Further, dispositions to maximize personal gain often stand in tension with dispositions for “altruistic” participation in a community.¹⁰³ These conclusions bear fundamentally on the nature of evolved human social psychology—that is, on the “group dynamics” HOGAN mistakenly presents as an alternative to evolution. Education, like the more general concept of “development” within which it is contained, is not an explanatory system at all. It is a component of a subject matter that is studied by an explanatory system. The appropriate explanatory system in this case is human developmental psychology, a robust subfield within the larger explanatory system of evolutionary

psychology.¹⁰⁴ Colonialism, again, is not an explanatory system. It is a historical and political phenomenon that is a subject of interest for various explanatory systems—for economics and social psychology, among others. Within evolutionary social science, the explanatory models most obviously relevant to this phenomenon are those concerning evolved dispositions for dominance, for ethnic and tribal identification, and for the psychology of in-groups and out-groups.

FRANK KELLETER affirms a fairly pure form of cultural constructivism but, like HOGAN, seeks to give his culturalism a specious air of biological sophistication. Like SPOLSKY, he evidently supposes, erroneously, that systems theory offers an alternative to unified causal explanation. He contrasts “thinking of a straightly causal kind” with ideas of “parallel processing, self-organizing structuration, and often unanticipated feedback loops.” As he is expounding this contrast, the phrase “thinking of a straightly causal kind” metamorphoses into a much broader concept: “unified causal explanation.” Through this metamorphosis, KELLETER tacitly reduces unified causal explanation to simple unilinear causation—no feedback loops. In this way, he sets up a factitious contrast between systemic complexity and unified causal explanation. In reality, systemic complexity and unified causal explanation are integral with one another. By setting them in opposition, KELLETER eliminates the causal connection between nature and culture and thus provides an opening for his claim that culture is “self-organizing.” The argument on “complexity” is just sophisticated drapery arranged to place a decent covering over KELLETER’s belief in the autonomy of culture.

KELLETER evidently knows little about the actual state of thinking in evolutionary cultural theory. If he had read or read more carefully the work of Baumeister, Boehm, Deacon, DISSANAYAKE, Hill, Klein, Mithen, Richerson and Boyd, Sterelny, Tomasello, Tooby and Cosmides, D. S. Wilson, or E. O. Wilson, to name only some of the most prominent contributors to this field, he would presumably have been more cautious in suggesting that the evolutionists generally fail to register the specifically human features of human culture. More importantly, he would also have been less likely to make basic errors in his own effort to identify those features:

Humans alone among species can communicatively shape and to a certain extent become the environmental factors that express their biological dispositions. Humans are not only able to gather individual information about the world and to share this information with other members of the species, but these acts of information-sharing can reach self-awareness. By this, they become acts of making meaning: they bring into existence a self-organizing, self-developing system of information called culture, which amazingly lacks a nervous system of its own.

These assertions are fanciful. Animals of many species communicate while shaping their environments—beavers, for example, or rodents who live in large underground communities with complex tunnel networks, or termites, ants, and other social insects. Further, humans are not the only animals who display self-awareness. The standard ethological test for self-awareness, the ability to recognize one's self in a mirror, has been given to animals of numerous species. Humans fail mirror tests until they are about a year and half old. Dogs cannot pass this test, but magpies can, along with Indian elephants, bottlenose dolphins, and all the great apes (bonobos, chimpanzees, orangutans, and gorillas).¹⁰⁵ KELLETER'S mistakes in cognitive ethology are not random. His ethological assertions, like his contrast between complexity and causality, provide support for his cultural transcendentalism. After erroneously affirming that "self-awareness" is a distinctively human feature and erroneously presenting that feature as the pivotal antecedent of human culture, he posits a mystical conception of culture as "self-organizing" and "self-developing." The terms "self-organizing" and "self-developing" are equivalent to the term "autonomous" (*auto* = self; *nomous* = law). In his conception, then, culture is a law unto itself, a transcendent category causally disconnected from any biological antecedent.

In affirming the autonomy of culture, KELLETER inevitably re-instates the "ontological rupture" he ostensibly disavows. He claims that the cultural constructivists have "already transcended" the dichotomy of nature and culture, but the kind of transcendence exemplified in his own commentary depends on simply cancelling one of the two terms of the dichotomy. If culture is autonomous, "human nature" would necessarily form an empty category. It would consist only in the capacity for culture. Theorists aiming at a vision of cultural autonomy typically avoid any mention of the substantive features of human nature, and in this respect, KELLETER is typical.

Evolutionary cultural theory has developed well beyond the level of the "rudimentary," but it is still fairly basic and thus offers rich opportunities for further development. Scholars in the humanities are already contributing to that development by integrating research into the universal aspects of human nature with research into specific historical periods and specific texts. Some of those efforts have been described in the target article—for instance, GOTTSCHALL on the warrior culture of Homeric Greece, Carroll on the diverse and conflicting cultural streams feeding into *The Picture of Dorian Gray*, COOKE on the Soviet background and the dystopian generic traditions of Zamyatin's *We*, SAUNDERS on the jazz-age expatriate culture that informs the family pathologies in Wharton's *The Children*,

and BOYD on the specific socio-political contexts of *Horton Hears a Who* and *Maus*. These and other efforts briefly described in the target article are only a beginning. Much remains to be done, immeasurably more than has been done already.

2.3. Science, Empiricism, and the Specificity of the Literary

JONATHAN GOTTSCHALL describes the often passionately hostile blogospheric response to an article he wrote advocating scientific methods in literary study, and he predicts similar responses to the target article. Such responses, he suggests, offer evidence that “scholars are girding up for a big fight about the role of scientific theory, methods, and ethos in the humanities.” As it happens, most of the responses to the target article were not passionately hostile, but even some of the most sympathetic responses indicate that scholars in the humanities are keenly concerned to preserve concepts peculiar and appropriate to their special subject. DAVID MIALL worries that appeals to scientific method entail risks that “the distinctively literary qualities of literature will be misrepresented or overlooked.” AMY MALLORY-KANI AND KENNETH WOMACK ask whether consilience, as presented in the target article, does not “simply stamp out the uniqueness of literary study?” Still further, is literature itself, they wonder, merely to be “subsumed by the sciences?” Philosophically, HAROLD FROMM is strongly attuned to evolutionary naturalism, but even FROMM declares that the pronouncements of his more scientific colleagues instill in him “a fear of triumphalism.”

In the responses to the target article, concerns about preserving concepts and attitudes specific to literary study distribute themselves into three main groups: (a) a concern for attending to the formal and aesthetic aspects of literary art; (b) a concern for valuing specific texts and authors; and (c) a concern for valuing individual critical performances. Before responding to these concerns, I shall quickly cite some representative instances of each.

Those who emphasize giving due attention to the formal aspects of literature tend to set those aspects into contrast with thematic content. ELLEN DISSANAYAKE says that “there are passages in literature and especially poetry—and film—that have stunning or even indescribable-but-unforgettable emotional residue that comes from image, sound, structure or unfolding in time.” She contrasts these aspects with “story” or “subject matter” and further stipulates that this “emotional residue” cannot be “subsumed by Basic Emotions theory.” DAVID MIALL seems to be thinking along similar lines when he distinguishes “what is specifically literary” in a text from its “‘motivational systems’ and ‘game plan models.’” PETER SWIRSKI, too, warns against the tendency to engage in “cookie-cutter criticism, whereby literature is used mainly as dough from which critics cut out just the parts that

confirm theories from other fields.” BRETT COOKE asks “*How do we account for individuality and unique texture?*” Darwinists tend to focus on general or universal properties, he says, but literary connoisseurs “are often attached to the peculiar qualities of favorite, sometimes *sui generis*, texts.” Like COOKE, BLAKEY VERMEULE affirms that as literary critics we are “reaching toward aesthetic power,” and she argues that all literary study can ultimately “be boiled down to authors and what they intended.” FREDERICK CREWS vigorously defends the practice of “trying to make rich sense of single works, or single careers, or single moments in literary history, that strike the common understanding as representing a pinnacle of insight and skill.” This defense covers both “imaginative writing” and “critical judgment.” EUGENE GOODHEART joins CREWS and others in asserting the importance of “literary sensibility”; ELLEN SPOLSKY touts the “well-honed sensitivity” of the experienced critic; and GEOFFREY HARPAM eloquently evokes the “performative” aspects of literary criticism. “Great literary criticism impresses us with the power, richness, and responsiveness of the critic’s mind.” In seeking “to accommodate criticism to science,” HARPAM asks, will the evolutionists “still be able to generate great criticism?”

In one of the earliest essays included in *Literary Darwinism*, I proposed a general program for Darwinian literary studies, as a collective enterprise, that would include both interpretive literary study—the kind of thing CREWS and HARPAM have in mind—and empirical, quantitative research—the kind of thing GOTTSCHALL and DAVID MICHELSON have in mind. The program outlined there still seems basically right to me, so I shall quote the main passage:

If literary studies are ever to satisfy the criteria for empirical validity, they will have to include a range of activities that can be located on a scale of empirical constraint, and these activities will have to be interdependent. At the lower end of the scale, with the least empirical constraint, we can locate most of what we now think of as literary criticism. At the upper end, with the greatest constraint, we can locate the kinds of experimental study—in psychology and linguistics—that are already being conducted but that have not often been expanded to include literature. As a behavioral science, experimental literary study would affiliate itself closely with observational disciplines like ethology or cultural anthropology. Such disciplinary connections would make it possible to pose and answer empirical questions about how art functions in social groups, what kinds of social needs it satisfies, and how it interacts with other social factors. The results of such study would supply us with the basic facts for the statistical generalizations that are indispensable for causal explanations of cultural and literary history.

To engage in empirical study, we must be able to propose alternative hypotheses, conduct experiments, confirm or fail to confirm predictions, and thus falsify propositions.

(Literary Darwinism 36)

CREWS fears that this kind of program would alienate the few students who still have a hankering after professional literary study. “Students who are still drawn to that field because certain poems and stories have heightened their self-awareness and whetted their appetite for teaching are left cold by charts, graphs, and tables.” This is a real issue and should be confronted head on. If I were given the option of fashioning a program of graduate literary study, I would include, as part of the initial training, required courses in statistics and experimental method. As I envision it, for some and perhaps most graduate students, that training would remain basic and introductory—as it remains, for instance, for many doctoral students in departments of education. The introductory courses would give the students ready access to research in the social sciences and prepare them more adequately, as generally educated people, to cope with the informational demands of a culture that is increasingly scientific and technological in character, but it would not become the dominant mode of their own professional activity. For others—MICHELSON is well in motion to provide a good instance—basic training in empirical methods would provide the starting point for careers that would develop into full-scale professional work along the model of the social sciences. If this training regimen were to become general, I imagine that many literary scholars would stake out areas somewhere in between these two extremes, making some use of empirical methods, absorbing much more than they now do from empirical research conducted by others, taking more heed of empirical validity as a criterion of conceptual merit, but concentrating much of their professional energy on historical and interpretive work within fairly traditional discursive modes. This program would help create the sort of “synergy” of which GOTTSCHALL speaks.¹⁰⁶

In his varied productivity, GOTTSCHALL himself exemplifies the range of activities envisioned in this program. He has authored two books—one defending empirical, scientific methods and giving practical examples of quantitative literary research, and the other offering a discursive historical and interpretive account of Homer’s *Iliad* and *Odyssey*. He is also one of four co-authors of a book under submission, *Graphing Jane Austen*, in which we combine statistical analysis of traits in hundreds of characters and emotional responses in hundreds of readers with discursive interpretive commentary that looks closely into style, formal organization, perspective, and tone in several specific novels. In its effort to integrate empirical methods with discursive interpretive commentary, *Graphing Jane Austen* is unlike most of the other interpretive literary works cited in the target article. In its effort to integrate concepts of human nature with close attention to

specifically literary and aesthetic features, *Graphing Jane Austen* joins company with much of the work described in the article.

GOODHEART remarks that “a detailed attention to particular works of literature would be a mark of empiricism” and complains that “none is forthcoming in Carroll’s essay.” This is of course an absurd charge. The essay is designed as an overview of a whole field. I cite and synoptically describe dozens of articles and books, including several of my own, in which evolutionary critics give detailed attention to particular works of literature. All one need do is get them from the library. (A similar suggestion could be offered in response to JANNIDIS’ remark that he cannot see how one might go about applying evolutionary psychology to the study of a single text.) GOODHEART is evidently so caught up in the spirit of repudiation that he lets it betray him into making a complaint that is patently unreasonable, thus undermining his own credibility.

Critics of literary Darwinism who wish to be taken seriously need to engage the best work done in the field. In his book on Darwinism in the humanities, GOODHEART takes easy shots at relatively vulnerable targets, ignores the bulk of better work, and only glances with a jaundiced eye at the better work he does consider. In his response to the target article, he persists in the first two parts of this strategy and eliminates the third. That kind of criticism carries no weight as argument. It serves only to confirm prejudice and gratify spite. When we speak of criticism that “impresses us with the power, richness, and responsiveness of the critic’s mind,” it is not to criticism of this quality that we refer.

CREWS delineates two different concepts of empiricism. One concept valorizes findings that are “generalizable, couched in numbers, procedurally controlled against bias and error, and preferably collaborative.” As an alternative to this scientific organon, CREWS defends a kind of empiricism that is non-systematic and non-quantitative but sincerely motivated by a desire to give fair judgment. That kind of empiricism is appropriate, he believes, for humanistic work. It consists in “setting aside partisanship and dogma, weighing the merits of competing hypotheses, attending to objections and recalcitrant facts, and wielding Ockham’s razor.” To add epistemic heft to the force exercised by this kind of reasonableness, CREWS presents Darwin himself as a prime example of it. He says that Darwin “worked and published alone, didn’t conduct experiments, didn’t quantify his results, and was content to report his impressions instead of laying out data that others could check.” This account of Darwin’s methods is inaccurate in almost every detail. Correcting the account will provide an opportunity for elaborating on the advantage that can be derived from a “synergistic” program of literary study.

Darwin published only under his own name, but he most certainly did not work alone. He was in correspondence with hundreds of naturalists all over the world, collecting vital bits of information that ultimately fed into *The Origin of Species*, *The Descent of Man*, *The Expression of Emotions*, and other works. He constantly conducted experiments with seeds, pollination, and ecological measurements, and he gave precise quantitative accounts of these experiments. Moreover, Darwin was the beneficiary of a vast, half-conscious program of experimentation that had been in progress since before the dawn of recorded history: the program of selective breeding of plants and animals. This is the “artificial” selection to which the term “natural” selection is explicitly contrasted. Darwin gives close attention to the relations among many domestic species. The opening pages of *The Origin of Species* devote themselves largely to pigeons, a breed susceptible of vast phenotypic variation, and thus a favorite of “fanciers.” Darwin joined clubs for pigeon fanciers, subscribed to their publications, and consulted heavily with experienced breeders, who were thus unconsciously contributing factual evidence to a large-scale scientific hypothesis.

The very heart of Darwin’s theory of natural selection consists in a simple mathematical ratio—the disproportion between rates of reproduction and the rate of food supply. (This ratio is of course derived from Malthus, an economist.) Darwin frequently gives a precise report of the rate of reproduction and mortality in various species. In one justly celebrated instance of simple but effective arithmetical evidence, to illustrate the geometric progression of reproduction, he describes the rate of reproduction in elephants—a slowly reproducing species—postulates a lineage in which no elephant offspring ever dies before reproducing successfully, and calculates that in just 500 years the living descendants of a single pair of elephants would number 15,000,000 (*On the Origin* 134).

Once it was formulated, Darwin’s theory had a certain massive cogency through the force of logic alone, and it was massively supported by the interlocking forms of evidence Darwin provides from domestication, comparative anatomy, embryology, paleontology, ecology, animal ethology, geology, taxonomy, and the geographical distribution of species. Despite its cogency as argument, Darwin’s theory of natural selection was vulnerable to two major scientific challenges: the age of the earth, and the nature of inheritance. (Natural selection would not work with “blending” rather than “particulate” inheritance.) These challenges were ultimately met, in geophysics and in genetics, by experiments producing precise quantitative results.

We can of course construct arguments without conducting experiments or collecting data. But to give real weight to our arguments, we still have to propose hypotheses that can be disconfirmed by factual evidence, and factual evidence of virtually every kind increasingly depends on empirical procedures that are generalizable, couched in numbers, and procedurally controlled against bias and error.

The issue of romantic love provides a good example of the way empirical study can intervene effectively in literary discussions. In *The Mind and its Stories*, PATRICK HOGAN identifies romantic love as a literary universal. In their response to the target article, KARL EIBL AND KATJA MELLMANN observe that “naturalists have rightly argued against the assumption that romantic love is ‘merely’ a social construct.” EIBL AND MELLMANN nonetheless repeat the culturalist commonplace that the depiction of romantic love arose at a particular moment in the cultural history of Western Europe. Referencing HOGAN, GOTTSCHALL and Nordlund designed an empirical study (“Romantic Love”) to test this culturalist assumption. By analyzing hundreds of folk tales in widely diverse cultures, they decisively demonstrate that romantic love is not a cultural convention limited to modern Europe. If future investigators were to take this study as a new point of departure, they could avoid replicating the mistake made by EIBL AND MELLMANN. More broadly, by not relying on purely speculative arguments supported by selective evidence and general impressions, scholars could avoid exchanges, like those in arguments between children, consisting only in a fruitless cycle of reiterated assertion and negation.

