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THE HUMAN REVOLUTION AND THE ADAPTIVE FUNCTION OF LITERATURE

I

BEFORE THE ADVENT OF purely culturalist ways of thinking in the early decades of the twentieth century, the idea of “human nature” was deeply ingrained in the literature and the humanistic social theory of the West.¹ In the past three decades, ethology, sociobiology, and evolutionary psychology have succeeded in making the idea of “human nature” once again a commonplace of public discourse, but the actual shape and content of human nature, even among Darwinian social scientists, remains controversial. Human nature is the product of evolution, and for Darwinians, concepts about the structure of human nature are necessarily bound up with concepts about the course of human evolution. My purpose in this essay will be to examine two chief alternatives in the current Darwinian understanding of human evolution and human nature, to advocate one of these alternatives, and to assess its implications for Darwinian literary study. One alternative can be identified with evolutionary psychology, and the other, the one I shall advocate, with evolutionary anthropology and cognitive archaeology. For the sake of economy, I shall refer to the former as the EP model and to the latter as the EACA model.

In the late 1980s and early 1990s, the main theoretical controversy in Darwinian social science was that between the sociobiologists and Darwinian anthropologists, on the one side, and the evolutionary psychologists on the other. The point at issue was whether “fitness maximization” or the desire to maximize reproductive success could serve as a direct motive in human behavior. The sociobiologists tended to assume it could; the

evolutionary psychologists instead insisted that fitness maximization was mediated through “proximal mechanisms” such as the male desire for sex and the female desire to acquire resources from male sexual partners. In the arena of received professional opinion, the evolutionary psychologists won this debate, and evolutionary psychology is now the mainstream, establishment creed in Darwinian social science.² Its hegemony is evidenced by a flood of popular expositions and textbooks. The majority of these expositions give little evidence that the authors are themselves alert to the speculative character of the fundamental concepts of their creed, and the chief tenets of the creed have often been reiterated in a naively uncritical way.

The chief tenets of orthodox evolutionary psychology are (a) that the structure of the human mind stabilized during the Pleistocene (beginning about 1.6 million years ago); (b) that the human mind is “modular” in character—consisting of discrete bits of dedicated neural circuitry automatically activated by environmental releasers; (c) that human cognitive aptitudes and motivational structures are firmly adapted to the hunter-gatherer life-style of the Pleistocene—the “environment of evolutionary adaptedness” or EEA; and (d) that the adaptation to Pleistocene conditions carries with it, as a necessary corollary, a “mismatch” between the adapted human mind and all cultural ecologies more complex than that of hunter-gatherers. The core concept, the idea on which all the others depend, is that of the EEA:

What we think of as all of human history—from, say, the rise of the Shang, Minoan, Egyptian, Indian, and Sumerian civilizations—and everything we take for granted as normal parts of life—agriculture, pastoralism, governments, police, sanitation, medical care, education, armies, transportation, and so on—are all the novel products of the last few thousand years. In contrast to this, our ancestors spent the last two million years as Pleistocene hunter-gatherers, and, of course, several hundred million years before that as one kind of forager or another. These relative spans are important because they establish which set of environments and conditions defined the adaptive problems the mind was shaped to cope with: Pleistocene conditions, rather than modern conditions.³

For evolutionary psychologists, the difference between our Paleolithic ancestors and ourselves is a difference not in anatomical and neurological character but only in external “circumstances.” In the EP model, the structure of the human mind at the present time and the structure

of the mind of, say, half a million years ago, would be the same. They would be equally the mind of the Pleistocene.

The EP model of human evolution is a model not of change but of stasis. If humans, like sharks, had remained morphologically stable for hundreds of millions of years, a model of stasis would make sense. But hominids have undergone an extraordinarily rapid series of major evolutionary changes in the six or seven million years since they last shared an ancestor with chimpanzees. To grasp the nature of the problem these changes present for the EP model of human evolution, consider the paradigmatic role evolutionary psychologists assign to modern hunter-gatherers. Evolutionary psychologists regard modern hunter-gatherers as a proxy for Pleistocene hunter-gatherers, but modern hunter-gatherers are anatomically and neurologically modern in a way that at least some of their Pleistocene ancestors were not. Among paleo-anthropologists, the question of the timing, pace, and character of the transition to the condition of fully modern humans remains controversial, but the earliest known fossils of anatomically modern humans are less than 200,000 years old, and there are good reasons to believe that significant anatomical and neurological evolution has continued within the past 100,000 years.⁴ There is no evidence to support a contention that human evolution ceased half a million years ago, and there is no good theoretical reason for supposing that it has ceased even now. Indeed, given the rapidly accelerating intervention of humans into their own genome, in the very near future the rate of human evolutionary change will probably increase exponentially. (All changes resulting in differences of gene frequencies, even changes brought about by human intervention into its own genomes, are forms of “evolution.”)

By emphasizing stability and regularity within the Pleistocene environment, evolutionary psychologists provide theoretical support for the idea of innate cognitive architecture (the “adapted mind”). They thus counter the idea of the mind as a “blank slate,” but they also produce a model of the mind in which the most distinctive features of human evolution and the human mind have no place. They make it unnecessarily difficult to acknowledge the activity of the distinctively human intelligence—an intelligence in which the powers of reflection, analysis, comparison, and creativity are uniquely developed; and they make it virtually impossible to give an intelligible account of the Human Revolution: the emergence of modern human culture over the past 100,000 years, and especially over the past 50,000 years. As a result of these weaknesses, in the last

decade or so the EP model of human evolution has been subjected to intense and effective criticism from evolutionary anthropologists, archaeologists, psychologists, linguists, and philosophers. Out of these criticisms, a new and more adequate model of human nature has begun to emerge. In the remainder of this section, I shall first summarize the criticisms and then describe the model of human nature that is emerging from them.

Evolutionary anthropologists have focused their critiques of evolutionary psychology on the EP concept of the EEA—the environment of evolutionary adaptedness. In the criticisms they have leveled against the orthodox EP concept of the EEA, they have made two chief claims. One claim is that the environments that have produced all human adaptations, even those that are exclusively human, extend far back beyond the Pleistocene. The other claim is that within the Pleistocene the orthodox concept supposes a stability or regularity that did not actually occur. The Pleistocene was a period of radical fluctuations in climate and ecology. The central point of this criticism is not just historical. This time-narrowed and falsely homogenized concept of the EEA corresponds to a false or distorted concept of human mental architecture—an architecture that in the EP model consists only or overwhelmingly of domain-specific cognitive modules designed to solve problems constituted by regularities within the Pleistocene environment. Modules are characterized by automaticity, and within this concept of the human mind, adaptive flexibility is achieved only by the accumulation of an ever-larger number of domain-specific modules. As Tooby and Cosmides put it, the way to “create an architecture that is at the same time both powerful and more general is to bundle larger numbers of specialized mechanisms together so that in aggregate, rather than individually, they address a larger range of problems.”⁵

In identifying the views that distinguish orthodox evolutionary psychology, the anthropologist William Irons quotes from the introduction to *The Adapted Mind*, and he also quotes from another seminal text, *The Evolution of Human Sexuality*, in which Donald Symons maintains that humans are “genetically adapted to a hunting and gathering way of life.”⁶ Irons objects both to this falsely simplified picture of evolutionary history and to the concordant simplification in the model of the human mind. He notes that “general mechanisms” are “better at dealing with novelty”; he instances a general mechanism for food choice; and he argues that “the human mind consists of a hierarchy of mechanisms, with some being more general in purpose than others.”⁷

Like Irons, anthropologist Robert Foley rejects the concept of the EEA as a “uniform background to which all humans adapted in the past,” and he observes that one effect of orthodox EP is to fence off evolutionary processes “firmly into the past.”⁸ Foley observes that actual hunter-gatherers even now are extremely variable in ecology and social organization, and he concurs with Irons in locating the origin of various important parts of the total human motivational structure in a past much more remote than that of the Pleistocene. He notes for instance that “human cognition and sociality are . . . closely linked and form an important element in explanations for the evolution of human psychological propensities,” and he observes that “there are good reasons for placing this evolutionary element well back within primate evolution. . . . Far from being a uniquely human phenomenon, sociality based on interactions, relationships, and individual knowledge has a deep evolutionary heritage” (pp. 196, 197). Similar observations apply to male kin bonding.

Foley traces out a complex series of changes in life-history strategy from the Pliocene through different stages of the Pleistocene—shifts involving dietary habits, sexual pairing, child-rearing and intergenerational relations, technology, language, social organization, and group size. “In this more context-dependent perspective, the hunter-gatherer way of life, far from being a deeply stable adaptation, is itself the product of the interaction between ancestral features and new conditions, in this case demographic ones” (p. 202). Underlining the radical nature of this conclusion, in contrast with the EP view of human evolution, Foley puts agriculture on the same adaptive footing as hunting and gathering. Neither strategy for obtaining food is “more evolutionarily stable than the other” they are rather “both equally responses to local ecologies and demographic conditions” (p. 202).⁹ Foley’s conclusion strikes at the heart of the EP conception that hunting and gathering is the definitive mold or whetstone for human nature.