We can propose general theories of literature, and indeed, we already possess a superabundance of such theories. Unless we can formulate these theories in ways that admit of practicable, feasible testing by experiment susceptible to falsification, we shall continue to swirl in non-progressive speculative debate. This is the main burden of MICHELSON’S commentary. MICHELSON sets up a contrast between the evolutionary emphasis on salient life-history concerns and the cognitivist emphasis on form and style. I would not myself accept any simple opposition between these complementary forms of analysis. I would not, for instance, argue that readers are “reading *through* metaphor” rather than “*for* metaphor,” or vice versa. AS DISSANAYAKE maintains, formal properties, both perspectival and figurative, are integral to literary meaning. Nonetheless, it is perfectly legitimate to ask, as MICHELSON asks, about the way thematic and formal elements interact in a given work to produce specific effects. That kind of critical analysis, conducted purely on the level of rhetorical “performance,” is a signal contribution of the (so-

called) New Critics, and it has remained an integral part of all literary study. Reconstructing that kind of critical analysis in empirical ways would give us a means for producing new and cumulative knowledge both about individual texts and about the large-scale theoretical concerns to which MICHELSON draws attention. It would also speak to the concerns of DISSANAYAKE, MIALI, and others about not losing sight of the specifically literary and aesthetic aspects of literary art.

CREWS and HARPAM both suggest an inherent tension between the performative aspects of literary criticism and the impersonal, objective stance of empirical research. GOTTSCHALL, in contrast, affirms that performance and objectivity can be effectively combined, but GOTTSCHALL also suggests a fairly stark opposition between two possible goals for professional literary study: on the one side, “knowledge accumulation,” and on the other “appreciation, imaginative play, self-improvement, and cognitive exercise.” AS GOTTSCHALL presents it, these latter purposes are fine as forms of leisure activity; they can provide guidelines for “how people ought to *read* literature”; but they cannot legitimately provide a “*raison d’être* of professional literary study.”

I think this polarized opposition is misconceived. In GOTTSCHALL’s exposition, it arises as a meditative speculation from a conversation with a companion who concedes that Freud and Lacan are wrong in basic ideas but feels that they are still illuminating for literary study. “They bring out pattern.” I see two possible ways to understand this claim. One is to suppose that Freudian theory, though wrong in fact, serves to stimulate patterns in the companion’s own mind. In this sense, reading Freud or Lacan would be like taking a hallucinogenic drug. The mental patterns thus produced would be entertaining but would have only a fitful and uncertain relation to external reality. This seems like a fairly frivolous conception of literary study, even for a Lacanian, and it seems more likely that the companion has a deeper idea in mind. In this deeper idea, Freudian theory would be untrue in the realm of empirical psychology but “true” (or “valid” or “real”) in the realm of literature. Assuming this is the correct interpretation of the gnomic utterance, “They bring out pattern,” GOTTSCHALL’S Freudian companion would tacitly suppose that science and literature occupy themselves with ontological and epistemic realms that are radically separate from one another. These realms would constitute not just two separate “cultures” but two separate universes, incommensurable and irreconcilable. In one universe, Lacanian psychology would not correspond to reality, that is, to the psychology of actual people. It would provide no accurate instruction as to the motives or behavior or mental experience of actual people. In the other universe, though, it would correspond beautifully to

structures of literary meaning. That is why it would “bring out pattern.” Whatever GOTTSCHALL’s Freudian companion himself might have been thinking, some such dualistic conception is a widely if half-consciously held view about the relations between literature and science. That conception hangs like a heavy mist in many of the swampy, low-lying regions of literary theory, and it is, ironically enough, a conception that many humanists share with scientists who inhabit the supposedly incommensurable universe knowable by science. AS SLINGERLAND observes, “a powerful source of resistance to applying evolutionary theory to human beings is our innate mind-body dualism (a product of our Theory of Mind).”

The idea of a dualistic universe suggests itself strongly in the heavily polarized disciplinary dichotomies on which CREWS, GOODHEART, SPOLSKY and VERMEULE insist; it is integral to KELLETER’S vision of cultural autonomy; and it appears also, indirectly, in FROMM’S suggestion that in the humanities the word “science” has only metaphoric value. SEAMON formulates the idea most explicitly. He draws a sharp contrast between generating new knowledge and carrying on a literary tradition. In his conception, carrying on a tradition involves archival work, but it also involves “interpretation” and “narrative.” SEAMON rigidly segregates “narrative” from “causal explanations,” but the analytic partition between these two categories is obviously flimsy. Narratives typically include causal explanations, and SEAMON himself, by invoking “historical context” as a province of criticism, points toward the causal force of social and material conditions. SEAMON’S manner is dogmatic, and his theoretical formulations will not hold water. He nonetheless seems to be groping, in a confused way, toward a theoretical principle that is at least half true: the idea that literary study is in some fashion continuous with literature itself. In contrast to the way of knowing in the hard sciences, literary understanding is often emotional and qualitative. Like literature itself, literary study legitimately and appropriately involves subjective affect, the sense of qualia, experience, or “felt life.” Literary scholars and critics do not merely uncover objective facts and develop causal explanations about those facts. They serve as sensitive media that register the imaginative qualities in aesthetic objects designed to communicate those qualities to other sentient beings. This sense of the subjective aspect of literary study is the central idea animating the claims for performance, talent, and sensibility made by CREWS, HARPAM, GOODHEART, SPOLSKY, and VERMEULE. When these claims are not formulated in an exclusive manner, as parts of misconceived ontological and epistemic dichotomies, they contain an important element of the truth. Literary study has both an objective, scientific side and a subjective, imaginative side. Literary study occupies an epistemic

borderland, and its inhabitants need to be conversant with the dialects on either side of their own territory—with the scientists on the one side, and on the other with the creative writers for whom TIM HORVATH speaks.

Professional literary study can legitimately involve both “knowledge accumulation” and “imaginative play.” GOTTSCHALL’S own book on the Homeric epics offers a case in point. GOTTSCHALL makes heavy use of cultural anthropology, sociobiological theory, and game theory. He assimilates previous scholarship, provides a broader theoretical and historical context for it, corrects limitations in previous conceptions, and thus creates a new interpretive perspective. He advances our understanding of Homer—no mean feat. Though serious in its purpose of advancing knowledge, GOTTSCHALL’S book is also powerfully literary. GOTTSCHALL became imaginatively absorbed in the Homeric poems, and through the often virtuoso quality of his interpretive rhetoric, he enables the reader to share in his responsiveness to Homer’s poetry. When we speak of criticism that “impresses us with the power, richness, and responsiveness of the critic’s mind,” it is to criticism of this quality that we refer.

If we were to adopt GOTTSCHALL’S own dichotomization of possible professional purposes for literary study, the performative aspects of his book on Homer would have to be regarded as decorative frills cleanly separable from the serious professional aim of advancing knowledge. In practice, no such segregation takes place. “Appreciation” and “imaginative play” are not merely forms of entertainment suitable for a scholar’s leisure hours. Without imaginative responsiveness, literary scholars would have no distinct idea of the nature of the subject about which they are supposed to be accumulating knowledge, and without rhetorical skill, they would have little capacity for communicating the specifically literary character of that knowledge. Imaginative performance is thus not merely compatible with accumulating specifically literary forms of knowledge; it is indispensable to it.

2.4. Literary Particularism and Evolutionary Reduction

In *Evolution and Literary Theory* and subsequent writings, I argue that human nature can usefully be analyzed at three levels: (a) elemental or species-typical dispositions; (b) the variable organization of those dispositions in specific cultural ecologies; and (c) the individual identities produced by variations in individual dispositions, environmental conditions (including cultural conditions), and individual histories. In his forthcoming book, *On the Origin of Stories*, BRIAN BOYD uses a similar scheme and adds that of course individual literary works, like individual persons, also display unique individual characteristics. In his response

to the target article, MURRAY SMITH lucidly probes the logic of this tri-partite analytic scheme, weighing potential objections, and affirming that “a multi-level account, combining all three layers, promises the richest and most satisfying account of all.”

As SMITH observes, a multi-level account of literature can be challenged by claiming that the only “truly informative explanations” locate themselves “at the levels of cultural and individual specificity.” The responses to the target article offer a good sampling of variations on this kind of challenge. GOODHEART and CREWS suggest that our responsive curiosity can or should be piqued only at the level of unique individual cases in literature. SLINGERLAND, like MURRAY SMITH, affirms the value of a “vertically integrated” model of literary study, but he also suggests that most literary analysis operates at a level of meaning so highly particularized that general conceptions of literary theory are essentially irrelevant. Taking a similar line, TONY JACKSON defends the practice of analyzing particular problems without reference to general theory, and in a variant of this argument, JACKSON, COOKE, and CREWS suggest that good and true observations can be offered from within the framework of false or misleading general theories.

GOODHEART belongs to the tradition of the New Criticism—“new” in 1938, at the time Brooks and Warren published *Understanding Poetry*, but still today, 70 years later, called the New Criticism. GOODHEART not only affirms the special value of close reading; he constructs a rationale for close reading that implies a radical epistemological separation between literary study and physical science. Unlike science, he says, literary study should occupy itself only with particular cases divorced from any larger explanatory context. “Reductionism in the natural sciences is no vice; on the contrary, it enables one discipline (for instance, physics) to explain another (chemistry). In the humanities, however, it subverts the uniqueness and complexity of works of art.” Yet further, what “Carroll and his fellow literary Darwinists propose is the dissolution of the individuality of a work (the very reason we enjoy and value it) into large generalizations that removes all of its distinctive features and vitality.” These assertions are senseless. Consider a parallel construction about the discipline of history: “If a historian describes large historical movements such as the American Revolution, that same historian cannot also consider individual agents such as George Washington or individual actions such as the crossing of the Delaware. Yet worse, by taking account of the Revolution as a whole, the historian actually *subverts* George Washington and *dissolves* the crossing of the Delaware. Clearly, that is a wicked thing to do.” Or in philosophy, “To characterize a style of argument as a Socratic dialogue subverts Socrates and dissolves *The Republic*.” As MURRAY SMITH observes, “it is hard to see

how incorporating the universal level of analysis in any way damages the cultural and individual levels.”

GOODHEART's logic is weak, but his animus is strong. His rhetoric of subversion and dissolution carries a heavy charge of defensive antagonism. In tone, then, his manner is very different from that of the early New Critics. Their best work has all the high good humor of creative energy opening up a rich vein for exploration. In its reactionary ill-temper, GOODHEART's tone sounds less like that of Brooks and Warren than that of Old Man Warner, a character in Shirley Jackson's story "The Lottery." Someone mentions to Warner that in another village there is talk of giving up the lottery. "Old Man Warner snorted. 'Pack of crazy fools,' he said, 'Listening to the young folks, nothing's good enough for *them*. . . . There's *always* been a lottery,' he added petulantly" (297). There hasn't always been good close criticism. The New Critics can be given large credit for bringing that range of analysis into the professional study of literature. The best criticism in every theoretical school has assimilated this repertory of analytic skills. That repertory will remain a permanent acquisition, but it will almost certainly be developed through new methods and new ideas. Critics interested in achieving higher levels of resolution in understanding the uniqueness and complexity of individual works of art can only benefit from extending their analytic reach by assimilating empirical research in cognition and linguistics and by lodging close readings within the larger explanatory context of human life history.

In a passage that has already been partially quoted in the previous section, CREWS declares, "There is nothing trivial about trying to make sense of single works, or single careers, or single moments in literary history, that strike the common understanding as representing a pinnacle of insight and skill." There is nothing trivial about good interpretive criticism, but the proliferation of close readings that depend only on the vivacity of a scholarly mind operating in the common language runs into the problem of diminishing returns, and that problem bears within itself a host of ills: repetition with superficial variation, ingenuity straining after novelty and soldiering on in the face of patent perversity, and the planned obsolescence of new, jargonized vocabularies that overtly proclaim their independence from truth and reality, until the disconnect between language and reality turns on its masters, like HAL 9000, declares itself master, and announces irrationality as an epistemological *ne plus ultra*.

CREWS concedes that "all explanatory efforts entail reduction" and then immediately sets to work to deprive that concession of all practical force. Reductions "to the most primordial level" tend to be, he says, "banal common

denominators that aren't helpful for the particular instance." As an alternative to the banal, CREWS delineates a hermeneutic practice that lodges itself in the particular instance. "The logic of inquiry would seem to require that we begin tackling a literary problem just below the textual surface, where unified and divided intentions, biographical experiences, psychological stresses, linguistic resources, traditions and conventions, historical events, and social circumstances can all be seen to have played a role." This is, CREWS says, "the normal practice of most critics." Actually, it isn't. CREWS's account of critical practice is a version of the hermeneutic circle—the perpetual interaction between general ideas and inductive detail. CREWS skews his version misleadingly toward the inductive end of the spectrum. In philosophy of science, this version of hermeneutics is identified most closely with Francis Bacon. While Bacon is generally honored for his commitment to the idea of science, his radical inductivism, as an account of actual scientific methods, is just as generally deprecated. CREWS believes we should be "as inductive and circumspect as possible." And as strong, generous, and good, to be sure. Taken merely as an expression of respect for intellectual scrupulosity, CREWS's ideal is unexceptionable. Taken as a description of standard analytic practice, it needs to be heavily qualified. We never approach a text without some set of general ideas. Many of those ideas are lodged in an intuitive common understanding, but the common understanding remains contested at every conceivable point. M. H. Abrams identifies the traditional "humanistic paradigm" as a belief that individual authors convey intentional meanings to readers in a shared actual world, and he rightly observes that every element in this paradigm has been rejected within the postmodern paradigm ("The Transformation" 115). Even if CREWS were correct that postmodern skepticism is a mysterious but transient disorder that will soon be only an unpleasant memory, his appeal to the common understanding would still face the problem of diminishing returns.

In my conception of it, literary Darwinism affirms the basic elements of the traditional humanistic paradigm but lodges those elements within a larger explanatory context. CREWS, GOODHEART, and SEAMON all observe, correctly, that in appealing to a systematic body of general theory outside the emergent principles of specifically literary structures, literary Darwinism joins company with other theoretical schools such as psychoanalysis and Marxism. Strange as these bedfellows might seem, we can spread at least one common coverlet over them—the desire for explanatory depth. Though seriously mistaken in its conception of human developmental psychology, Freudian psychology enables critics to abstract psychologically charged themes from literary texts. Freudian psychology gets at

partial truths about literary texts, though inevitably distorting them in the process. So also, Marxist social psychology gets at social themes that do in fact exist, though the inadequacies of Marxist views of human social psychology inevitably distort the themes that Marxist theory serves to isolate. Similar remarks can be made about deconstruction, feminism, Bakhtinian dialogics, and all the other standard elements in contemporary critical theory. None is absolutely wrong. Otherwise, they could not have had large persuasive appeal to intelligent literary scholars who sincerely wish to understand their subject. COOKE, JACKSON, KELLETER, and MALLORY-KANI AND WOMACK suggest similar concessions to standard contemporary theories. So far as it goes, their point is well taken. But why stop short with partial and distorted versions of explanatory systems for which better alternatives already exist?

CREWS disparages “primordial” explanatory reductions as “banal.” But consider the analytic categories he wishes us to engage “just below the textual surface.” These categories include “divided intentions,” “psychological stresses,” “linguistic resources,” “historical events,” and “social circumstances.” Good critics take account of such things, and in accounting for them, they necessarily have recourse to general ideas about human psychology and human social interaction. Criticism on *Pride and Prejudice* can offer an example. CREWS gives a generous appraisal of my reading of *Pride and Prejudice* and notes that I locate the reading within a Darwinian account of basic human motives. The Darwinian account does not get in the way, exactly, but it is, he feels, superfluous. “All that was needed to arrive at the same emphasis was open-minded attention.” In the recent history of Austen criticism, other readers, many of whom no doubt feel that they too have open minds, have discovered quite other themes in the novel, for instance: class struggle, the Phallus, the mirror stage, compulsory heterosexism, the other, desire, patriarchy, dialogism, textuality, semiosis, discourse, and power. These readers, too, have looked “just below the textual surface,” and what they have found there has corresponded with the large general ideas through which they organize surface details into thematic and tonal structures. As GOTTSCHALL’S Freudian companion observes, the theories “bring out pattern.”