In an article that directly challenges the central theoretical premise of the EEA, anthropologist Rick Potts argues that adaptations can be selected not just for massively regular features of an environment but specifically for environmental variability. One form of “variability selection”—the form humans have adopted—is that of evolving complex structures or behaviors that are designed to respond to novel and unpredictable adaptive settings. “The primary characteristics are, according to the variability-selection hypothesis, adaptive with respect to environmental instability (the inconsistency of selective conditions)

rather than to any single relatively short-lived stable habitat or any series of such habitats experienced over time.”¹⁰ Potts succinctly describes the whole evolutionary sequence of an expanding repertory of adaptations designed not for the most efficient and automatic response to stable conditions but for exactly the opposite—flexible response to unstable conditions:

There appears to have been a succession of evolved mechanisms that amplified the adaptive flexibility of certain hominid taxa over time. . . . Pliocene locomotor versatility was succeeded in the early Pleistocene by an expansion of dietary possibilities, habitat diversity, and distances of movement. These means of adaptive flexibility were heightened as relative brain size increased during the middle Pleistocene. In still later populations, new means of behavioral flexibility were manifested, including complex symbolic coding, more rapid and spatially diverse technological innovation, and powerfully coordinated social action such as bone architectural feats and long-distance trading. These new possibilities represented an unprecedented degree of behavioral versatility, and were expressed after several hundred thousand years of intense habitat change. (p. 93)

In this conception of human evolution, adaptive flexibility is not a late-comer on the scene of human evolution. Flexibility in various forms is a continuous theme in the deep history of hominid evolution.

Irons, Foley, and Potts base their criticisms of evolutionary psychology on the EP concept of the EEA. That concept is integral with a certain concept of mental architecture, and other critics, working in a complementary way, have directed their criticisms primarily at the EP concept of mental architecture. Formulating concepts of human motivational structures similar to those formulated by Irons, psychologist Kevin MacDonald identifies a set of “evolved motive dispositions” that interact with domain-general intelligence to solve basic adaptive problems like survival, mate acquisition, or the creation of social coalitions.¹¹ In their critical examination of the idea of modularity, several Darwinian psychologists—including Chiappe, Geary, Huffman, MacDonald, and Hershberger—have concurred with the evolutionary anthropologists in emphasizing human adaptive flexibility, and they have argued that this flexibility depends on cognitive capacities for inferential and analogical reasoning that are decoupled from the automaticity of cognitive modules.¹²

Combining cognitive science with paleo-archaeology, Steven Mithen has also constructed a model of human mental architecture in which

the capacity for analogical thinking is a key element. Mithen argues that the emergence of this capacity, in the guise of “cognitive fluidity,” is the decisive event that produces the Human Revolution.¹³ The chief features of that revolution include complex social organization, complex multi-part tools, and symbolic thinking. Anthropologist Richard Klein and linguist Derek Bickerton adopt a similar perspective on the relative suddenness of the Human Revolution and speculate that the cognitive changes on which it depends are fundamentally linguistic in character. Archaeologist Paul Mellars concurs with Mithen in emphasizing the revolutionary character of the development of symbolic culture, and he gives a sympathetic hearing to the hypothesis that the originating force in the revolution is some crucial development in the capacity for language.¹⁴

By integrating the various criticisms and hypotheses I have described, we can construct a composite model of human evolutionary history and of human mental architecture that is sharply distinct from the model of orthodox evolutionary psychology. In the EP model, all the adaptive structures that had developed in the course of hominid evolution stabilized during the Pleistocene, and they stabilized in adaptive adjustment to a specific ecology, that of hunter-gatherers. The hunting and gathering way of life provided the regularities against which natural selection shaped the human motivational and cognitive system. In the EACA model, in contrast, human evolution did not stabilize in a structure of adaptations genetically molded to the hunter-gatherer way of life. In the EACA model—to exaggerate it a little for the sake of making the distinction clear—hominid evolution took almost exactly the opposite course. Hominids in the direct lineage of modern humans accumulated an ever-expanding repertory of adaptations designed to provide them with the capacity for flexible response to unstable ecological and demographic conditions, and that capacity for flexible response culminated in the Human Revolution.

The Human Revolution produced an exponential increase in the human capacity to manipulate its own ecology, including its social organization, and that revolutionary alteration in human power rendered the total human environment still more unstable, more variable and complex, more rapidly changing, than it had ever been before.¹⁵ The pace of change fuelled by technology keeps increasing, but so far, human motivational and cognitive structures have kept pace marvelously well with those changes. Humans in the Pleistocene were not adapted specifically for constructing and inhabiting global digital communities

or maneuvering wheeled internal combustion devices moving faster than any land animal, but computers are now second nature to most children in the developed world, and mild-mannered grandmothers routinely barrel down the freeway at seventy miles an hour.