In suggesting that critics can perform sensible mid-level work even while giving “a perfunctory bow to some Continental guru,” CREWS joins with JACKSON, SLINGERLAND, and VERMEULE, who argue that the subjects of literary study are often so particular that large general ideas, like the Irish of old, need not apply. JACKSON takes up this issue with specific reference to Lisa Zunshine’s book on *Theory of Mind* in the novel. Zunshine argues that in reading novels we exercise our

distinctively human capacity for peering into the minds of other humans. This claim is obviously true and potentially important. It could be a major analytic lever for literary theory and for the close reading of specific texts. To give it force as a theoretical category, though, the lever would have to be braced against some fulcrum—some other idea with which it could be set in tension. “Because Theory of Mind accomplishes *X* in relation to *other idea Y*, we can conclude *Z*.” Zunshine is careful not to introduce any substantive ideas about human motives from evolutionary psychology. She thus avoids offending postmodern sensibilities, but she also deprives herself of having much of anything to say. She can only describe various relations among characters and readers as instances of reading other minds.¹⁰⁷ The problem is not that the descriptions are wrong but that they are conceptually thin. One tires quickly of analytic summary that bears on no larger conceptual claim. Darwin points toward the investigative economy that produces that sense of ennui. “How odd it is that anyone should not see that all observation must be for or against some view if it is to be of any service!”¹⁰⁸ Operating at the purely descriptive level, a critic is often tempted to dress up truisms in pseudo-technical terminology and announce the result as an Advance of Science. This procedure provides employment for the needy but contributes little to the productive intellectual economy.

SLINGERLAND’S exposition gives the impression of a conceptual double exposure. He declares that evolutionary theory provides “a powerful new explanatory framework” for literary study but then says that adopting that framework might not have any very dramatic effect “on the day-to-day work of most literary scholars.” Like CREWS, he suggests that many scholars make a perfunctory bow to postmodern theory and then go sensibly about their daily business, contentedly ignoring the disconnection between their explicit theoretical commitments and the ideas implicit in their mundane scholarly operations. Such scholars share assumptions about “important commonalities in human nature” even when “they deny these commonalities in their rhetorical and theoretical posturing.” SLINGERLAND offers this endemic intellectual incoherence as a source of reassurance to colleagues who might be alarmed at the monolithic character of his “vertically integrated model.” Most scholars are not intellectually integrated anyway, he suggests, so a change of theory at the highest levels would not much affect them. One thinks of peasants in remote villages hearing of a dynastic revolution in a far-off capital. The cow must still be milked, and the Emperor is just the Emperor, whether his name is Sung or Chang.

SLINGERLAND himself is undecided about just how much integration is involved in his vertically integrated model. Taking as illustration the case of a colleague whose subject is the production of official poetry anthologies, he presents two separate and incompatible versions of the way changes in basic theory would affect her work. He himself is evidently unaware that these two versions are incompatible, so I shall ascribe the versions to two separate SLINGERLANDS—intellectual alter egos. One version derives from the SLINGERLAND who believes in the explanatory power of the vertically integrated model. The other version derives from the SLINGERLAND who shares in the peasants' indifference to changes of theoretical dynasty. The first SLINGERLAND lucidly describes the way vertical integration would affect his colleague's basic assumptions:

The typical Foucaultian framework we all imbibed in graduate school encourages her to see her work as documenting the manner in which aesthetics is primarily driven by politics and power, with "beauty" revealed as no more than culturally-specific construction. An evolutionary framework might lead her to focus more on coalition-formation, prosociality, and aesthetic forms as in-group markers—an important advance over Foucault.

So far, so good. Then, though, the other SLINGERLAND picks up the camera and takes a second shot from a different perspective. Ninety percent of his colleague's work, he argues, proceeds at a level of mundane particularity that would be little affected by wider theoretical commitments. "Familiarity with the literature on coalition-formation and prosociality is not going to tell my colleague anything about the specific aesthetic choices made by competing factions of poets." In the first camera shot, conceptions of "beauty" are closely linked with alternative, competing theories of psychology and social organization. In the second shot, "specifically aesthetic choices" operate independently of causal theories about the nature of beauty. Double exposure. I think the first exposure gives the truer picture. Insofar as the second exposure corresponds to his colleague's actual practice, the disjunction between theory and practical criticism constitutes a form of intellectual mediocrity. Incoherence should not be a cause for reassurance. It is a problem that needs to be corrected.

Both SLINGERLAND and HOGAN acknowledge the authority of "science" in general but nonetheless affirm the relative "autonomy" of culture. This is a diplomatic solution that sacrifices coherence for the purpose of pleasing two masters—the belief in material causality that dominates the sciences, and the cultural constructivism that dominates the humanities. To accomplish their diplomatic maneuver, both HOGAN and SLINGERLAND (the second SLINGERLAND)

restrict causal constraint to the level of physics. HOGAN says that the ideological uses of a play “cannot violate the laws of physics. That does not mean that physics contributes significantly to explaining the ideological uses of the play.” The right question to ask, of course, is not whether physics contributes significantly to the ideological uses of the play but whether evolved human psychology contributes significantly to the ideological uses of the play. And the answer is yes, it does. In parallel with HOGAN, SLINGERLAND argues that for the study of literature, often, “evolutionary psychology is only marginally more relevant than quantum mechanics.” Claims of this character suggest that a theorist has never seriously considered the way every aspect of producing and consuming literature is necessarily constrained by evolved features of the human mind. Even when we look aside from social context, “aesthetic choices,” the specific topic to which SLINGERLAND refers, cannot be discussed without considering formal literary structures that activate evolved psychological mechanisms: perceptual, cognitive, and affective. When one discusses aesthetic choices made at “the intersection of poetics and political patronage,” the aesthetic choices are almost certainly going to be involved with precisely those issues of social power to which Foucauldian theory draws attention. As SLINGERLAND himself acknowledges, evolutionary psychology and Foucauldian theory offer radically different conceptions of social power.

Like SLINGERLAND, BLAKEY VERMEULE rejects the epistemic claims of postmodern literary theories but wonders whether “clearing them away in favor of science will really make a difference to what English departments do.” She offers two reasons for thinking the answer to this question might be no. She does not herself seem clearly to distinguish between the two reasons, but they are not compatible with one another, and each separately reflects thinking in a transitional or incomplete state. The first reason is that literary study is not primarily concerned with advancing knowledge. It is concerned instead with “aesthetic power—the love and appreciation of great art.” The second reason is that while literary scholars are, after all, concerned with advancing knowledge, evolutionary theory might have no bearing on the kind of knowledge with which they are occupied. In her first reason, VERMEULE concurs with SEAMON in simply inverting GOTTSCHALL’S polarized notion of the appropriate goal of literary study. In her second reason—concurring with CREWS, JACKSON, SLINGERLAND, and HOGAN—she supposes that literary study takes place at a level of particularity so remote from the governance of general theory that for all practical purposes it might as well be an independent and autonomous republic, with its own internal constitution, occupied with its own particular, local affairs.

VERMEULE'S theoretical commitments seem to be anchored in two chief intuitive convictions: a conviction about the importance of emotional responsiveness in literary study, and a conviction about the importance of the individual identity of authors—their specific intentions, their distinctive characteristics of mind and personality, and their specific imaginative affiliations. I am myself in sympathy with these two convictions but think it possible to include them within an encompassing evolutionary perspective. VERMEULE'S own perspective seems to hang ambiguously suspended between traditional humanism and poststructuralism. She is impatient with the “silly statements” poststructuralists are wont to make, but she also formulates a rationale for poststructuralism that accords with her own sense that emotional responsiveness is the ultimate rationale for literary study. “Theory has taken hold in the humanities departments because it is (or was) a branch of theology, not science. Its explanatory aims are finally subordinate to its emotive ones.” In this usage, “Theory” is shorthand for “poststructuralist literary and cultural theory.” The shorthand usage—abbreviating “poststructuralist theory” as “theory” *tout court*—is a common poststructuralist idiom. As used by poststructuralists, the idiom implies the ultimate, all-encompassing character of poststructuralist epistemic claims. No other form of theory, we are to understand, is quite sufficiently theoretical to count as Theory. VERMEULE'S use of this idiom tacitly differs from that of committed poststructuralists, but it is nonetheless symptomatic and revealing. In formulating her own purposes vis à vis “theory,” VERMEULE seems not quite consciously to identify poststructuralist theory with all theoretical formulation. Poststructuralist theory is both anti-rationalist and anti-individualist. In deprecating knowledge or “explanation” as a goal for literary study, VERMEULE thus affiliates herself with “Theory,” but in affirming individualism, she leaves “Theory” behind. “When you strip out theory, the question of what an author intended is still, even now, at the core of the organized and professional study of literature.” From an evolutionary perspective, there is no need to strip out theory. In rejecting Theory, we need not leave theory behind. Emotional responsiveness is not antithetical to explanation, and evolutionary theory is not inherently inimical to individual identity. An evolutionary perspective encompasses emotion and individual identity and locates both in the larger context of human life history theory.

2.5. The Interpretive Power of Literary Darwinism

CREWS gives a good summary of my argument for how life history theory can be used in interpretive criticism. “Starting from the expected ‘life history’ concerns of gendered authors, characters, and readers,” the Darwinian critic “possesses an

objective, analytic baseline for showing how a given work exemplifies, challenges, or complicates the norm.” SWIRSKI and ESLINGER give similar accounts, and SWIRSKI uses the same metaphor of the “baseline.” Offering a different metaphor for the same idea, MURRAY SMITH notes that in an evolutionary model “the universal level” constrains the cultural and individual levels “by limning the universal ‘pressure points’ underpinning the drama.”

What sort of norm or baseline does a Darwinian perspective provide? According to SEAMON, the Darwinian vision could never compete effectively with Freudian psychodramatics or Marxist *Sturm und Drang*. “As an interpretation of life,” he declares, the Darwinian vision “is dull and empty of meaning.” For MALLORY-KANI AND WOMACK, the problem is not so much that Darwinism is dull as that it is brutal. They quote Darwin’s observation that among human groups “extinction follows chiefly from the competition of tribe with tribe, and race with race.” GOODHEART, in contrast, complains that “in Carroll’s benign paradigm of evolutionary psychology,” he can find “not a word” on “the nihilistic, genocidal propensities of tribes and nations.” For SEAMON, then, literary Darwinism is empty; for MALLORY-KANI AND WOMACK, it is genocidal; and for GOODHEART it is not nearly nihilistic and genocidal enough. The blind men have gone to see the elephant, have each touched some part of it, and have delivered their partial reports. What does the whole beast look like?

In the target article, I outline a model of human nature and suggest the kinds of themes and affects Darwinian critics are likely to look for. MICHELSON quotes a key passage in which I affirm that the governing terms in an evolutionary critique are “the urgent needs and driving forces in life—survival, reproduction, kinship, social affiliation, dominance, aggression, and the needs of the imagination. Physical realities and the rhythms of the life cycle shape the analytic categories through which Darwinians make sense of literary depictions.” These are substantive themes, but they converge with an important formal principle. I argue that “the logic of natural selection has shaped human dispositions in such a way that all intimate relations involve conflict. . . . The workings of inclusive fitness . . . guarantee a perpetual drama in which intimacy and opposition, cooperation and conflict, are inextricably bound together.”

GEOFFREY HAPHAM suggests that conflict arises in human affairs through the fall into consciousness—a Darwinian version of original sin. Self-consciousness does in truth introduce a range of crucial themes in human life, but conflict goes deeper than any specifically human experience. It is integral to the whole Darwinian conception of natural relations. This observation has a wide bearing on

the formal structure of dramatic depictions. All dramatic relations that end in perfect harmony necessarily repress the recognition of unresolved conflicts. Even so, life is more or less adaptively functional. Important local resolutions do in fact take place. A naturalistic perspective on human affairs would thus have good reason to be skeptical of any purely nihilistic vision of human life.

In applying the principle of inevitable conflicts, Darwinian criticism would converge with the “hermeneutics of suspicion” that characterize poststructuralist thought, but with a major difference. From the poststructuralist perspective, the norm against which all historical and actual power relations are measured is a norm of universal cooperative behavior—a world that is free of competing interests, and free of conflict. This utopian norm is a world in which “power,” the differential exercise of force in social relations, no longer exists. Measured against this utopian norm, all historical and actual exercises of power are necessarily forms of gratuitous oppression. From a Darwinian perspective, in contrast, conflicting interests are an endemic and ineradicable feature of human social interaction. A Darwinian critic would thus not be disposed to evaluate historical structures of power relative to the norm of an imaginary world in which power does not exist.

To give just one example of how these abstract principles can be brought to bear on interpretive problems, I shall quote here the final paragraph from a forthcoming essay on *Wuthering Heights*:

Wuthering Heights operates at a high level of tension between the motives that organize human life into an adaptively functional system and impulses of revolt against that system. In Brontë’s imagination, revolt flames out with the greater intensity and leaves the more vivid impression. Even so, by allowing the norms of romantic comedy to shape her plot, she tacitly acknowledges her own dependence on the structure of human life history. She envisions her characters in the trajectory of their whole lives. The characters are passionate and highly individualized, but life passes quickly, death is frequent, and individuals are rapidly re-absorbed within the reproductive cycle. Catherine and Heathcliff seem to break out of that cycle, but in the end, they are only ghosts—elegiac shadows cast by pain and grief. Investing those shadows with autonomous life enables Brontë to gratify the impulse of revolt while also satisfying a need to sacralize the objects of elegy. That improvised resolution points toward no ultimate metaphysical reconciliation, no ethical norm, no transcendent aesthetic integration, and no utopian ideal. Brontë’s figurations resonate with readers because she so powerfully evokes unresolved discords within the adaptively functional system in which we live.

(“The Cuckoo’s History”)

Delineating essential elements in a Darwinian critical perspective, TIM HORVATH rightly foregrounds the dual emphasis on elemental passions and endemic conflict. He notes that “Darwinism insists on a universe teeming with conflict on a

variety of levels, more interesting and variegated than either those of tooth-and-claw caricature or those of Dr. Freud.” The specific examples HORVATH mentions are parent-offspring conflict, sibling rivalry, and male-female interaction—the “continuous dance of attraction and rejection, admiration and hostility.” In striking contrast to this perceptive delineation, GOODHEART suggests that the theory outlined in the target article is geared toward “a person in the bourgeois comfort of her home.” Given the strong emphasis Darwinism places on ineradicable conflicts, this characterization of the moral and aesthetic quality of the theory seems particularly random and gratuitous.

CREWS quotes the passage in which I say that Darwinians “can identify the biological forces that are invoked or repressed in any given work and can assess how those forces impinge on meaning.” CREWS bristles at the use of the word “repression” and issues an invitation to explain what I mean by it. When CREWS describes “an objective analytic baseline for showing how a given work exemplifies, challenges, or complicates the norm,” he has already pointed toward the answer I shall give. His invitation offers an opportunity for expanding on that simple formulation.

CREWS cites research that brings the specifically Freudian concept of repression into grave doubt. In the article CREWS references, Yacov Rofé notes that the specifically psychoanalytic concept of repression involves “*pathogenic effects* on the individual’s psychological and physical functioning, preventing both an accurate perception of reality that is necessary for adequate coping and a discharge of harmful tension” (63). CREWS has now for decades been almost obsessively preoccupied with discrediting the Freudian notions to which he himself once subscribed, so it is understandable that he would have seized upon a single word with possible Freudian associations and would have located it, inappropriately, in a Freudian theoretical context. I have myself never subscribed to a Freudian conception of human mental architecture. The word “repressed,” as I use it, has no specifically Freudian meaning. A glance into any standard dictionary will confirm that Freud did not invent this word and that psychoanalysis does not currently have an exclusive claim on its denotation. In the common language, “repression” means only to keep under control, to suppress, quell, or to put down by force. In the context in which I use it, the most pertinent meaning is that people commonly filter information about the world and about themselves, often eliminating or distorting evidence that does not accord with their own preconceptions, preoccupations, or desires.

As Rofé notes, repressing information need not be traumatic. Quite the contrary, avoiding unpleasant realities often serves the needs of mental health—of self-confidence and well being. Having an accurate view of reality and of one's self also has adaptive utility, though, and the need for accuracy often conflicts with the need for distorting information in comforting ways. In a book delineating a biological conception of the unconscious parts of the mind, Timothy Wilson observes that “the conflict between the need to be accurate and the need to feel good about ourselves is one of the major battlegrounds of the self” (39).¹⁰⁹ Information that is repressed—avoided, ignored, suppressed, or distorted—does not have to enter into any personal subconscious repository, where it supposedly festers as neurosis. It can simply disappear, or it can hover on the margins of consciousness, vaguely threatening, occupying a liminal sphere of latent consciousness, and thus exercising pressure against imaginative constructs from which it has been excluded. It can make itself felt not through neurotic symptoms emerging out of a personal subconscious but aesthetically, through the sense of incompleteness or falsity in an imaginative construct.

If death is absent from a given author's work, or if sexuality is envisioned only in conventional terms of domestic sentiment, those are significant critical facts. If a homosexual author feels constrained to disguise homosexual dispositions by transposing them into depictions of heterosexual relations—as Pater, Forster, Wilde, Cather, Proust, and Maugham do—that transposition crucially affects the imaginative character of the author's works. When a whole culture enforces a public norm of selfless altruism, we can be virtually certain that depictions according with that norm will produce sensations of false and forced sentiment, and we shall be alert to ironic and satiric evasions of that false norm. If an author tells us that some couple “lived happily ever after,” we can reasonably suppose that in this particular depiction some significant portion of life—some frustration, antagonism, endurance, tolerance, and ennui—has been repressed in favor of a generic convention designed to produce facile satisfaction. Most generally, for literary purposes, when we examine any author in a critical, interpretive way, we probe the limits of that author's imaginative universe. We inquire closely into how the author filters information, forming plots and characters that conform to the author's own emotional needs, the norms of the culture to which the author belongs, and to the generic conventions within which the author is working.