Modern humans have modified their environments to maximize their own comfort, health, longevity, and general well-being, and the orthodox EP emphasis on mismatch flies in the face of common observation. Stress is part of living, and modern psychological economies have their own peculiar stresses, but modern humans in the developed world are remarkably comfortable, healthy, and happy. If we compare our general well-being with the implications in the bones of our ancestors, most of us would hardly be willing to trade in our air-conditioned houses and automobiles for short, painful lives punctuated by rampant disease, frequent starvation, and repeated, severe physical trauma.

Men still seek young and beautiful women; women still seek high-status males in possession of resources; parents still love and tend their children; people try to avoid death and injury, but nonetheless still engage in violent and dangerous behaviors when driven by sexual passions, greed, or a militant sense of social group identity. These basic dispositions are not exclusively or particularly adaptations to the Pleistocene ecology of hunting and gathering. Important elements of them were established far back in the hominid or primate past, and in the ecologies that have prevailed since the Human Revolution—in the Upper Paleolithic, the Neolithic, and in the agricultural, industrial, and technological periods—people have found new and often more effective ways of satisfying their basic adaptive needs. In the past 100,000 years, they have evidently developed adaptive capacities and needs—intellectual, social, and cultural powers—of which their Paleolithic ancestors had no inkling.

II

These alternative models for human evolution and human nature—the EP model and the EACA model—have different implications for the adaptive function of literature. If human nature reached fixity somewhere in the Pleistocene, before the Human Revolution took place, the complex cultural behavior and symbolic figuration that are distinguishing features of the Human Revolution would be peripheral to the core features of human nature. If the EACA model of human evolution and human nature is closer to the truth than the EP model, human nature

consists not in cognitive structures rigidly adapted to Pleistocene conditions but rather in evolved motive dispositions mediated by a flexible general intelligence. Within this model, complex cultural behavior and symbolic figuration would not be peripheral to the adaptive features of human nature. The arts, including the oral antecedents of literature, would serve a vital adaptive function—that of organizing human motives and thus ultimately regulating behavior. (In what follows, when I use the word “literature” I shall ask the reader to understand that word as a shorthand term for the phrase “literature and its oral antecedents.”)¹⁶

Evolutionary psychologists seeking to explain literature have formulated at least three distinct hypotheses that accord with the EP model of human nature. Geoffrey Miller explains all manifestations of specifically human mental capacity, including the arts and literature, as a medium for sexual display. Michelle Sugiyama argues that narratives serve as a vehicle to convey adaptively useful information about resources in the environment. Steven Pinker suggests that narratives can provide models of behavior that can be useful in solving adaptively significant problems, and he also suggests that the pleasure afforded by art is a parasitic side-effect of the gratification produced by activating cognitive capacities that have evolved to fulfill other adaptive functions.¹⁷ In these hypotheses, the arts appear either as supplementary instruments for solving more general and basic adaptive problems or as side-effects of such adaptations. They have no adaptive function that is integral to their own nature—that is, no adaptive function they are distinctively designed to fulfill. None of these hypotheses offers an explanation for art that takes account of its own distinguishing characteristics.

The hypothesis I am proposing for the adaptive function of the arts postulates that there is a fundamental difference between the cognitive condition of fully modern *homo sapiens* and that of all other animals. For all animals except humans, the bulk of behavior is automatically regulated by instinct or by conditioned response. Even for the highest primates, cultural learning and analogical and inferential reasoning are limited to simple instrumental activities, including crude tool use, and no primate other than humans achieves a degree of detached self-consciousness sufficient to assess his or her own motives, make conscious decisions about value structures, and subordinate immediate impulse to abstract concepts and symbolic figurations. 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, and 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.¹⁸

To my knowledge, this hypothesis about the adaptive function of literature and the other arts was first formulated by E. O. Wilson. In his chapter on the arts in *Consilience: The Unity of Knowledge*, Wilson supposes that intelligence subserves adaptive flexibility, and he argues that in detaching human behavior from stereotyped instinctive responses, intelligence presented a new adaptive problem—the problem of confusion, uncertainty, and motivational disorientation. The human capacity for the arts, he suggests, evolved precisely as the solution for that problem. “There was not enough time for human heredity to cope with the vastness of new contingent possibilities revealed by high intelligence. . . . The arts filled the gap.”¹⁹

The idea of a high intelligence revealing contingent possibilities and introducing uncertainty and confusion accords much more closely with the EACA model of human evolution than with the EP concepts of a monolithic EEA and a massively modular mind. Nonetheless, in seeking to account for the arts as “puzzling anomalies,” Tooby and Cosmides have reached conclusions very similar to those of Wilson.²⁰ They acknowledge that “humans are radically different from other species in the degree to which we use contingently true information—information that allows the regulation of improvised behavior that is successfully tailored to local conditions,” and they observe that “the exploitation of this exploding universe of contingent information created a vastly expanded risk of possible misapplications.” Narratives help to mitigate this risk by exercising “a powerfully organizing effect on our neurocognitive adaptations. . . . With fiction unleashing our reactions to potential lives and realities, we feel more richly and adaptively about what we have not actually experienced.”²¹ To argue this conclusion from the EP concept of the EEA is to take the long way around, but the point of arrival is the right one.