CREWS, GOODHEART, and MALLORY-KANI AND WOMACK suggest limitations on the kinds of literature that can be effectively incorporated within a Darwinian perspective. GOODHEART fancies that *King Lear*, *Gulliver's Travels*, and *The*

Metamorphosis fall outside the reach of a Darwinian vision. He thus somehow supposes that “this view of life” leaves out of account the possibility of tragic family discord, misanthropic alienation, and sudden catastrophic transformations. GOODHEART also continues to flail away at Steven Pinker’s critical perspective on modernism. Pinker is a cognitive psychologist and a lucid expositor in fields over which he has primary expertise. As a literary critic, he is at best an amateur. He has no specifically literary training and displays a fairly limited range of literary taste. If readers care to see what a capable literary Darwinist can do with modernist texts, they could read BRIAN BOYD on *Lolita* or on *Maus*—both of which essays are referenced in the target article. They could also read JUDITH SAUNDERS’ response to the target article, a response in which she draws on a rich familiarity with modernist poetry.

In his selection of texts that he fancies might present a particular challenge to literary Darwinism, CREWS also mentions Swift and gives an emphasis to modernist, imagist, and surrealist poetry and to modern political allegories such as *Rhinoceros* and *Animal Farm*. Are the themes and affects evoked in these works alien to human life history? For instance, does the evolved social psychology of dominance and cooperation offer no access to the political allegory of *Animal Farm*? Is the psychopathology of filial relations in “Daddy” immune to rapidly advancing knowledge on the neurochemistry and phenomenology of affective disorders? Does Stevens’ juxtaposition of “concupiscent curds” and the “horny feet” of an old dead woman offer no suggestions for the aesthetics of naturalism? “In a Station of the Metro” offers a pleasurable shock to one of our deepest innate cognitive dispositions—facial recognition. Babies recognize faces, distinguishing them from the surrounding sensorium, before they recognize almost anything else. By blending that category with a natural lyric image, “Petals on a wet, black bough,” Pound transfigures the social crowd and the urban, underground scene. This imagistic legerdemain produces the effect of an epiphanic moment of benignity and poise—most unusual for Pound, and signaled, as a moment of grace, by the word “Apparitions.” The objects of nature take on the intimate familiarity of human faces, and human faces, often so unlovely, take on the freshness of vividly perceived objects in nature. The two-line poem is a single perceptual metaphor, and that metaphor is itself the constitutive imaginative reality of the poem—not either image alone, but the two in combination approximating verbally to a specific perceptual event. As in all good lyric poetry, the verbal construct is the effective medium for the realization of a distinct and richly realized affect. The minimalism

of the style is not just an arbitrary convention or a literary trick; it is a particularly condensed instance of a large general principle of efficiency in cognitive economy. Often in the arts and sometimes also in the sciences, theorists and critics designate this principle with the term “elegance.” Pound’s minimalist aesthetic economy is rooted in evolved cognitive dispositions that are the effective source of the Haiku conventions within which Pound is working. The impression made by the poem is crystal clear both in sensation and affect. Though its subject is slight, it stays in the mind as a touchstone for a kind of cognitive, affective, and linguistic integration that is an essential principle of aesthetic value.

Both CREWS and GOODHEART are hoping to find a range of cognitive processes, motives, and emotions that escape “this view of life.” They will look in vain. Darwin begins with a few forms of life or one, billions of years in the past, and traces an unbroken chain through the origin of species, the descent of man, and the expression of emotion in man and animals. Speaking of the contemporary writer’s search for novelty in subjects and manner, HORVATH observes that “no matter how outlandish the situations, no matter how oblique or experimental or allusive the prose gets, some connection remains in it to basic underlying human wants, needs, and motivations.”

The small band of literary Darwinists thus far has contained more people interested in narrative than in lyric poetry, but Easterlin has worked on Wordsworth’s poetry; GOTTSCHALL’s book on Homer is, after all, a book about epic poems; and the Darwinians collectively have written more on Shakespeare than on any other author. In his summation for the prosecution, CREWS includes an indictment that “Carroll draws instances from the most congenial texts he can find, avoiding the harder cases that might test his ambitious claims.” The argument for the defense, then, could reasonably contain a quotation from the introduction to my critique of *The Picture of Dorian Gray*:

Oscar Wilde’s *The Picture of Dorian Gray* offers two special challenges to Darwinian criticism. First, the novel is saturated with homoerotic sexual feeling, and it thus defies any simple reading in terms of behavior oriented to reproductive success. Second, the central conflicts in the novel involve two competing visions of human nature, and in their conceptual structure neither of those visions corresponds very closely to the quasi-Darwinian conceptual structure implicit in most realist and naturalist fiction. One vision derives from the aestheticist doctrines of Walter Pater, and the other from a traditional Christian conception of the soul. . . . If Darwinian psychology gives a true account of human nature, including its homoerotic variations and the affective and ethical dimensions of religious beliefs, it can explain the meaning structure of *Dorian Gray*.

(“Aestheticism” 287-88)

MALLORY-KANI AND WOMACK bring forward the topics of post-colonial, feminist, and homosexual literature. With respect to homosexuality, they remark, “By depending on heterosexual procreation, natural selection and its ancillary theories seemingly exclude individuals who are ‘other’ to the dominant norm.” Not so. They say they have not yet run across an effective Darwinian reading of a post-colonial or feminist text, and they ask, “Can it be done?” It not only can be done; it most certainly will be done, and soon.

Trying to identify kinds of literature inaccessible to literary Darwinism is a reckless strategy. As the number of scholars adopting Darwinian ideas increases, the range of specialist expertise in periods and genres will inevitably expand. Critics interested in lyric poetry will probably find a special challenge, and thus a potentially large reward, in isolating cognitive mechanisms that are particularly useful for understanding fine verbal effects—for instance, the distinction between semantic and episodic memory, the interactions between cognitive processing in the forebrain and deep emotional memories activated in the limbic system, the microsecond timing in the processing of complex cognitions, the blending of “domains” from different knowledge areas, and the interaction between “foregrounding” and habituation (a topic with which DAVID MIALL is particularly concerned). Theory of Mind, “perspective taking,” and empathy are all aspects of one of the most rapidly advancing areas of research in cognitive and developmental psychology. That research extends into political dynamics on one side—with important large-scale applications to the structure of drama and fiction—and it extends on another side into the interplay of point of view, useful, obviously, in the analysis of narrative, but useful also for the interplay of perspectives evoked in the allusive features of lyric poetry. Close analysis at this level can and ultimately will be united with large-scale cultural analysis that advances our understanding of modernism and of all such epochal shifts in manner and world view.

3. The Adaptive Function of Literature and the Other Arts

In observing that the literary Darwinists “seem particularly fixated on the issue of the adaptive value of literature and the arts,” GORDON BURGHARDT is clearly correct. BOYD, EIBL AND MELLMANN, FOY AND GERRIG, GRODAL, SALMON, SCALISE SUGIYAMA, SAUNDERS, D. L. SMITH, and STOREY all make it their chief topic; and DISSANAYAKE, ESLINGER, GOTTSCHALL, HARPHAM, JACKSON, JANNIDIS, MIALL, SALMON, MURRAY SMITH, and SWIRSKI also take it up. In suggesting that the literary Darwinists have exaggerated the significance of this issue, BURGHARDT is, I think, mistaken. Other animals have adaptations for cooperative endeavor in social groups with specialized functions and status hierarchies. Other animals engage in play, produce

technology, and share information. Humans alone spontaneously produce imaginative artifacts designed to depict reality, express their individual characters, evoke the subjective quality of experience, and delineate through symbols the principal structural elements in their affective and cognitive order. Producing art is arguably the single most distinctive feature in the specifically human cognitive and behavioral repertory. The arts offer a main avenue for understanding human nature, and no understanding of human nature that leaves out the arts could possibly give an adequate account of its subject.

In various publications, BRIAN BOYD has made a sustained effort to develop a theory of the adaptive function of the arts, and in his response to the target article he issues a broad challenge to the collective theoretical effort with which I associate my own views. After reflecting on BOYD'S critique, below, I give an exposition of the central idea in this collective theoretical effort—the idea that literature functions adaptively by influencing our subjective sense of the world. Questions of adaptive function have been plagued by confusions over definitions, with aspects of definitions sometimes standing in the place of substantive propositions about adaptive function. Several of the responses offer an occasion for a brief overview of these problems. In my own theory of adaptive function, the idea of an “instinct” for art holds a prominent place. Several respondents speak to that issue. “Instinct” naturally associates itself with the problem of pleasure and pain as motivating mechanisms in the production and consumption of art. I link that issue with the issue of aesthetic value judgments. Several theorists have given a primary emphasis to the idea of art as a didactic medium—the topic of “Coming to Grips with Reality.” E. O. Wilson is a seminal contributor to the idea that literature functions adaptively by influencing our subjective sense of the world. In “Magic?” I assess D. L. SMITH'S critique of Wilson'S hypothesis. In the final section, on falsification, I consider ways we might advance beyond speculative debates on the adaptive function of the arts.

3.1. BOYD'S Theory

BOYD declares that I have not given an accurate account of his theory of the adaptive function of the arts. Since my report of his views consists largely of quotations from his own work, it seems unlikely that the report is seriously inaccurate. BOYD'S efforts to delineate the adaptive function of literature and the other arts include several conceptual elements. In the target essay, I observe that he “delineates several cognitive and behavioral components that enter into the production and consumption of art: enhanced pattern recognition, pretend play, shared attention, heightened sociality, social attunement, narrative, fiction, Theory of Mind, and

metarepresentation.” In his response, BOYD reiterates the items stipulated in this list and makes yet another effort to put them together in a coherent fashion.

In the target article, I single out the three adaptive targets BOYD has previously proposed for the arts. I quote his claim that “an explanation of art and fiction in terms of shared attention can account for both origin and function” (“Evolutionary” 170). I also note that “he further appeals to the power of art in stimulating general creativity.” And finally, I note that, like DISSANAYAKE and other theorists, BOYD emphasizes the idea that the arts subserve the purposes of social cohesion. In one of his most succinct formulations, he brings all three of these putative adaptive functions into play: “Art is an adaptation whose functions are *shaping and sharing attention*, and, arising from that, fostering *social cohesion and creativity*” (151).

BOYD and I both designate a relation between art and cognitive flexibility. We differ in the way we envision that relation. BOYD argues that art evolved as a stimulant to the general powers of creativity, which in some writings he identifies as the main adaptive target. In an essay of 2007, for instance (referenced also in his response), he summarizes the arguments on adaptive function from his forthcoming book. There are, he says, “two core arguments”:

First [art] serves as a stimulus and training for a flexible mind as play does for the body and physical behaviour. It secures attention by appealing to human cognitive preferences, especially for pattern, and thereby fine-tunes minds repeatedly engaged in such play. All art’s other functions lead *from* this. Second, art becomes a system for engendering creativity, for producing options not confined by the here and now or the immediate and given. All other functions lead *up* to this.” (“Artistic” 17)

This formulation is relatively clear and definite. Art originates in cognitive play and engenders creativity. Creativity is the adaptive target. It is not altogether clear to me what distinction is intended between play and creativity. Training for “a flexible mind” is included in the play activity that functions “lead *from*,” and it is hard to distinguish that activity from the creativity that all other functions “lead *up* to.” In any case, in this theory, achieving flexibility and creativity are both somehow involved. If BOYD is claiming that cognitive flexibility is an adaptive target in human evolution, we concur. In my view and that of various other theorists, art subserves flexibility by affecting the way the mind transforms elemental dispositions (“instincts”) into complex and variable behavior.

3.2. Game Plans and Master Narratives

BOYD makes a plausible conjecture that play and expressive vocalization in other animals are evolutionary precursors for certain aspects of human art. BURGHARDT

also stresses continuities between animal and human cognition. The continuities are real and important, but they should not blind us to the specifically human character of human cognitive architecture. That architecture evidently contains a functional structure—an interface between instinctive impulse and behavior—that other species do not possess or that in other species is not developed to the same degree. The traditional term for this cognitive interface is “the imagination.” D. L. SMITH cites several standard definitions for the imagination, and he observes that “prior to the evolution of the capacity for imagination, our ancestors’ minds must have been as rigidly bound to the deliverances of their sense organs as the minds of nonhuman primates are today.” This seems like a reasonable formulation. So far as we know, no other animal spontaneously produces imaginative artifacts that contain emotionally saturated images of the world. Bower birds build patterned displays that resemble abstract art, but, so far as we know, these bowers do not constitute symbols reflecting the inner imaginative life of the birds who fashion them. The bowers serve an instrumental purpose as fitness displays for the purposes of sexual selection. They are in this respect like the peacock’s tail. As artifacts outside the actual body of the animal, they are instances of what Richard Dawkins calls an “extended phenotype.” The pattern of behaviors surrounding the instrumental purpose of the bowers is rigidly prescribed by the genotype of the species. The adaptive cognitive system dedicated to producing bowers is thus, in Ernst Mayr’s terms, “closed,” not “open” (23). The bowers do not exercise an imaginative power that transforms the bird’s conception of itself and its world.

I think I can put my finger on the chief reason BOYD has trouble understanding the adaptive hypothesis formulated in the target article. I argue that the emotionally saturated images of literature feed into the interface between instincts and behavior. In his reply, BOYD misconstrues my notion of how these images work to influence human behavior. He evidently supposes that when I speak of imaginative verbal constructs I am thinking of specific tactical plans like that of Odysseus trying to escape from the Cyclops’ cave. The idea to which he is responding, and that he confuses with my idea, is that literature provides us with a set of model behaviors, like model chess games. According to this idea, when we are faced with a situation requiring a choice among alternative strategies, we would consult our library of game plans, quickly thumbing through relevant plot lines, and select a course of action that would enable us to achieve our goals. DAVID MIALL also mistakenly conflates my propositions with this idea. As I note in the target essay, this hypothesis for the adaptive function of fictional narratives has been advanced by various theorists, most prominently by Steven Pinker. It appears also in SCALISE

SUGIYAMA's declaration, in her response to the target article, that "narrative is planning." When I speak of the adaptive function of imaginative verbal artifacts, it is not this sort of game-planning for specific practical goals that I have in mind. Literature influences our concepts, values, and feelings in a much more basic way.

By providing emotionally saturated images of the world and of our place in the world, literature works through the imagination to regulate our motivational systems. All our local, practical game-planning takes place within a structure of feelings and values that constitute our individual identities. Literature is one of the chief cultural media that influence our feelings and values. The contrast between basic values and local game-planning can be likened to the difference between the head of a government and a junior military officer operating in the field. The head of a government is responsible for the broadest policies affecting international relations, including policies of war and peace. The junior officer is responsible for executing small-scale operations such as conducting a patrol or leading a platoon. SWIRSKI makes the right distinction in contending that literary scenarios "should not be understood literally as a context-specific database of action scenarios but rather a contingent library of behavioural attitudes, emotions, and disposition."

I doubt that our small-scale practical plans are usually determined in any very direct way by our experience of art. Occasionally, someone might say to himself or herself, "I'd like to commit suicide today. Shall I take arsenic, like Emma Bovary, or jump under a train, like Anna Karenina?" (Presumably, this choice of an example would be congenial to FOY AND GERRIG.) Usually, though, art works at a level much more fundamental than that of offering practical guidelines for achieving specific practical goals. Art works through the imagination, shaping our feelings and values, our sense of our own identities and the nature of the world. When we make practical choices—the arsenic or the train—those choices take place within a context of motivation and feeling informed by art. When Hamlet asks, "To be or not to be?" he is posing a question on the level of basic motivation—a broad policy issue. Whether to use a bare bodkin, though, is a more simply practical question—an issue of small-scale tactics. In some of his formulations, BOYD also seems to envision art working on the imagination at a level of basic motivations. For instance, he argues that "the play of art" strengthens neural pathways "in the patterns that matter most to us—especially, in story, patterns of agency and action."

In an essay on the changing conditions of life for African Americans, the essayist and novelist Charles Johnson designates a psychological function for

narrative. When I say that we live in the imagination, I mean something very close to what Johnson has in mind:

A good story always has a meaning (and sometimes layers of meaning); it also has an epistemological mission: namely, to show us something. It is an effort to make the best sense we can of the human experience, and I believe that we base our lives, actions, and judgments as often on the stories we tell ourselves about ourselves (even when they are less than empirically sound or verifiable) as we do on the severe rigor of reason. (33)

Johnson is speaking of stories on the level of master narratives, specifically here the historical narrative of African American experience from the landing of the first slave ships, through Emancipation and Civil Rights, to the present era. A story on this level is not about specific game plans for achieving local goals. It works “quietly in the background of every conversation we have about black people, even when it is not fully articulated or expressed” (33). This particular story has a historical basis, but, as Johnson makes clear, it becomes effective for the imagination only by being shaped into a dramatic narrative, with protagonists, conflicts, and a plot charged with emotional tension. The imaginative structure of the master narrative is constituted and constantly reinforced by more particular narratives—by memoirs, novels, plays, the rhetoric of ministers and politicians, and by the stories individuals tell of their experiences.

3.3. Questions of Definition

ROBERT STOREY remarks that he has difficulty in describing a definition of art and literature in the target essay. Perhaps he has overlooked these formulations: “We can define art as the disposition for creating artifacts that are emotionally charged and aesthetically shaped in such a way that they evoke or depict subjective, qualitative sensations, images, or ideas. Literature, specifically, produces subjectively modulated images of the world and of our experience in the world.” These definitions include the idea of formal aesthetic order. When DISSANAYAKE speaks of “making special” or “artification,” the actual content of these terms consists in various kinds of formal organization: “formalization, repetition, exaggeration, elaboration, and manipulation of expectation.” (In his emphasis on “pattern,” as in his emphasis on social cohesion, BOYD follows DISSANAYAKE.) Aesthetic organization is integral to most definitions of literary art, but it is not sufficient in itself to account for the kind of psychological work art performs for us.

As a comprehensive definition of art, “making special” tends toward tautology, thus: *art consists in objects or activities that have been made special; making special consists in shaping aesthetically*. The predicate is implicitly contained within the subject: *art consists in aesthetic objects or activities; aesthetic*

objects or activities are objects or activities that have aesthetic features. To use formal organization effectively in a concept of art, we need to provide a predicate for aesthetic objects or activities, and that predicate should not simply reiterate the idea of the aesthetic. A conceptually useful proposition would take the following transitive form: “Aesthetic objects perform psychological function X.” BOYD, DISSANAYAKE, and other theorists have proposed to fill in the X with the term “social cohesion.” BOYD posits “creativity” as a second kind of X, but “creativity,” like “making special,” tends toward tautology: “Creative activities fulfill the psychological function of producing creativity.” The idea that art subserves social cohesion is at least not tautological, and it has considerable explanatory value. In some contexts, art contributes to social cohesion. In other contexts, though, literature contributes to social subversion, so social cohesion cannot serve as an all-encompassing term for the adaptive function of art. In any case, social cohesion and social subversion both leave out of account the way art influences the imagination for purposes that are not specifically or particularly social.

MURRAY SMITH cites a formulation in the target article in which I affirm that literature “provides points of reference within which humans adjust their sense of the relative value and significance of things.” SMITH asks, “Doesn’t ideology serve this function too? Indeed, don’t all cultural phenomena serve this orientational and motivational function to some degree?” Yes, they do. In the target article, I define “culture” as information that is transmitted “in non-genetic ways” and give a list of practices that fall under this definition: “arts, technologies, literature, myths, religions, ideologies, philosophies, and science.” These various practices of culture, I argue, organize the innate dispositions of human nature “into systems that regulate public behavior and inform private thoughts.” Literature and the other arts operate in close alliance with religions, ideologies, and philosophies, but the arts have their own special ways of working, and they fulfill their own special parts in the general functions of culture. “Ideologies” are systems of belief and value that most particularly concern social and political practices. Art often has an ideological dimension, and ideologies often make use of art, but the two categories should not be collapsed into one another. From a Marxist or Foucauldian perspective, art is always contained within ideology; ideology is the broadest possible category. In the formulations I put forward in the target article, in contrast, the concept of art is broader than ideology. Art speaks both to our public selves and to our inmost private identities. It informs not just our political values but also our internal conflicts and concerns, our most intimate personal relations, our sense of the natural world, and our sense of any spiritual dimension we might suppose to exist.

MURRAY SMITH suggests that a comprehensive account of the function of art should include the ideas of play and creativity emphasized by BOYD. I agree, but I would include this aspect of art—along with the aspect of formal organization—in the definition of art itself; I would not make it part of the adaptive target. (As already noted, play is common to animals, and art is not.) Art is that kind of cultural practice that uses creative play and formal aesthetic organization to fashion imaginative structures that include our vision of the world and our place in the world. It incorporates elements of science, technology, and philosophy, but it operates subjectively and affectively in ways that science and philosophy do not, and it is not strongly constrained by specifically scientific or philosophical criteria of validity. In its appeal to values and emotion, it is like ideology, but it is broader in scope than ideology, and it contains elements of play and of aesthetic order that are not integral to ideology.

Like MURRAY SMITH, EIBL AND MELLMANN observe that “culture” in general has adaptive functions that encompass those of literature. They argue that “producing ‘meaning’ can just as well be achieved by other, non-artistic, cultural phenomena such as law texts, traffic rules, science, or morals.” Though the kind of “meaning” produced by the arts can usefully be distinguished from other sorts of cultural meaning, the claim that various cultural processes all generate “meaning” is obviously true. On the basis of this true observation, though, EIBL AND MELLMANN construct a false argument about the adaptive function of the arts. They reject the claim that the arts constitute “an adaptive response to the adaptive problem produced by the adaptive capacities of high intelligence.” In opposition to this hypothesis, they argue that the arts “have not one biologically adaptive function, but many cultural functions.” The fallacy in this line of thinking should be easy to discern. If various cultural activities are “biologically adaptive,” and if the arts are among those activities, then the arts are “biologically adaptive.” The fact that the arts are part of culture does not disconnect them from “biologically” adaptive functions.

The fallacy at work in the contrast between “biologically adaptive” activities and “cultural” activities is closely related to the fallacy that animates HOGAN’S distinction between “evolutionary” causes and “ideological” causes. In all such formulations, theorists suppress the idea of an interaction between innate dispositions and cultural conditions. In place of that interaction, they tacitly posit a factitious opposition between biology and culture, as if innate dispositions and cultural conditions were alternative and mutually exclusive causes. Since EIBL AND MELLMANN argue forcibly against any such dichotomization of biology and culture,

we can infer that their views on culture and evolution, like those of SLINGERLAND, simultaneously assume incompatible forms: (a) “biocultural” conceptions, and (b) a residual, half-conscious notion of cultural autonomy.

FOTIS JANNIDIS argues that the definition of art presented in the target essay is too broad. This argument moves in two directions. In one direction, JANNIDIS suggests that a workable definition of art would have to conceive of art as a discrete category cleanly separable from other categories, for example, from “the speeches of ancient orators, the Christian cross, advertisements, the ceremonies at baroque courts, cars, or haircuts.” In the other direction, JANNIDIS suggests that it is wrong to class together different activities or objects usually regarded as forms of art—“like pictures or sculptures, movies, and photographs, dance and music.” (EIBL AND MELLMANN make a similar point.) I am not persuaded by the arguments from either direction. The activities and objects JANNIDIS mentions all have aesthetic elements that bring them within the range of art as defined in the target article. Car manufacturers and hair “stylists” obviously aim at aesthetic effects; ancient oratory is one of the fine arts; modern advertisements are imaginative productions that contain pictorial, musical, and dramatic elements; baroque ceremonies are closely allied with tableaux; and the Christian cross is a symbol soaked in artistic affect—hence its ubiquitous use as a centerpiece of Western painting. The various particular arts have common properties that collectively distinguish them from other cultural practices—for instance, from science, philosophy, ideology, sports, and games. Art is thus sufficiently well defined to form a subject area worthy of study in its collective mass. There is of course no inherent contradiction between that kind of broad-based aesthetic study and studies aimed at delineating the features specific to one or another of the arts, narrative, say, or drama.

ELLEN DISSANAYAKE and Denis Dutton give strong demonstrations that evolutionists can usefully consider the arts in their collective mass. In her various publications, DISSANAYAKE offers rich anthropological detail supporting her view that the arts pervade the daily lives of people in all cultures. She rejects modern Western concepts of “high” art as a specialized activity reserved for elites. In *The Art Instinct*, Dutton makes no sharp theoretical distinction between high art, folk art, and popular culture, but he concentrates his own attention on the arts produced by specialized artistic elites. In most chapters, he draws illustrations from all the arts, moving without effort from the pictorial and plastic arts to music and literature. In the process, he illuminates the deep commonalities in the way all the arts fulfill basic human needs. In contrast to DISSANAYAKE and Dutton, JANNIDIS proposes that we restrict our attention to particular forms of art considered in

isolation both from one another and from the uses of everyday life. The concept of the arts implicit in this proposal is merely an artifact of an imperfect analysis. It is the reified product of a definitional procedure that has been halted in mid-career and erroneously regarded as a phenomenal reality.

As a supplement to his argument on breadth, JANNIDIS argues that “art” is a modern concept and thus not applicable to artifacts produced in earlier times. This objection is a red herring. Consider parallels with technology and with the germ theory of disease. People in a given culture might possess no abstract concept grouping their tools into a single category, but anthropologists can still usefully compare their total tool kit with the tool kits of other cultures. To treat disease effectively, a doctor need not share a patient’s belief about the nature of disease. A doctor who attributes typhus and cholera to pathogenic microorganisms can provide more effective treatment than a doctor who shares his patients’ belief that disease results from witchcraft. It should be clear that the validity of a given set of concepts does not depend on the correspondence between those concepts and concepts in other cultures. Validity depends on the correspondence between concepts and phenomenal realities.

TORBEN GRODAL argues that in seeking to identify features that are “peculiar and essential to art,” a theorist necessarily becomes entangled in an “essentialist definition.” As an alternative to essentialism, Grodal maintains that the arts “developed out of a series of adaptations that have provided behavioral flexibility.” Actually, this hypothesis accords closely with the hypothesis put forward in the target article—the idea that high intelligence and dispositions for art co-evolved as interdependent means for producing adaptive flexibility.

I think we can unravel GRODAL’S reasons for supposing that his own hypothesis on adaptive function stands in contrast to the hypothesis in the target article. He makes two theoretical mistakes, both of which involve logical relations between two separate conceptual operations. In the first mistake, he equates two quite different conceptual operations: (a) identifying a specific adaptive problem the arts might have solved in ancestral environments; and (b) affirming that the arts consist in some one “essential” property. I identify a specific adaptive problem the arts might have solved in ancestral environments, but I do not affirm that the arts consist in some one essential property. The second mistake is to suppose that there is some incompatibility between two conceptual operations that are in reality complementary: (a) identifying an adaptive problem the arts might have solved; and (b) recognizing that the arts “developed out of a series of adaptations.” Both these latter propositions are integral with the hypothesis put forward in the target

article. GRODAL evidently supposes that if one identifies a specific adaptive problem the arts might have solved, one must necessarily believe that the arts arose at a single bound, in a grand macromutational leap, to solve that specific problem.

GRODAL's second theoretical mistake can be corrected by observing that *all* complex functional structures have “developed out of a series of adaptations.” Mating and parenting, for instance, are adaptive behaviors depending on complex functional structures—physiological, anatomical, perceptual, and cognitive. Those structures developed gradually, over evolutionary time, out of a series of adaptations. Some of the physiological and perceptual mechanisms involved in human mating and parenting originated before mammals evolved and could thus not originally have been “designed” by natural selection for specifically human forms of reproduction. To function as components in human reproduction, they had to have been “exapted” (Gould and Vrba).

The faculties and dispositions active in art include perceptual organs; motor skills; affective neural circuits; impulses of play and exploration; motive dispositions shaped by human life history; and cognitive capacities that include recognition of formal design, self-awareness, awareness of others as intentional agents, and (for the verbal arts) language. As in the case of human reproduction, some of these faculties and dispositions originate in the remotest regions of the evolutionary past, preceding even the evolution of mammals. Other elements such as Theory of Mind and language have emerged, on the scale of evolutionary time, only recently. Since some of the human characteristics prerequisite to the arts emerged only recently in evolutionary history, all the faculties and dispositions together could only recently have converged to fulfill adaptive functions specific to the arts. If the arts have any adaptive function or functions, then, ancient adaptations that originated before humans evolved have been “exapted” to fulfill those functions. In that respect, these exapted adaptations are like the human lung, which originated as a swim bladder in ancient fishes and was eventually exapted for the function of breathing on dry land. This kind of exaptive evolutionary process is nothing exceptional. It is a central structural feature in all evolutionary development.

3.4. An Instinct for Art

ROBERT STOREY makes a distinction between “instinct” and “emotion.” Humans no longer have instincts, he argues; in place of instincts they have emotions. This distinction is unsound. In humans as in other animals, behavior is ultimately prompted by emotion—by feeling states that are caused and accompanied by physiological and neurochemical changes manifesting themselves, on the

phenomenal level, as qualities of sensation. Those emotions are generated within brain structures that have been conserved over hundreds of millions of years and that have been only partially modified by the development of specifically human neural structures. In the hypothesis I am proposing for the adaptive function of literature and its oral antecedents, the imagination functions as a central cognitive processing unit that integrates basic emotions with images of ourselves and of the world we inhabit. In addition to their other arguments, both DISSANAYAKE and STOREY contend that art is a way of “finding and making ‘meaning’” (*Art and Intimacy* 74). As I note in the target article, I agree with this part of their arguments.

TONY JACKSON and MICHELLE SCALISE SUGIYAMA both have difficulty in conceiving how dispositions for art can have evolved to help regulate our motivational systems. In summarizing my argument, JACKSON supposes I envision a simple temporal sequence: high intelligence evolves, is disorganized and chaotic, and then, sometime after that, art evolves, like the Lone Ranger appearing on the horizon, to rescue the poor befuddled human species. JACKSON is skeptical of the causal evolutionary logic in this hypothesis, and the skepticism is well warranted. The hypothesis he describes is nonsensical. My own hypothesis is that higher intelligence—the capacity for making complex plans that involve abstract reasoning—co-evolved with the powers of imagination. Such co-evolutionary processes are a normal and necessary feature in the evolution of all complex systems. GRODAL and SCALISE SUGIYAMA correctly formulate the idea of a co-evolutionary relation between art and high intelligence. GRODAL argues that “activities like storytelling develop in tandem with the radical increase of intelligence and the ability to provide verbal representations to memorized or imagined scenarios.” And SCALISE SUGIYAMA observes, “Two million years is ample time for mechanisms mitigating the effects of high intelligence to co-evolve—which would be necessary if high intelligence did indeed impose severe fitness costs.” Though she grasps this basic concept, SCALISE SUGIYAMA is still puzzled. “If motivational systems must be organized by art behavior,” she asks, “what motivates humans to engage in art behavior?” The short answer appears in the title of Denis Dutton’s forthcoming book, *The Art Instinct*. Dutton argues that “the evolution of *Homo sapiens* in the past million years is not just a history of how we came to have acute color vision, a taste for sweets, and an upright gait. It is also a story of how we became a species obsessed with creating artistic experiences with which to amuse, shock, titillate, and enrapture ourselves” (from the introduction). There is no difficulty in conceiving that artistic dispositions can be prompted directly through spontaneous impulse and still function to organize other

motivational systems. Artistic behavior, like other forms of behavior, is both rooted in innate dispositions and susceptible to modulation through learning. Artists learn from other artists and absorb the traditions of their cultures, and in that sense, art is itself one of the motivational systems that art regulates. “The art instinct” does not stand outside of and apart from other motivational systems. Art interacts with other motivational systems, feeding off them, being stimulated by them, and in turn helping to regulate them.

Like Dutton, GEOFFREY HARPHAM argues that we should regard art as “an instinct.” It is, in other words, a “kind of unwilled behavior peculiar to the species” and is thus “a necessary rather than an optional feature of our behavior.” HARPHAM says that this view of art would be “far more suggestive and even accurate than the one Carroll proposes.” So far as I can tell from the formulations in HARPHAM’S response, our views on this issue are not in fact substantively different. Outside the hard-wired functions of the autonomic nervous system regulating activities such as breathing and digestion, virtually all features of human behavior are “optional” rather than “necessary.” Through the exercise of will, we can contravene our most deeply rooted and adaptively central dispositions. We can choose to abstain from sex and can even starve ourselves to death. Fulfilling adaptively central dispositions is nonetheless essential to our well being and is in that sense “necessary,” not optional. We *can* starve ourselves to death, but it is not generally advisable, and carrying it off usually requires an extreme effort in self-suppression. In this discursive context, we need not haggle over the meaning of the word “instinct.” In my view, humans have a primary, irreducible need for art. That need is a hunger, an appetite, precisely because it solves adaptive problems. We *can* do without imaginative culture, but to do so would frustrate our basic needs and stunt our personal and social development. That is the didactic lesson taught by the tale of the Gradgrind siblings in Dickens’ *Hard Times* (*Literary Darwinism* 63-68).

Art is “optional” only in the limited sense that sex and food are optional. Art feeds the imagination, and the imagination itself is not optional even in this limited sense. Hence my claim, in the target article, that “we do not have the option of living outside our own imaginative constructs.” We can imagine a child deprived of all imaginative nurture through art—raised in a laboratory say, by robots. We cannot imagine a human child, no matter how impoverished in external stimuli, who does not have some emotionally charged image of itself and the world it inhabits.

JEFFREY FOY AND RICHARD GERRIG grasp what it means to say that “we live in the imagination,” and they acknowledge that literature can enrich human experience.