Humans must make choices about behavior, and they must regulate those choices by assessing alternative potential behaviors in relation to their evolved motive dispositions. Motives are activated through emotions, and the force of any given motive makes itself felt qualitatively, subjectively, as emotion. Literature and the other arts provide paradigmatic and emotionally saturated images of the world and of

human experience, and it is through these images that people come to understand the emotional quality of the motives available to them. The emotionally saturated images of art can, as Pinker argues, serve as practical guides to action—as game plan models. But that is not their chief psychological function. Their chief psychological function is to serve as instruments of subjective orientation—orientation in attitudes, emotional responses, values, and beliefs. Along with myth, religion, and ideology, the arts are a chief means through which humans organize their complex motivational dispositions and thus channel their own evolved motive dispositions into a functional program of behavior. By entering an author's imaginative universe, readers participate vicariously in the author's realized act of motivational orientation.

The experience of reading—or the auditory equivalent in the oral antecedents to literature—has some parallel with the experience of dreaming and also with the experience of “virtual reality” simulators. It is an experience of subjective absorption within an imaginary world, a world in which motives, situations, persons, and events operate dramatically, in narrative sequence. Unlike dreams, most literary works have a strong component of conscious conceptual order—a “thematic” order. But like dreams, and unlike other forms of conscious conceptual order—science, philosophy, scholarship—literature taps directly into the elemental response systems activated by emotion. Works of literature thus form a point of intersection between the most emotional, subjective parts of the mind and the most abstract and cerebral. This feature of literature is not incidental to its adaptive function. Literature provides imaginative structures within which people can integrate the ancient, conserved elements of their nature—elements conserved from pre-mammalian systems of approach/avoidance, mammalian affectional systems, and systems of primate sociality—with the conceptual, thematic structures through which they make abstract, theoretical sense of the world in which they live.²²

What evidence can we adduce for propositions, like those above, for the adaptive functions of literature? First, we can adduce the evidence of universality. Imaginative verbal constructs—myths, tales, and dramatic enactments—are common to all cultures. We can also adduce the ontogenetic evidence that humans have a universal, reliably developing aptitude for producing and consuming narratives. Every normally developing child learns language, and every normally developing child uses language to produce and consume imaginative narratives. Given that literature is a human universal, more particular evidence can be derived,

in almost limitless quantity and diversity, from every culture on earth, for the way literature enters into the total motivational life of individuals, shaping and directing their belief systems and their behavior.²³

Experimenting with human subjects presents certain obvious limitations, so one range of potential evidence for the adaptive function of literature—experiments in which individuals and social groups are raised in environments rigorously controlled to exclude and repress all imaginative activity—is out of reach. Since the production of imaginative verbal narrative is a human universal, we know of no naturally occurring instances of such imaginatively barren human groups. Other forms of experiment, including neuroimaging to assess the direct impact of literary experience, are possible and will in all likelihood be developed within the foreseeable future. Statistical content analysis of biologically significant content is already a rapidly developing research enterprise.²⁴ One chief purpose of empirical literary experimentation would be to give precise, quantified content to a working hypothesis that is, on its face, evidently true: the idea that literature has a profound impact on the emotions and ideas of its consumers.

Human contrivances, like the contrivances of natural selection, can have primary functions but also serve secondary purposes. For instance, the primary function of clothing is to provide warmth and protection, but clothing can also be used for sexual display, for status display, or to indicate affiliation with a specific social group. So also with writing. Writers write for any number of secondary reasons: to make money, to impress people, and perhaps sometimes even (as Geoffrey Miller would suppose) to attract sexual partners, though in this latter regard their success is notably inferior to that of rock stars, athletes, politicians, and evangelical ministers. For purposes such as these, producing literature is merely a means to an end—an end that could just as easily be reached by other means. None of these secondary purposes speaks directly to the distinctive psychological features of literary experience, either in its production or its reception. The distinguishing characteristic of literature is that it creates an imaginative order in which simulated experience can take place. None of the secondary purposes has any particular affinity with that characteristic, and as a result none accounts for the profound psychological and cultural effects of literature. In seeking to identify adaptive benefits for literature as a universal and reliably developing human behavior, we should not let secondary purposes draw our attention away from the distinguishing characteristics that can help us to identify the primary adaptive functions of the behavior.

III

By emphasizing stabilizing selection within a supposedly monolithic EEA, evolutionary psychologists limit the significance of individual and group differences. They thus skirt social Darwinism and racialism, but they also produce a model of human evolution in which one key feature of natural selection—adaptively significant individual variation—has virtually disappeared, at least for humans.²⁵ Other Darwinian psychologists, in company with behavioral geneticists, have rejected this dogmatic limitation of human nature to human universals. They have observed that individual differences form a crucial part of human ecology. In assessing tactical options, all individual people must take account of their own particular characteristics, their aptitudes and dispositions, and they must take account also of the individual characteristics of other people, since these differences constitute a major part of the social environment.²⁶

Since individual identity is a crucial feature of the adaptive ecology of human beings, it is crucial also to the construction of meaning in literary texts. Writers are people, and people construct imaginative scenarios in order to satisfy their own psychological needs. The most general such need is the need to articulate and affirm the writer's own characteristic stances or ways of coping with the world—his or her own beliefs, values, and attitudes. The total set of these beliefs, values, and attitudes constitutes a "point of view," a certain perspective on the world. In this broad sense, there is a distinct point of view implicit in all literary art. Characters in a literary representation, like people in real life, need to affirm their own distinct points of view, but the author mediates among all represented points of view and encompasses them within a single, comprehensive interpretation. The ultimate shaping force behind any imaginative construct is thus the individual identity of the writer. It is for this reason, as Henry James declares, that "the deepest quality of a work of art will always be the quality of the mind of the producer."²⁷

All individual identities are shaped partly by innate characteristics—the elements of human nature that vary within the range of individual differences—and partly by the conditions of experience. Those conditions are themselves partly local and individual and partly collective and public. Local and individual conditions include circumstances of personal experience such as that of being orphaned or lamed. Collective and public conditions include climate and physical ecology, the forms of social organization, the modes of production, and collective

imaginative structures such as religions, political ideologies, moral doctrines, philosophical ideas, and literary traditions. The total set of such collective imaginative structures is a chief part of what we commonly call “culture.”

Every specific culture constitutes a distinct symbolic order and a distinct range of possible meanings and values, and every literary text constitutes a distinct arrangement of the symbolic meanings available within a given cultural order, including its literary traditions. Traditional, highly conventionalized cultures severely restrict the range of individual variation in imaginative expression, and modern Western cultures have maximized individuality, but all experience takes place within individual minds, and even in highly conventionalized cultures, a conventional set of symbols instantiates itself as the imaginative experience of the poet, storyteller, or dramatist who serves as the local medium of the traditional symbolic order. No symbolic order is wholly static, and all individual writers introduce some element of individual uniqueness or creativity into the symbolic order of their own cultures.

From this whole set of propositions—about the EACA model of human evolution and human nature, about the adaptive function of literature, and about the interpenetration of the elemental components of human nature, specific cultural orders, and individual identities—we can formulate three main objectives for Darwinian literary study: (1) to assess each individual literary work or group of works as a peculiar configuration of a specific temperament or individual identity within a specific cultural ecology; (2) to identify both the individual identity and the cultural ecology as a specific organization of the elements of human nature; and (3) to assess and compare the scope and quality of life and mind in all such configurations.

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1. On the history of Darwinian and anti-Darwinian thinking in the social sciences, see Carl Degler, *In Search of Human Nature: The Decline and Revival of Darwinism in American Social Thought* (New York: Oxford University Press, 1991). For an account of the role of “human universals” in literary theory from Aristotle to the present, see Joseph Carroll, *Literary Darwinism: Evolution, Human Nature, and Literature* (New York: Routledge, 2004), pp. 117–28.