Their main point, though, is that imaginative experience can involve us in dangers and excesses. This observation is clearly correct. In its liability to danger and excess, our appetite for the arts is like all our other appetites. Our appetites for sex, food, and status, for instance, have adaptive functions but can nonetheless lead us into serious difficulties—into sexually transmitted diseases, unwanted pregnancies, attack from jealous rivals and the resentment of mates, food poisoning, obesity, colon cancer, the alienation of our friends, and the lethal antagonism of our competitors. A sober understanding of evolution has nothing Panglossian about it. Life is fraught with conflict. Everything comes with a cost. And there is nothing so good that it cannot be turned to bad.

3.5 Pain, Pleasure, and Aesthetic Value

GRODAL evinces some erroneous conceptions about my ideas on the relations between pleasure, pain, and aesthetic value. He suggests that I associate pleasure with bad art and pain with good art, that I regard pleasurable fantasies as “maladaptive,” and that I regard good art, even though it causes pain, as contributing to inclusive fitness in the present. I hold none of these views.

All successful art produces some kind of pleasure. Tragedy allows us aesthetic distance from the primary anguish we would feel if we were actually participating in the tragedy we witness. Tragic art that causes pain by depicting “failure and death” also provides deep emotional satisfactions of various kinds—for instance, sensations of retributive justice, heroic defiance, or sublime renunciation, the warmth of fellowship realized in empathic grief, and epiphanic delight in the recognition of elemental forces at work in nature. Besides activating primary emotions of this sort, tragedy, like comedy, activates specifically aesthetic sensations such as the delight in finely realized literary form and in the pleasurable play of wit and imagination.

GRODAL confuses my hypothesis about the adaptive origin of the arts with a hypothesis about their current adaptiveness. He argues that we cannot know for sure how different kinds of literary or cinematic art contribute to the inclusive fitness of readers or viewers in the present. I not only agree with this observation, I would appeal to it in deprecating GRODAL’S suggestion that Milton, by promoting supernaturalism, is influencing his readers in “maladaptive” ways. Securing comfort and peace of mind by engaging in pleasurable fantasies—whether those of religion or those of pornography and romance—might well provide therapeutic advantages similar to those derived from deluding one’s self about one’s own personal merits. We can nonetheless make reasonable distinctions, like those made by SALMON and Symons, between works that primarily activate pleasurable

fantasies and works that “most fully engage organizing adaptations” (“Slash Fiction” 95). In distinguishing “great” works of literary imagination from lesser works, SALMON and Symons point to the historical evidence that only a select set of works has “survived the tests of time and translation.” Literary works attain canonical status because they have produced deep forms of satisfaction to generations of readers whose judgment has earned the respect of their peers.

From an evolutionary perspective, questions of aesthetic value, like questions of ethics, always involve the distinction between “is” and “ought.” The commonplace wisdom in evolutionary psychology is that one can never derive “ought” from “is.” True enough, but the deeper wisdom, less frequently heard, is that “is” constrains the likely boundaries of “ought.” Our common nature narrows and particularizes the range of satisfactions most of us can expect to achieve. In one of the essays in *Literary Darwinism*, bearing these considerations in mind, I formulate propositions about the epistemological character of our literary value judgments:

We cannot claim that any of our own literary judgments are objectively correct in the sense that they are grounded in some system of values independent of personal feeling, but we can nonetheless identify the basis for our judgments; we can generalize the principles on which they are founded; and we can correlate these principles with the characteristics of our evolved psychology. We cannot justify our values, but we can explain them, and those explanations are part of the total body of knowledge relevant to literary criticism. (165)

When we say that “great” literary works give us deep insight into human experience, awaken fine, rich chords of emotional response, activate our keenest faculties, produce a sensation of expansive exhilaration, and fill us with awe at the power of the human imagination, we are not appealing to arguments about the adaptive function of the arts. We are stating facts of our own experience and referencing those facts as the reasons for our subjective judgments. In psychology, subjective judgments are routinely turned into data through experimental inquiries, as they are, for instance, in studies of mating preferences. Statements of aesthetic value can also be turned into data. Consequently, while aesthetic values do not depend on theories about the adaptive function of the arts, aesthetic values, transformed into data, could potentially serve as evidence supporting or disconfirming hypotheses about the adaptive functions of the arts.

3.6. Coming to Grips with Reality

Art, and especially literature, often contains didactic elements, but the need for art cannot plausibly be reduced to the need to acquire factual information. LYLE

ESLINGER affirms that stories “communicate valuable information about their environment,” and SCALISE SUGIYAMA maintains that we read stories in order to obtain “reliable information about the physical and social environment.” Fairy tales? Myths? Allegories? Melodramas? Science fiction? Pornography? Romance novels? Magical realism? A simple informational concept of literature can scarcely begin to explain how literature works on the imagination. Traditional literary theory has produced numerous speculative accounts of symbolic meaning, genre, formal organization, style, tone, perspective, psychodynamic influence, ideological context, and aesthetic value. As DAVID MIALL argues, scholars working in evolutionary literary study need to assimilate the best ideas from traditional literary theory and integrate them with the best knowledge available from the social and cognitive sciences. It will not do to stop short with naïve versions of literary realism.

Nor will it do to discount literary realism altogether. D. L. SMITH makes a sharp and ultimately untenable distinction between the imagination and literature. The aim of imagination, he says, is “to represent the world as it really is.” The aim of literature, in contrast, “is to misrepresent the world.” Formulations of this character are no doubt meant to be provocative. They catch attention, but they have the potential for sowing confusion and generating fruitless debate. I think SMITH is correct in claiming that “the function of literature is to shape human action,” but action is not shaped exclusively by deceit and self-delusion. When we read Balzac, Tolstoy, Flaubert, and Dreiser, most of us feel that they aim to represent the world as it really is. We read them to share their insights into human nature and also to learn about individual personalities in particular cultures. Their fictions enable us to see from the inside of individual human experiences and at the same time to recognize in these particularities our common humanity. Clearly, then, literature does not only distort and misrepresent reality. Like emotionally charged rhetoric, literature can be used to manipulate behavior in almost any imaginable direction. But one of our passions is the passion for coming to grips with reality, and literature also serves to satisfy our need for an imaginative grasp of reality. JUDITH SAUNDERS’ collect of poetic reflections effectively evokes the epistemologically ambiguous character of the fictive world, “as unreal as it is realistic.” Even works of fantasy derive much of their power from using metaphoric, symbolic figuration to evoke underlying regularities in human life.

3.7. Magic?

D. L. SMITH presents his ideas on adaptive function as an alternative to some of E. O. Wilson’s formulations. I think SMITH misconstrues one of the passages he cites from

Wilson. SMITH says, “the conjecture that art began and continues to function as a magical way to control the environment strikes me as implausible.” Indeed. It is so implausible that one might want to look more closely before ascribing such an odd notion to a serious theorist. *War and Peace* as a magical incantation? *Madame Bovary* a medium for supernatural agencies to control the environment? Wilson’s notion that the arts began in magic is speculative. It might or might not be true. As I read it, though, he does not argue that the arts at the present time continue to function in a magical way. Here is the relevant passage:

Early humans invented [the arts] in an attempt to express and control through magic the abundance of the environment, the power of solidarity, and other forces in their lives that mattered most to survival and reproduction. The arts were the means by which these forces could be ritualized and expressed in a new, simulated reality. They drew consistency from their faithfulness to human nature, to the emotion-guided epigenetic rules—the algorithms—of mental development. They achieved that fidelity by selecting the most evocative words, images, and rhythms, conforming to the emotional guides of the epigenetic rules, making the right moves. The arts still perform this primal function, and in much the ancient way. Their quality is measured by their humaneness, by the precision of their adherence to human nature.” (*Consilience* 225-26)

The arts ritualize and express elemental forces that matter to humans. When Wilson says “the arts still perform this primal function,” presumably it is this function to which he is referring. The arts fulfill this function in much the ancient way because they still use evocative words, images, and rhythms, and they still appeal to basic human emotions. As a practical issue, it hardly matters whether Wilson himself means to suggest that contemporary writers and readers are engaging in magical thinking. It seems most unlikely he does mean this, but even if he does, no one else has taken up the idea. It is not an active part of any current theory. It is not part of an ongoing, collective theoretical effort. To dispute it, then, is to knock over a straw man.

In some ways, D. L. SMITH’s arguments overlap with those of Wilson more than SMITH himself seems to realize. When SMITH describes the way in which the human imagination has freed itself from the direct objects of sense, he is arguing along the lines sketched in by Wilson. His observation that the “qualitative, quasi-sensory character of imagination” contributes to “its special motivating power” also dovetails with Wilson’s conceptions of the arts. And finally, the idea that art manipulates our behavior “by canalizing deep, biologically rooted passions” overlaps with Wilson’s invocation of basic emotions. There is, however, one distinct idea that clearly distinguishes SMITH’s notions from Wilson’s: SMITH’s idea that art draws on basic emotions in order “to produce novel forms of behavior.” The

restrictive stipulation of novelty does not correspond to observable fact. Art sometimes generates new possibilities (as BOYD and MIALl emphasize), but it sometimes confirms and reinforces traditional values and traditional modes of belief (as DISSANAYAKE and Kathryn Coe emphasize). We obtain the images of art partly through our cultural traditions—through religion and art and other cultural forms—and we obtain them also through the spontaneous creative play of our own minds. Art always involves some degree of interaction between the collective, shared forms of artistic tradition and the creative play of individual minds.

3.8. Falsification

BOYD and GOTTSCHALL both argue that we need to formulate adaptationist hypotheses in ways that render them susceptible to falsification. I concur. BOYD remarks, “Carroll claims that in order decisively to falsify his or Wilson’s hypothesis, one would have to demonstrate that human cognitive evolution had simply stopped at some point in the past. He seems closer here to immunizing the hypothesis from falsification than inviting it to genuine test.” The reader is invited to re-read the whole paragraph from which BOYD extracts the statement to which he refers. That paragraph contains the following sentence: “If one could demonstrate that dispositions to produce and consume imaginative verbal artifacts are not universal and reliably developing, that they have no characteristic formal properties corresponding to specific cognitive structures, or that they have no effects on adaptively significant behavior (sexual or social), the hypothesis would be falsified.” This sentence identifies four possible avenues of falsification: cross-cultural comparison, developmental psychology, correlations between formal literary structures and cognitive structures, and behavioral effects. The concept in the statement to which BOYD refers—on evolution stopping at some point in the past—is presented only as a qualification for a fifth possible avenue of falsification—paleoanthropology: “If, through paleoanthropological research, one could demonstrate that the arts, whatever effects they might have in contemporary environments, could not have produced similar effects in ancestral environments, the hypothesis would be cast into a highly problematic light. Even then, though, in order decisively to falsify the hypothesis, one would have to demonstrate that human cognitive evolution had simply stopped at some point in the past, before the arts began to have psychologically and socially significant effects.” The charge of self-immunization bears false witness against the five possible avenues of falsification delineated in the paragraph to which BOYD refers.

As I argue in the target article, we have made good progress in gradually, collectively developing a plausible and comprehensive theory about the adaptive

function of the arts. BOYD suggests that the theory expounded in the target article can be reduced to an appeal to the authority of E. O. Wilson. That suggestion creates a false picture of the collective theoretical effort described in the article. After stipulating three criteria a good theory of adaptive function would have to satisfy, I observe that “various writers have formulated propositions that collectively meet these three challenges.” The collective theoretical effort I describe includes formulations by Wilson, SWIRSKI, DISSANAYAKE, STOREY, Deacon, Tooby and Cosmides, SALMON and Symons, Panksepp and Panksepp, and not least, BOYD. It also includes my own formulations, synthesizing these others. In this synthesis, as SALMON correctly observes, I assimilate two main lines of argument about adaptive function: the idea that literature can exploit pleasure mechanisms, an idea most prominently represented by Steven Pinker, and the idea that literature can serve as a means of psychological organization, an idea that SALMON, like EIBL AND MELLMAN, attributes chiefly to Tooby and Cosmides. From an essay by SALMON and Symons, I appropriate, with due acknowledgment, the supposition that these two causal arguments can be linked with two different kinds of art, with, for example, pornography, which exploits pleasure mechanisms, and with tragedy, which organizes basic emotions in relation to a serious vision of deep and irresolvable conflicts.

We have made good progress in theoretical speculation, but the basic theoretical alternatives that have been laid out have already now been formulated multiple times. Further purely speculative argument is likely to contain large proportions of repetition, tenuous elaboration, and the kinds of distortion produced by polemical animus—distortions, for instance, like those in BOYD’S false changes on self-immunization and the appeal to authority. I thus second GOTTSCHALL’S appeal that we make a concerted, collective effort to formulate this problem in ways that admit of empirical investigation. In the target essay, I suggest one promising avenue—the use of neuroimaging to isolate specifically aesthetic responses. The more we know about how the arts affect the brain, the more precisely we will be able to describe how they interact with other cognitive processes. Other avenues are open also, of course. SALMON suggests delving into “the experiments of motivation researchers.” In *Graphing Jane Austen*—the book manuscript derived from our online questionnaire project about characters in Victorian novels—we do just this. We use basic emotions, basic motives, and personality factors, among other elements, to delineate the relations of protagonists and antagonists in Victorian novels. The data thus collected has a bearing on

adaptive function. In an article under submission, drawn from this data, we formulate the following argument:

Our central hypothesis was that protagonists would form communities of cooperative endeavor and that antagonists would exemplify dominance behavior. If this hypothesis proved correct, the ethos reflected in the agonistic structure of the novels would replicate the egalitarian ethos of hunter-gatherers, who stigmatize and suppress status-seeking in potentially dominant individuals (Boehm).

In this conception, the novels subserve the purposes of social cohesion. They provide a medium of shared imaginative experience through which authors and readers affirm and reinforce coalitional dispositions on a large cultural scale. The argument here is not about the adaptive function of art in general but about the adaptive function of one specific literary structure. Agonistic structure in these novels is a particular instance, an instance in which the idea of social cohesion is relevant and appropriate. We limit the range of adaptive explanation to the data at hand, but we use those data to illuminate the connections among psychological, social, and formal literary aspects in the organization of characters in the novels. We correlate agonistic structure with evolved dispositions for dominance and affiliation, and we suggest how that structure performs a specific kind of psychological work. We correlate that psychological work with elemental political dynamics that have been closely studied in other primates and in hunter-gatherer bands. This one questionnaire-style study, then, though it is focused on a specific formal feature in a specific literary genre in a specific period, opens wide prospects for explanation. If enough qualified researchers focus on the problem of adaptive function, we can be certain that other such avenues for empirical investigation will suggest themselves.

4. Conclusions

Marxists used to speak of the inevitability of the historical process leading to the triumph of the proletariat—a secular version of the Christian eschatology. The obsolete status both of Christianity and of Marxism might well make us wary of prophecy, and Darwinians, especially, should be well schooled in avoiding the fallacies of historical teleology.¹¹⁰ Civilizations, like species, have often come to bad ends. Intellectual progress is by no means inevitable, but it is sometimes possible and even probable. I think it likely that the convergence between the humanities and the evolutionary social sciences will continue.

If FREDERICK CREWS is right that only a Darwinian perspective “can make general sense of humankind and its works,” the chances for development of the evolutionary paradigm in literary studies should be fairly good. People like making

sense. They like other things, too, sometimes more than they like making sense. The history of literary studies over the past thirty years or so has given ample illustrations of the kinds of things literary academics often prefer to making sense. Making sense is clearly not an absolute value, but it is a definite motive, and most people feel its pressure. During the hegemony of poststructuralism, many literary academics, though they are decent folk sensitive to the promptings of intellectual rectitude, have felt an irresistible need to accommodate their rhetoric to the necessities of their careers. As a form of compromise, they have made obligatory obeisance to poststructuralist axioms, like performing routine religious rituals, while tacitly moderating poststructuralist principles to bring them into conformity with common sense. If the appeal of reason and the importunities of professional ambition were to be brought more closely into harmony, many literary academics would be much the happier for the change.

At the present time, generational demographics have produced an institutional bottleneck in literary studies. There is a field wide open for the development of evolutionary thinking, and there is plenty of young talent ready to exploit it. But we still have to get past the institutional barriers created by the theoretical investments of previous generations. We have to provide institutional settings in which graduate students and younger scholars can be free to develop the potential of this new field.

Literary Darwinists have two main reasons to hope that this bottleneck will soon be broken. One reason is the alluring opportunity of fruitful research. Until recently, many scholars might have been vaguely intrigued by the idea that literary study could be connected in some way with a biological understanding of human nature, but they had not seen quite how one might actually fashion that connection. Enough work in this area has now been produced to demonstrate that the enterprise is indeed feasible and to point the way toward further development. The other main reason for hope is the increasing isolation and marginalization of literary studies. In enrollments, funding, and public prestige, the humanities are at an all-time low. The lament over this state of affairs is now general and is sounded at the highest levels of the profession (Gottschall, *Literature*). The humanities are like a polar bear trapped on an ice floe that is steadily decreasing in size as it drifts into warmer waters. The warmer waters in this case consist in the steadily increasing volume of knowledge about the evolved dispositions of human nature. Cognitive and affective neuroscience, behavioral genetics, primatology, ethology, evolutionary anthropology, behavioral ecology, linguistics, personality theory, sex research, human life history theory, developmental psychology, cognitive archaeology,

game theory, multi-level selection and its extensions into ethics, economics, politics, and cultural history—all these areas of inquiry form an ever more complex and integrated network of findings. By insisting on the separateness of humanistic subjects, philosophical traditions, and modes of inquiry, literary scholars deprive themselves of the resources available in this network. They also render their own research irrelevant to the interests that now most actively engage the minds of the larger educated world. It need not be this way. Change for the better might not be inevitable, but it is the next best thing to inevitable. It is available, and there is no good alternative.