2. See Carroll, *Literary Darwinism*, pp. 193–94.
3. Leda Cosmides, John Tooby, and Jerome Barkow, “Introduction: Evolutionary Psychology and Conceptual Integration,” in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*, ed. Jerome Barkow, Leda Cosmides, and John Tooby (New York: Oxford University Press, 1992), p. 5.
4. See Christopher Stringer and Clive Gamble, *In Search of the Neanderthals* (New York: Thames and Hudson, 1993), p. 183. Richard Klein and Blake Edgar, *The Dawn of Human Culture* (New York: John Wiley and Sons, 2002), pp. 225–29; Vincent Sarich and Frank Miele, *Race: The Reality of Human Differences* (Boulder: Westview, 2004).
5. John Tooby and Leda Cosmides, “The Psychological Foundations of Culture,” in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*, ed. Jerome Barkow, Leda Cosmides, and John Tooby (New York: Oxford University Press, 1992), p. 113. Also see Dan Sperber, *Explaining Culture: A Naturalistic Approach* (Oxford: Blackwell, 1996), pp. 119–50; Leda Cosmides and John Tooby, “Consider the Source: The Evolution of Adaptations for Decoupling and Metarepresentation,” in *Metarepresentations: A Multidisciplinary Perspective*, ed. Dan Sperber (Oxford: Oxford University Press, 2000), p. 56; Richard Samuels, “Massively Modular Minds: Evolutionary Psychology and Cognitive Architecture,” in *Evolution and the Human Mind: Modularity, Language, and Meta-Cognition*, ed. Peter Carruthers and Andrew Chamberlain (Cambridge: Cambridge University Press, 2000), pp. 13–46; Leda Cosmides and John Tooby, “Unraveling the Enigma of Human Intelligence: Evolutionary Psychology and the Multimodular Mind,” in *The Evolution of Intelligence*, ed. Robert J. Sternberg and James C. Kaufman (Mahwah, N.J.: Lawrence Erlbaum, 2002), pp. 147, 178.
6. Donald Symons, *The Evolution of Human Sexuality* (New York: Oxford University Press, 1979), pp. 35–36.
7. William Irons, “Adaptively Relevant Environments versus the Environment of Evolutionary Adaptedness,” *Evolutionary Anthropology* 6 (1998): 198.
8. Robert Foley, “The Adaptive Legacy of Human Evolution: A Search for the Environment of Evolutionary Adaptedness,” *Evolutionary Anthropology* 4 (1996): 194.
9. Also see Paul Griffiths, *What Emotions Really Are: The Problem of Psychological Categories* (Chicago: University of Chicago Press, 1997), pp. 114–15.
10. Rick Potts, “Variability Selection in Hominid Evolution,” *Evolutionary Anthropology* 8 (1998): 86.
11. Kevin MacDonald, “A Perspective on Darwinian Psychology: The Importance of Domain-General Mechanisms, Plasticity, and Individual Differences,” *Ethology and Sociobiology* 12 (1991): 449–80; Kevin MacDonald, “Evolution, The Five-Factor Model, and Levels of Personality,” *Journal of Personality* 63 (1995): 525–67; Kevin MacDonald, “Evolution, Culture, and the Five-Factor Model,” *Journal of Cross-Cultural Psychology* 29 (1998): 119–49. On the interplay between relatively general and relatively specific cognitive mechanisms, also see Anthony P. Atkinson and Michael Wheeler, “The Grain of Domains: The Evolutionary-Psychological Case against Domain-General Cognition, Mind and Language,” *Mind and Language* 19 (2004): 147–76.

12. Dan Chiappe and Kevin MacDonald, "Metaphor, Modularity, and the Evolution of Conceptual Integration," *Metaphor and Symbol* 15 (2000): 137–58; David Geary and Kelly Huffman, "Brain and Cognitive Evolution: Forms of Modularity and Functions of Mind," *Psychological Bulletin* 128 (2002): 667–98; Kevin MacDonald and Scott Hershberger, "Theoretical Issues in the Study of Evolution and Development," in *Evolutionary Perspectives on Human Development*, 2nd edition, ed. Robert Burgess and Kevin MacDonald (Thousand Oaks: Sage, 2004), pp. 21–72; David Geary, *The Origin of Mind Evolution of Brain, Cognition, and General Intelligence* (Washington: American Psychological Association, 2005).
13. Steven Mithen, *The Prehistory of the Mind: The Cognitive Origins of Art, Religion, and Science* (London: Thames and Hudson, 1996); Steven Mithen, "Mind, Brain, and Material Culture: An Archaeological Perspective," in *Evolution and the Human Mind: Modularity, Language, and Meta-Cognition*, ed. Peter Carruthers and Andrew Chamberlain (Cambridge: Cambridge University Press, 2000), pp. 207–17; Steven Mithen, "The Evolution of Imagination: An Archaeological Perspective," *SubStance* 30 (2001): 28–54.
14. Klein, Edgar, *The Dawn of Human Culture*, pp. 24, 146, 215, 270–72; Derek Bickerton, *Language and Species* (Chicago: University of Chicago Press, 1990); Derek Bickerton, "Foraging versus Social Intelligence in The Evolution of Protolanguage," in *The Transition to Language*, ed. Alison Wray (Oxford: Oxford University Press, 2000), pp. 207–25; Derek Bickerton, "From Protolanguage to Language," in *The Speciation of Modern Homo Sapiens*, ed. T. J. Crow (Oxford: Oxford University Press, 2002), pp. 103–20; Paul Mellars, "Symbolism, Language, and the Neanderthal Mind," in *Modelling the Early Human Mind*, ed. Paul Mellars and Kathleen Gibson (Cambridge: The MacDonald Institute for Archaeological Research, 1996), pp. 27–29. For an account of the emergence of modern humans that emphasizes gradual, step-wise change, see Sally McBrearty and Alison S. Brooks, "The Revolution that Wasn't: A New Interpretation of the Origin of Modern Human Behavior," *Journal of Human Evolution* 39 (2000): 453–563. Also see Christopher S. Henshilwood and Curtis W. Marean, "The Origin of Modern Human Behavior: Critique of the Models and Their Test Implications," *Current Anthropology* 44 (2003): 627–51.
15. For a synthesis of models emphasizing ecological and social forces in human cognitive evolution, see Mark V. Flinn, David C. Geary, and Carol V. Ward, "Ecological Dominance, Social Competition, and Coalitionary Arms Races: Why Humans Evolved Extraordinary Intelligence," *Evolution and Human Behavior* 26 (2005): 10–46.
16. For a survey of work in Darwinian literary study, see Joseph Carroll, "Evolutionary Psychology and Literature," in *The Evolutionary Psychology Handbook*, ed. David M. Buss (Hoboken, N.J.: Wiley, forthcoming).
17. Geoffrey Miller, *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature* (New York: Doubleday, 2000); Michelle Sugiyama, "Food, Foragers, and Folklore: The Role of Narrative in Human Subsistence," *Evolution and Human Behavior* 22 (2001): 221–40; Steven Pinker, *How the Mind Works* (New York: W. W. Norton, 1997), pp. 534–43.
18. See Stephen Budiansky, *If a Lion Could Talk: How Animals Think* (London: Weidenfeld and Nicolson, 1998); Marc Hauser, *Wild Minds: What Animals Really Think* (New York: Henry Holt, 2000). On the significance of "intentional states" in the evolution of the modern human brain, see Robin Dunbar, *The Human Story: A New History of Mankind's Evolution* (London: Faber and Faber, 2004).

19. E. O. Wilson, *Consilience: The Unity of Knowledge* (New York: Alfred A. Knopf, 1998), p. 225.
20. John Tooby and Leda Cosmides, "Does Beauty Build Adapted Minds? Toward an Evolutionary Theory of Aesthetics, Fiction, and the Arts," *SubStance* 30 (2001): 7.
21. Tooby and Cosmides, "Does Beauty Build Adapted Minds?": 19, 21, 23. Also see Cosmides and Tooby, "Consider the Source": 90.
22. On the interaction between the conserved (ancient) and emergent (modern) elements of human nature, see Arnold Buss, "Evolutionary Perspectives on Personality Traits," in *Handbook of Personality Psychology*, ed. Robert Hogan, John Johnson, and Stephen Briggs (San Diego: Academic Press, 1997), pp. 346–66.
23. On the argument from universality, see Ellen Dissanayake, *Art and Intimacy: How the Arts Began* (Seattle: University of Washington Press, 2000); Michelle Sugiyama, "Narrative Theory and Function: Why Evolution Matters," *Philosophy and Literature* 25 (2001): 233–50.
24. For instance, see Jonathan Gottschall, "Patterns of Characterization in Folk Tales across Geographic Regions and Levels of Cultural Complexity: Literature as a Neglected Source of Quantitative Data," *Human Nature* 14 (2003): 365–82; Daniel Kruger, Maryanne Fisher, and Ian Jobling, "Proper and Dark Heroes as Dads and Cads: Alternative Mating Strategies in British and Romantic Literature," *Human Nature* 14 (2003): 305–17; Joseph Carroll and Jonathan Gottschall, "Human Nature and Agonistic Structure in Canonical British Novels of the Nineteenth and Early Twentieth Centuries: A Content Analysis," in *Anthropologie und Sozialgeschichte der Literatur Heuristiken der Literaturwissenschaft*, ed. Uta Klein, Katja Mellmann, and Steffanie Metzger (Paderborn, Germany: Mentis Verlag, forthcoming).
25. See John Tooby and Leda Cosmides, "On the Universality of Human Nature and the Uniqueness of the Individual: The Role of Genetics and Adaptation," *Journal of Personality* 58 (1990): 17–67; Tooby and Cosmides, "The Psychological Foundations of Culture," pp. 25, 35, 38, 79, 80; Sperber, *Explaining Culture*, pp. 152–53.
26. See MacDonald, "A Perspective on Darwinian Psychology"; David M. Buss, "Social Adaptation and Five Major Factors of Personality," in *The Five-Factor Model of Personality: Theoretical Perspectives*, ed. Jerry S. Wiggins (New York: Guilford, 1996), 180–207; Nancy Segal and Kevin MacDonald, "Behavioral Genetics and Evolutionary Psychology: Unified Perspective on Personality Research," *Human Biology* 70 (1998): 159–84; Nancy Segal, *Entwined Lives: Twins and What They Tell Us about Human Behavior* (New York: Dutton, 1999).
27. Henry James, "The Art of Fiction," in *Henry James: Literary Criticism: Essays on Literature, American Writers, English Writers*, ed. Leon Edel and Mark Wilson (New York: Library of America, 1984), p. 64.