Notes

¹ See Carroll, “Emerging Research Program,” “Evolutionary Approaches,” “Introductory Guide,” and “Literature and Evolutionary Psychology.” For other surveys, see Fromm, “Plato to Pinker” and “Back to Nature Again.”

² See, for example, Boyd, “Literature” and “The Origin”; Carroll, *Evolution and Literary Darwinism*; Cooke, *Human Nature*; Dissanayake, *Art and Intimacy*; Easterlin, “Hans”; Gottschall, *Rape of Troy* and “The Tree”; Headlam Wells; Jobling; McEwan; Nordlund; and Storey.

³ For similar appraisals of the disciplinary alignments of the contributors to cognitive poetics, see Jackson, “Issues” and “Questioning.”

⁴ See Barrett, Dunbar, and Lycett 8-21; D. M. Buss, *New*; Dunbar and Barrett, “Evolutionary”; Gangestad and Simpson, “An Introduction”; Hagen and Symons; Laland and Brown; Mamelli; Pinker, “Foreword”; Sterelny, *Thought* 234-35; and E. O. Wilson, “Sociobiology” v-viii.

⁵ See for instance Baron-Cohen; Barrett, Dunbar, and Lycett 295-350; Barton; Bickerton; Chiappe and MacDonald; Damasio; Deacon; Geary, *The Origin*; Jellema and Perrett; Kirby; MacDonald and Hershberger; Mithen, *Prehistory* and “Mind”; Panksepp; Pinker, *How the Mind Works, Language, and Stuff of Thought*; Pinker and Jackendoff; Plotkin; Premack and Premack; Rizzolatti and Fogassi; Stone; Tomasello et al.; and Wyman and Tomasello.

⁶ See Anderson; Anderson and Anderson; Bordwell, *Poetics*; Bordwell and Carroll; Plantinga and Smith; Smith; and Tan.

⁷ See Boyd, “Art of Literature,” “Literature and Evolution,” *On the Origin*, and “The Origin.”

⁸ On narrative, in addition to Boyd’s work cited in the previous note, see Carroll et al., *Graphing*; Scalise Sugiyama, “Narrative Theory” and “Reverse-Engineering”; and Steen. On poetic meter, see Turner 61-110. On the number and organization of social groups in drama, see Matthews and Barrett; Stiller and Hudson; and Stiller, Nettle, and Dunbar.

⁹ For a polemical essay by Boyd, see “Getting It All Wrong,” in which Boyd responds to Louis Menand’s repudiation of Wilsonian “conscience.” Also see Menand.

¹⁰ For other ecocritical works closely affiliated with evolutionary literary study, see Easterlin, “Loving”; Love, “Ecocriticism,” *Practical Ecocriticism*, and “Science.” Also see Carroll, *Literary Darwinism* 85-100.

¹¹ Other forthcoming books of related interest include Dutton, *The Art Instinct*; Grodal, *Embodied Visions*. Also see Slingerland, *What Science Offers*.

¹² Other chief “biopoetical” works by Cooke include “The Promise” and “Sexual Property.”

¹³ Components of this study have been published as articles. See Gottschall, “An Evolutionary” and “Homer’s.”

¹⁴ For a chapter published as an article, see Saunders, “Evolutionary.” For another sociobiologically oriented essay by Saunders, see “Male.” For a set of sociobiological literary critiques geared toward a popular audience, see Barash and Barash.

¹⁵ Portions of this section have been adapted from an essay, “Introductory Guide,” in the journal *Ometeca*. This section and the two following have been extracted from the introduction and conclusion to *Graphing Jane Austen*.

¹⁶ See Pinker, *How the Mind Works*; Symons, *The Evolution* and “On the Use”; and Tooby and Cosmides, “Psychological Foundations.”

¹⁷ See Hill and Kaplan; Kaplan and Gangestad, “Life” and “Optimality”; Kaplan, Gurven, and Lancaster; Kaplan, Hill, Lancaster, and Hurtado; Lancaster and Kaplan; Low; and Lummaa.

¹⁸ See Boehm; A. Buss; Cummins; Gray; MacDonald, “Evolution, Culture” and “Evolution, the Five-Factor Model”; and Plutchik.

¹⁹ See Bjorklund and Pellegrini; D. M. Buss, *The Dangerous Passion* and *Evolution of Desire*; Deacon; Flinn and Ward; Geary, “Evolution,” *Male*, and *The Origin*; Geary and Flinn; Hill; Hill and Kaplan; Low; Schmitt; and Symons, *The Evolution*.

²⁰ See Bjorklund and Pellegrini; D. M. Buss, *The Evolution*; Daly and Wilson; Flinn and Ward; Geary, *Male* and *The Origin*; Geary and Flinn; Hamilton; Salmon; Schmitt; Symons, *The Evolution*; Trivers, “Parental Investment” and *Social Evolution*.

²¹ See Alexander, *The Biology*; Boehm; Cummins; Flinn and Ward; Geary and Flinn; Harris; Kurland and Gaulin; Kurzban and Neuberg; Pinker, *Stuff of Thought* 380, 401-409; Premack and Premack; and Sober and Wilson.

²² See Budiansky; A. Buss; Darwin; Focquaert and Platek; Hauser; Lewis; Paulhus and John; and Tomasello et al.

²³ See Baron-Cohen; Barrett, Dunbar, and Lycett 295-321; Premack and Premack; Rizzolatti and Fogassi; Stone; Tomasello et al.; and Wyman and Tomasello.

²⁴ For formulations on the relations between human nature and culture, see Baumeister; Boyd, “Art and Evolution, ““Literature and Evolution, “ and “The Origin”; Brown; Carroll, “Aestheticism,” *Evolution*, and *Literary Darwinism*; Cooke, *Human Nature*; Dissanayake, *Art and Intimacy* and *Homo Aestheticus*; Easterlin, “Hans”; Fromm, *The Nature*; Gottschall, “The Tree”; Headlam Wells; Headlam Wells and McFadden; Nordlund; Panksepp and Panksepp; Plotkin; Richerson and Boyd, *Not by Genes*; Sterelny, *Thought*; Storey; Tooby and Cosmides, “Does Beauty”; and E. O. Wilson, *Consilience* 210-37.

²⁵ See Alexander, “Evolution”; Baron-Cohen; Brown, *Human Universals* and “Implications”; Dunbar, *The Human Story*; Flinn and Ward; and Mithen, *Prehistory*.

²⁶ See Baron-Cohen; Boyer; Dunbar, *The Human Story*; Geary, *The Origin*, 131-39, 330; and Mithen, *Prehistory*.

²⁷ See Lorenz 1-19.

²⁸ See Barrett, Dunbar, and Lycett 351-83; Boyd and Richerson; Deacon; Heinrich and McElreath; Hill; Kirby; Laland; Lumsden and Wilson; McElreath and Heinrich; Plotkin; Richerson and Boyd, *Not by Genes*; Shennan; Sterelny, *Thought*; Tomasello et al.; D. S. Wilson, “Evolutionary” and “Group-Level Evolutionary Processes”; and E. O. Wilson, *Consilience*.

²⁹ See Boyd, “Evolutionary” and *On the Origin*; Dissanayake, *Art and Intimacy*, “Universality,” and “What Art Is.”

³⁰ On art as a means of promoting social cohesion, also see Coe; Dunbar, “Why.” On art as a means of enhancing creativity, also see Swirski 75. On narrative as a means for transmitting adaptively relevant information or providing models for behavior, see Pinker, “Toward” 173-74, *How the Mind Works* 539-43; and Scalise-Sugiyama, “Reverse-Engineering” 190.

³¹ For critiques of “narrow” or “orthodox” evolutionary psychology, see Barrett, Dunbar, and Lycett 8-21; Carroll, “The Human” and *Literary Darwinism* 190-99; Dunbar and Barrett, “Evolutionary”; Griffiths 106-36; Hill; Laland; Mithen, *The Prehistory*; Panksepp; Panksepp and Panksepp; Sterelny, “An Alternative” and *Thought*. For evolutionary accounts of human cognitive

architecture broader than those in orthodox evolutionary psychology, see Geary, "Motivation to Control" and *The Origin*; and Sterelny, *Thought*. On the developmental plasticity of human cognitive architecture, see Deacon; Panksepp; Plotkin; and Sterelny, *Thought*.

³² See Tinbergen.

³³ Also see Carroll, "The Adaptive," "Evolutionary Approaches," "Literature and Evolutionary Psychology," and "Literature as a Human Universal."

³⁴ On mother-infant interaction as a well-spring of aesthetic responsiveness, see Dissanayake, *Art and Intimacy*. Also see Easterlin, "Psychoanalysis." For a commentary on the importance of the arts in childhood development, with special reference to abused children in the novels of Dickens, see Carroll, *Literary Darwinism* 63-68. For an interpretative critique that uses developmental psychology to analyze narratives aimed at children, see Boyd, *On the Origin* and "The Origin."

³⁵ See Jackson, "Questioning" 319, 322, 328; and Pinker, "Toward" 175.

³⁶ See Scalise Sugiyama, "Cultural"; and Storey 131-35.

³⁷ See Nettle, "What" and "The Wheel."

³⁸ See Boyd, "Art and Evolution," "The Art of Literature" (on *Lolita*), "Literature" (on *Hamlet*), *On the Origin* (on *The Odyssey* and Dr. Seuss), and "The Origin." On the use of Adaptationist categories in the analysis of postmodern fiction, also see Easterlin, "Do Cognitive."

³⁹ See Daly and Wilson 107-21; and Degler 245-69.

⁴⁰ See Abrams; Bordwell; Bordwell and Carroll; Boyd, "Art and Evolution" and "Getting It All Wrong"; Carroll, *Evolution* and *Literary Darwinism* 15-27; Cooke, *Human Nature* and "Toward"; Dissanayake, *Homo Aestheticus*; Crews; Fromm, *Academic Capitalism*; Gottschall, *Literature* and "The Tree"; Headlam Wells; Headlam Wells and McFadden; Love, "Science"; McEwan; Slingerland; Storey; and E. O. Wilson, *Consilience*.

⁴¹ For instances and further references, see Martindale; Miall; Moretti; and Van Peer. Also see the Web site for the International Society for the Empirical Study of Literature and Media: <http://www.arts.ualberta.ca/igel/>, accessed February 15, 2008.

⁴² See Matthews and Barrett; Stiller and Hudson; and Stiller, Nettle, and Dunbar.

⁴³ For a pilot study using categories similar to those used in *Graphing*, see Carroll and Gottschall.

⁴⁴ For information on the EvoS program at SUNY Binghamton, see <http://evolution.binghamton.edu/evos/>, accessed February 15, 2008. For further information on evolutionary literary studies, including posted articles, see the Web sites of Brian Boyd, <http://www.arts.auckland.ac.nz/staff/index.cfm?P=11379>; Joseph Carroll, <http://www.umsl.edu/~carrolljc/index.htm>; Harold Fromm, <http://hromm.net/professional/>; and Jonathan Gottschall, <http://www.washjeff.edu/users/jgottschall>—all accessed February 15, 2008. A Web site consolidating information on evolutionary literary studies is in preparation at www.evolit.ac.nz.

⁴⁵ See Boyd, ““Artistic,” “Art of Literature,” and *On the Origin*.

⁴⁶ Doidge speaks of “focused attention, the condition for plastic change” in the brain (111).

⁴⁷ See Inoue and Matsuzawa.

⁴⁸ See Tomasello et al.

⁴⁹ See Dissanayake, *Art and Intimacy*; Goleman; Hobson; and Trevarthen.

⁵⁰ See Gordon et al.

⁵¹ See Levitin.

⁵² See Richerson and Boyd; and Wilson and Wilson.

⁵³ See Tomasello et al.

⁵⁴ See Burghardt, “Darwin ’s Enduring Legacy.”

⁵⁵ See also Dissanayake, *Homo Aestheticus*.

⁵⁶ See C. Darwin, *The Expression*.

⁵⁷ See Burghardt, “Instinct.”

⁵⁸ See Cooke, “Evolution of Interest.”

⁵⁹ See Cooke, “Microplots.”

⁶⁰ See Cooke, *Human Nature*.

⁶¹ See Cooke, “Microplots.”

⁶² Carroll generously acknowledged those efforts on my part. At the same time, he asserted, with disapproval, that Crews “is sympathetic to the political orientation of the poststructuralists, and he is disposed to give the strongest possible weight to

the positive political motives for their theoretical formulations” (Carroll, *Evolution* 11). This was a misperception, perhaps deriving from an effort on my part to distinguish my position from that of Roger Kimball, who had objected to egalitarian sentiments per se on the academic left. From 1972 onward, I had repeatedly criticized the merely gestural radicalism of many literary academics (see *System* and *Skeptical*). As that revolutionism-in-the-head became bundled with Continental “Theory,” I demurred as forcefully as I could through both argument and satire, and I have continued to do so (see *Critics*, *Postmodern*, and *Follies*).

⁶³ Crews, *Follies* 8. See also chapters 14 and 15 of the same book.

⁶⁴ Despite the Laplacean air of this last sentence, other passages make it clear that Carroll is no believer in billiard-ball determinism in the cultural realm. By “material causation” he surely means that cultural manifestations result not from empty deductive constructs such as “the Western mind” or “the spirit of the age” but from conjunctions of real-world factors operating on individual persons.

⁶⁵ Carroll, “Human Nature” 95.

⁶⁶ Carroll, “Human Nature” 100.

⁶⁷ There is no unchallenged evidence for a psychic mechanism of repression. (For a recent comprehensive survey of the literature, see Rofé, “Does Repression Exist?”) Why does the scientifically minded Carroll feel entitled to put this threadbare concept to argumentative use?

⁶⁸ The outcome of my own attempt to uphold “community standards” at a conference on Freud is one vivid instance of this phenomenon; see Crews, *Follies* 79-82.

⁶⁹ Thanks to Ranja Knöbl and Joseph Carroll for their help in translating this paper.

⁷⁰ For a sketch of the field see Eibl, “Naturwissenschaft.” See also the recent exchange in the *Journal of Literary Theory*: Kelleter, “A Tale”; and Eibl, “On the Redskins”; and see our review of *The Literary Animal* (Eibl and Mellmann, “Literatur.”).

⁷¹ See Carroll, “Steven Pinker’s Cheesecake”; for an indirect response see Pinker, “Toward” 169-73; and, finally, the section on “The Adaptive Function of Literature” in the target article.

⁷² For a comprehensive discussion of this distinction and the meaning of the word “adaptive” see Tooby and Cosmides, “The Past.”

⁷³ See also Eibl, “Adaptationen.”

⁷⁴ See Groos, *Die Spiele der Menschen* and *Die Spiele der Tieren*, referenced in Bühler, *Die geistige Entwicklung* and *Die Krise*.

⁷⁵ See Schwender; and Mellmann, *Emotionalisierung*, 42ff. and “Literatur.”

⁷⁶ For a survey on emotional effects of literature see Mellmann, “Biologische Ansätze.”

⁷⁷ Tooby and Cosmides, “Does Beauty Build?” 20-22. See also Cosmides and Tooby, “Consider.” Gehlen (*Der Mensch*) had already conceived of the “unhinging” of drive and action as the origin of culture.

⁷⁸ Tooby and Cosmides, “Does Beauty Build?” 20. See also Cosmides and Tooby, “Consider.” On the role of language see Eibl, “Vergegenständlichung.”

⁷⁹ See C. Darwin, *The Expression* 166.

⁸⁰ Also see Boyd, “Evolutionary.”

⁸¹ See for example the discussion in the *Journal of Literary Theory*: Eibl, “On the Redskins”; and Kelleter, “A Tale” and “The Polemical Animal.”

⁸² In Tomasello et al., compare the account of sharing intentions as the basis of human communication, and see their references to Grice and to Sperber and Wilson.

⁸³ See Kelleter, “Tale”; Eibl, “Redskins”; and Kelleter, “Polemic.”

⁸⁴ See Kelleter, “Polemic.”

⁸⁵ See Singer, *Beobachter* 120-143.

⁸⁶ “That unified explanation is intrinsically satisfying,” Carroll claims. Even if this was true—which I doubt—the question of adequate unification would remain.

⁸⁷ Also see Eibl and Mellmann’s highly critical review of *The Literary Animal* (“Literatur”).

⁸⁸ Darwin, however, unlike his predecessors and contemporaries, believed that distinct races were not distinct species. He understood that “race is not an empirically supported basis for biological differentiation in the genuinely scientific sense of the word” and that “the races of man are not sufficiently distinct to coexist without fusion” (Niro 98-99).

⁸⁹ Carroll employs similar language in his astute essay, “Human Universals and Literary Meaning: A Sociobiological Critique of *Pride and Prejudice*, *Villette*, *O*

Pioneers!, *Anna of the Five Towns*, and *Tess of the d'Urbervilles*" (*Literary Darwinism* 129-45).

⁹⁰ See Pinker, *The Blank Slate* and *How the Mind Works*.

⁹¹ See Biesele; Blurton Jones and Konner; Mithen, *Thoughtful*; and Rink. See also Scalise Sugiyama, "Food."

⁹² Hyman describes modern criticism as "the organized use of non-literary techniques and bodies of knowledge to obtain insights into literature," and he says that "the bodies of knowledge of most usefulness to criticism are the social sciences" (*Armed* 3).

⁹³ For an account of how academic interpreters use scientific vocabularies to create non-scientific interpretations, see Seamon.

⁹⁴ Carlyle had this to say about Darwinism: "If true, it was nothing to be proud of, but rather a humiliating discovery, and the less said about it the better" (cited in Hyman, *Tangled Bank*). That doesn't quite get things right, but the sentiment should not be ignored once Darwinism leaves the edifice of scientific achievement.

⁹⁵ See Flesch 205, note 6.

⁹⁶ See Albritton; Hallam; Oldroyd; and Winchester.

⁹⁷ On the emergence of human life history theory as a theoretical matrix for evolutionary social science, see Kaplan and Gangestad, "Optimality" 122.

⁹⁸ To gain a synoptic overview of the current state of thinking on these various topics, see Gangestad and Simpson, *The Evolution*. For more detailed accounts of research on specific topics, see Buss, *Handbook*; and Dunbar and Barrett, *The Oxford Handbook*.

⁹⁹ See Dunbar and Barrett, "Evolutionary"; Hill; Laland and Brown; Gangestad and Simpson, "An Introduction."

¹⁰⁰ See Boehm; Eibl-Eibesfeldt; Hill; Richerson and Boyd, "Darwinian" and *Not by Genes*; Sterelny, *Thought*; Sober and Wilson; D. S. Wilson, *Evolution for Everyone* and "Group-Level Evolutionary Processes"; and Wilson and Wilson.

¹⁰¹ See Sterelny, *Thought*; and Tomasello.

¹⁰² For a taxonomic analysis of the theoretical options available within gene-culture co-evolution and cultural evolution, see Hodgson.

¹⁰³ See Ben-Ner and Putterman; Frank; Hammerstein; Hodgson; Richerson and Boyd, "Darwinian" and *Not by Genes*; Sober and Wilson; D. S. Wilson,

“Evolution, Morality” and *Evolution for Everyone*; Wilson and Wilson and; J. Q. Wilson.

¹⁰⁴ See for instance Bjorklund and Pellegrini; Burgess and MacDonald; and Ellis and Bjorklund.

¹⁰⁵ For overviews of comparative cognitive ethology, see Bekoff; Bekoff, Allen, and Burghardt; Easton and Emery; Emery, Clayton, and Frith; and Reznikova.

¹⁰⁶ For an instance of this kind of interdisciplinary work in history, see Smail.

¹⁰⁷ For a condensed exposition of her analytic scheme, see Zunshine, “Why Jane Austen.”

¹⁰⁸ Darwin to Henry Fawcett, September 18, 1861; in *On the Origin* 493.

¹⁰⁹ Also see Rofé (67-68); and Hassin, Uleman, and Bargh.

¹¹⁰ See Veblen’s contrast between the Darwinian conception of historical change and the Marxist teleological conception.

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The Achaians Spread their Seed

***The Rape of Troy: Evolution, Violence, and the World of Homer.* By Jonathan Gottschall. Cambridge, UK: Cambridge UP, 2008. xii, and 223 pp. \$34.99 paper.**

This double issue of *Style* seems an especially appropriate place to review Jonathan Gottschall's new book. Almost as an answer to some of the respondents in this issue who demand what could be called a variation of "show me the money," Gottschall employs adaptationist thinking to investigate what are perhaps the most widely discussed literary works in western culture: Homer's *The Iliad* and *The Odyssey*.

Gottschall is a graduate of the exciting interdisciplinary program in the evolutionary studies of the humanities and sciences (EVOL-S) at SUNY-Binghamton, and if even only some of their graduates produce books as interesting as the one under review, they both they and we may look forward to some fascinating times ahead. Gottschall quotes the Homeric scholar, John Myres, as "savoring his understatement [that it] is not easy to say anything new about Homer . . . after more than 2,500 years" (2), but the former continues by suggesting that, if it is to be done, the novelty must come from one of two places: "discoveries of new evidence, or applications of new perspectives" (10). *The Rape of Troy* is one of the latter, and "analyzes Homeric conflict from the perspective of modern anthropology and evolutionary biology; it is best described as an evolutionary anthropology of conflict in Homeric society" (3). In his account, "Homeric society" "refers not so much to Homer's fictional *construction* as to a specific scholarly *reconstruction* of the real world from which the epics emerged" (3; emphasis in the original).

Summarily stated, *The Rape of Troy* (RT) begins by noting how close to "sudden violent" death Homeric men (and women) habitually lived during what Gottschall calls the "Late Dark Age" model of Homeric society (11), the period of time following the collapse of Mycenaean culture in the late thirteenth and twelfth centuries BC, or roughly between 800 and 650 BC (22). His arguments comprise three major issues: I) the "patterns of conflict in Homeric society converge beautifully with those described by anthropologists and ethnographers across a strikingly diverse spectrum of non-state societies" of the kind typically found in the

“small, poor villages” of the Dark Age Greeks (3, 23). For Gottshall, “all forms of Homeric conflict result from direct attempts, as in fights over women, or indirect attempts, as in fights for status and wealth, to enhance Darwinian fitness in a physically and socially exacting ecological niche” (3).

II

His second argument states that “patterns of violence in Homeric society are tantalizing consistent with the hypothesis that Homeric society suffered from an acute shortage of available young women relative to young men. The institution of slave-concubinage meant that women were not equally distributed across the circum-Aegean world [but were] concentrated in certain communities” and often within the “households of powerful men” (4). Later in the book, Gottshall supports this claim by pointing to some basic biological facts: males have “small, cheap sperm” in contrast to females’ “large, nutritious, and expensive eggs,” and the consequence of this imbalance for sexually reproducing species is the “fundamental shortage of female reproductive capacity relative to male demand” (44-5) under any circumstances. When the absolute number of females generally is held artificially low, the “value” of a female’s reproductive capacity thereby “ratchets up . . . [as does the] costs that males are willing to “pay” for access to it, measured in the currency of risky competition and/or other costly physical and behavioral traits” (45). III. His third argument claims that “this model helps to illuminate the origins of specific features of Homeric philosophy: [an] oppressive miasma of fatalism and pessimism pervades *The Iliad* and, to a lesser but still palpable extent, *The Odyssey*. While “the desirability of peace is obvious, Homeric men—like their fathers and grandfathers before them—feel that they are doomed to perpetual conflict” (4).

This almost sounds like a wonderful metaphor for literary critics and scholars. To help contribute to the un-ending controversies in Homeric studies, Gottshall draws on what he calls the “promiscuous interdisciplinary . . . science of antiquity,” thus placing his work “in an old and illustrious tradition of Homeric scholarship” (5). Citing such well-known scholars as Ullrich von Wilamowitz-Moellendorf, and later Millman Perry and Alfred Lord (15-21), Gottshall argues that *Altrerumswissenschaft* (science of antiquity) had as its goal no less than to “revivify and reconstruct every facet of classical civilization” and demanded “unfettered disciplinary miscegenation” (5). He intends much the same, bringing “Homeric studies into contact and conversation with the large and vibrant areas of intellectual ferment from which they have been isolated.” However, since his intended audience is the general reader and the “interdisciplinary community of

scholars using evolutionary theory and research,” he can “only skim the surface of some deep controversies in Homer studies, evolutionary biology, and anthropology,” relegating “specialist material to the notes” (7).

The first two chapters cover material already mentioned above: the dating of and reconstruction of when and how the two epics were created, and a brief history of what Gottschall calls the Late Dark Age of Greek antiquity in the post-Mycenaean age, and a short ethnographic description of Homeric society. In a world rather like the Caucasian area currently under conflict among the Georgians, the Ossetians, and the Russians—with multiple, mutually incomprehensible languages divided up among relatively isolated ethnic groups highly suspicious of one another’s motives and ambitions—“Homeric Greeks lived in semi-isolation from each other” (27), separated by mountain walls and the vasty ocean deeps. Living in small villages (the use of the word, *Polis*, was appropriate for city-states some centuries later), people in each settlement “were headed by a group of influential males” known as *basileis* (singular, *basileus*), a kind of chief whose “position of dominance was tenuous and limited,” based on his “personal; leadership capacity rather than hereditary status” (32-33). These leaders relied on their “powers of persuasive speech,” second in importance only to their “military prowess.” Lacking dictatorial rights, the *Basileis* relied on persuasion, “charisma, and a subtle tongue” (34). These skills were important because the Greeks of the “Late Dark Age were involved in nearly constant low-level raiding and feuding with other Greeks, punctuated by rare larger-scale wars” (37). From an early age, young men were taught military skills; hence, taking revenge for wrongs was a cultural imperative, with the revenger being “lionized” rather than disapproved. Gottschall intends to demonstrate how, “from an evolutionary perspective, these many proximate causes of intense and pervasive conflict among and between groups of Greek males were ultimately rooted in reproductive rivalry,” the “main objective of this book” (38- 39).

Chapter Three is a lengthy discussion of the evolutionary biology and anthropology of male violence. Gottschall reminds us that “anthropology has revealed no aboriginally peaceful peoples, much less the prelapsarian world of primitive harmony envisioned by Rousseau and his many followers” (41). Indeed, all “evidence indicates that lethal intergroup conflict has been part of the human condition for at least tens of thousands of years.” The question of why males are more violent has been touched upon above: “the fundamental shortage of female reproductive capacity relative to male demand” makes males “who are better able to compete for access to scarce female reproductive capacity, in whatever form the

competition takes [peacock plumage; Olympic gold medals; seven houses to call home, etc], pass on genes more effectively than rivals (44-5). Males need only invest a bit of time and some cheap sperm. For female mammals (who tend to be highly discriminating in selecting mates), their minimal costs are far more extensive, include forgoing mating opportunities while in gestation, and all the costs—in about 95% of mammalian species—of fostering young. Because female mammals invest so heavily in reproduction, that investment is, for males, a precious resource worthy of competitive risk-taking.” Hence, Gottschall quotes Robert Trivers who argues that “the terms male and female are not essential properties of “maleness” or “femaleness” but properties of low or high parental investment” in their offspring (46).

Thus, from a Darwinian perspective, “sexual selection has shaped men to compete for woman and for concrete material resources and for intangible social resources because they are all *reproductive resources* (49; emphasis in original). Gottschall makes clear, it should be noted emphatically, that his book attempts to “integrate biological and socio-cultural analyses, not to enshrine one over the other. The evolutionary approach cannot replace approaches operating at different analytic levels: the best it can do is complement them” (50). To summarize, the “unremitting cycles [of violence among Greek males] may help to illuminate both the tragic elements of the Homeric world view and the frequently cruel and capricious natures of the gods and fate” (55).

In the next chapter, Gottschall complicates any critically dismissive ideas of simple sexual desire on the part of males as singular motives for the Trojan war. He revisits the conflict between Agamemnon and Achilles over the slave girl, Briseis, arguing that tensions between the two—both political and sexual threads—cannot be disentangled. The “political dispute escalates dangerously precisely because it hinges on rights to a desirable woman that one of them loves” (60). His basic ideas in this example also illuminates *The Odyssey* as well: “men attempting to gain sexual access to women claimed by other men” is the reason for the primary conflicts in both epics (63).

Gottschall turns for corroboration of his claims to the “entire Cycle of epic poetry, of which Homer’s poems were initially only a small part” (73). The picture that “emerges from the tatters of the Cycle is one of strife in foreground and background narratives: of murders, wars, raids, and abductions and rapes of women.” When the Greeks sack a city, the pattern is virtually always the same: city looted and destroyed, men killed, women carried off into concubinage and bondage. The symbolic relationship between toppling of citadels and the violation

of women within is expressed in the [Greek] words, *kedemnon luesthai* (to loosen a veil), which can either mean to sack a city or to breach a woman's chastity" (75).

In Chapter 5, Gottschall discusses the "proximate" reasons for Greek touchiness, that "men are socialized to strive hard for altitude in the dominance hierarchy ... governed by the dictum "always be the best and superior to others" (82). As top dogs in the pack, so to speak, "higher ranked individuals receive a larger share of precious, contested resources, including mating opportunities, than lower ranked individuals" (85). These resources in Homeric Greece especially include those associated with simple food "in the face of climatically induced shortfalls in production" (89). Hence, "partly as a result of the ever-present threat of hunger, capturing the enemy's livestock is a prime goal of all Homeric raids" (90). Likewise, the worth of a potential bride required that the suitor "must first be able to afford a substantial transfer of resources to the potential bride and her family—the more desirable the bride, the more substantial the transfer" (93). Thus Homeric conflict "flows from three [major], proximate sources—competition for women, social prestige, and wealth—all feeding into the ultimate goal of enhancing reproductive success" (94-95).

Warriors are willing to take the risks of deadly competition for resources not only for the positives entailed but also because they wished to "avoid the social consequences of failing to take the risk." All the sweeter then the victory because they shoulder "great risks in combat," while the battle shirker would have to "live with the disdain of women, who demand courage and respect courage in men" (98-99).

Chapter 6 examines closely the roles and issues of women in Homer's world. While their strategies "for surviving and reproducing are different from men's—most striking in that they are less likely to entail violent aggression—they are no less complex, effective, or potentially Machiavellian" (100). Although in general, beauty was, at least initially, a woman's greatest asset, they also used "the few tools their society [could not] deny them—sharp intelligence, manipulative stratagems, and sexual allure—to defend and promote their interests in spite of their muscular and political disadvantages (107). Thus, making a "good marriage was by far the most important challenge a Homeric woman faced in negotiating her fitness landscape" (108). Homeric marriage customs appear to be of "the most common anthropological type" where the interests of daughters and families are substantially (but not perfectly) aligned, and so the family and bride "negotiate" the ultimate choice (112).

Gottschall's next chapter goes to heart of skepticism about his major thesis: that "intense male competition was the result of a persistent and pervasive shortage of available young women relative to young men" (120). Although I will not rehearse his detailed arguments in this review (cf. pg. 138), he lists several reasons why what he calls "sex-ratio manipulation"—including the greater productive value and hence cultural preference of sons—resulted in what Gottschall calls "excess female mortality (EFM) "and the large and often violent numbers of males "competing for the opportunity to bear of fruit" of sexual needs.

If one assumes the plausibility—Gottschall calls it "playing an educated hunch" (138)—of these arguments, then his last full chapter captures what he thinks is the tragedy of the Homeric epics: Homer's insistence that "every glorious victory forces inestimable sorrow on a man and his entire family" (144). While he acknowledges the important differences between the two epics, "equally important commonalities are downplayed" (147). Homer's "neat ending" of *The Odyssey* belies what Gottschall sees as a recognizably Homeric "tone, and texture of morality, philosophy, and outlook" as Odysseus tells Penelope that "their trials are not over—measureless toil, long and hard, awaits them" (149). The key question is asked: why in the midst of the "blessings of peaceful existence" do they squander this beauty? Why, even "when they seek out peace, do they so often find war?" (150).

Gottschall uses the metaphor from game theory called "the Prisoner's Dilemma" (PD), one too familiar to readers of *Style for me* to rehearse here. Suffice to say, that when a society's sex-ratios are strongly masculinized (favoring males), that this practice "engenders a vicious cycle: "manipulation of the sex ratio . . . creates shortages of females, which creates an incentive to raid for women, which leads to violent retribution, which exacerbates the need for warriors, which increases pressures to manipulate the sex-ration in favor of males, which exacerbates the shortage of women, which increases the incentive to raid, and on and on" (151). "Prisoner's Dilemma, at its core, describes a tragic paradox produced by the pursuit of individual good over collective good" and those caught up in its dilemma are themselves "prisoners of nothing so much as vaunted human rationality and natural self interest (153). In its radically simplified form, PD captures "the essence of many Homeric conflicts" where "individuals cannot safely behave differently," hence the emphasis on the tragic fate (155, 158).

Gottschall's conclusion draws parallels between lions and men. He asserts that "the evolutionary view of human potential is appreciably more rigid than the liberal philosophical paradigms that have dominated intellectual life since the

Enlightenment. In place of utopian visions . . . evolutionary theory offers only the hope of some unspecified level of diminishment of human suffering and malfeasance” (163-64). He says that “we are what we are—magnificent, gentle, bloody-toothed—and there may be limits to what we can change” (164).

Nonetheless, as I hope this review has intimated, the first step for the human race is self-understanding, and one of the largest reasons for studying the humanities and the past generally is that we are aware—in ways Homer’s heroes could not—that sacking a city holds far more danger for the planet than it ever could have back then. . One could argue that evolution has not been in arrested development over the last 3,000 years and that - so far at least—we have lived with some forbearance in a world of assured atomic mutual destruction.

Gottschall’s book is a fascinating step toward understanding the past with the intellectual tools of the present and is well worth the attention of both the general reader and the Homeric specialist alike.

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