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Adaptationist Literary Study: An Introductory Guide

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The New Darwinian Revolution

In the past thirty years, a revolution has taken place in the social sciences. When anthropology and sociology were founded as academic disciplines in the early years of the nineteenth century, both disciplines segregated themselves from evolutionary biology and insisted that “culture” or “society” were autonomous forces that shaped human behavior (Brown, pp. 1-38; D. M. Buss, 1999, part one; Degler; Fox, 1989, chaps. 3 & 4; Freeman, 1992, 1999, pp. 17-27; Tooby and Cosmides, 1992, p. 28). During the early and middle parts of the twentieth century, analytic psychology oriented itself on one side to the ideas of simple behavioral conditioning and on the other to the “depth” psychology of Freudian psychoanalysis. “Humanistic” psychology, opposing the “determinism” both of behaviorism and of psychoanalysis, emphasized concepts such as free will, conscious self-determination, and transcendence. Thus it was that until about 1975 “standard social science” operated without reference to the idea of an evolved and adapted “human nature,” that is, a genetically mediated, species-typical set of behavioral and cognitive dispositions. Over the past three decades, sociobiologists and evolutionary psychologists have overwhelmingly demonstrated that human nature does in fact exist and that it fundamentally constrains all cultural formations. In the past fifteen years or so, literary scholars have begun to assimilate the findings of evolutionary social science, and these scholars now constitute a distinct movement in literary theory and literary criticism.

The most commonly used umbrella term for all the evolutionary social sciences is “evolutionary psychology,” but the new Darwinism in the social sciences integrates findings from a wide range of disciplines: evolutionary anthropology, ethology or cross-cultural anthropology, sociobiology, genetics, sex research, developmental psychology, family psychology, cognitive neuroscience, affective neuroscience, primatology, animal behavior, linguistics, and other fields. This whole interlocking set of disciplines has produced a constantly expanding network of empirically grounded findings about the evolution and the

actual current structure of human psychology and human social organization. Centers for the study of evolutionary psychology have now established themselves in numerous major universities in America and Europe, and works of evolutionary psychologists written for the educated lay public regularly top the best-seller lists for works of non-fiction.

Many social scientists have not yet acknowledged the authority of the new evolutionary synthesis, but it seems safe to predict that within two decades virtually all social science will be at least implicitly evolutionary in character. This prediction seems safe for both positive and negative reasons. The positive reason is that evolutionary social science has produced new findings and new explanations that are of fundamental importance for the understanding of human behavior, and there is every reason for thinking that this scientific success will continue. Evolutionary social science is based on the historical reality of human evolution; it is comprehensive in scope and empirical in method; and it is progressively synthetic. The negative reason is that there is no real alternative to an evolutionary conception of human psychology. The only alternative is the hypothesis that humans, in contrast to every other species of animal, do *not* possess a species-typical set of genetically mediated behavioral dispositions. That hypothesis, though it governed most social science through the twentieth century, is profoundly false. Its falsity has been decisively demonstrated in multitudinous ways, in all the interlocking disciplines mentioned above.

Adaptationist literary scholars accept the basic logic of an adaptationist understanding of human behavior. In concord both with evolutionary psychologists and with the majority of literary authors and theorists from the time of Aristotle to the later part of the twentieth century, they believe in “human nature.” That is, they believe that humans in all ages and cultures display a common, basic set of motives, feelings, and ways of thinking. They believe further that literature commonly depicts human nature, that it is produced by human nature, and that it satisfies the needs of human nature. As contemporary Darwinists, they look to adaptationist social science to provide the most thorough, detailed guide to the actual content and structure of human nature, and they use that guide in analyzing the content and form of literary depictions, the perspectives of authors, and the responses of readers.

In the second section of this essay, I describe the historical context of adaptationist literary study, locating it in relation to the history both of academic literary study and of the social sciences. In the third section, I delineate the current understanding of human nature

in the social sciences and in the folk psychology exemplified in literature. In section four, I describe the work done thus far in adaptationist literary study, and in the final section I consider the prospects for the increasing acceptance of adaptationist literary study within departments of literature.

The Historical Context of Adaptationist Literary Study

Literature did not become the subject of an academic discipline until the last two decades of the nineteenth century, and until the 1940s, literary scholarship consisted chiefly of philological and historical scholarship and moralized aesthetic commentary (Abrams; Graff). In the 1930s, “The New Criticism” introduced methods for the intensive formal analysis of theme, tone, and style. In the late 1970s, “poststructuralism” or “postmodernism,” spearheaded by the “deconstructive” philosophy of Jacques Derrida, produced a revolution in literary studies. The two chief tenets of poststructuralism are “textualism” and “indeterminacy.” Textualism identifies language or “discourse” as the primary constitutive material of human experience. In Derrida’s famous formulation, “*Il n’y a pas de hors texte*”—there is no outside the text; there is nothing outside the text (p. 158). Indeterminacy identifies all meaning as self-contradictory, with the result that no determinate meaning is possible. In Fredric Jameson’s formulation, “‘Poststructuralism,’ or, as I prefer, ‘theoretical discourse,’ is at one with the demonstration of the necessary incoherence and impossibility of all thinking” (p. 218). In its political aspect, poststructuralism seeks to undermine traditionally dominant terms in social, psychological, and sexual concepts. In modern Western civilization, science is itself a dominant cultural value, and in its epistemological aspect, poststructuralist theories of science seek to undermine the ideas of “truth” and “reality” through which science claims normative epistemic authority (Gross & Levitt, 1994; Gross, Levitt, & Lewis, 1997; Koertge, 1998; Parsons, 2003; Sokal, 1996; Sokal & Bricmont, 1998).

Before the poststructuralist revolution, humanists for the most part felt that their own kind of intellectual activity—scholarly, impressionistic, intuitive, and discursive—was fundamentally distinct from the activity of the sciences, both the physical and the social sciences. The “two cultures,” as C. P. Snow designated them, were supposed to have fundamentally different subject matters, to operate according to different rules, and to produce different kinds of knowledge. New Critics regarded literary texts as autonomous systems of meaning, independent of all external conditioning, either social or

biographical. Poststructuralist theory expanded the notion of textual autonomy to include not just the isolated literary text but the whole textual universe—the world constituted by “discourse.” The idea of cultural autonomy brings “standard social science”—that is, non-evolutionary social science—into partial alignment with poststructuralism, and in the 1990s poststructuralist theory began to seep over into anthropology. Much standard social science nonetheless remains distinct from postmodernism in that standard social scientists, though they reject the idea of human nature and deny that biology influences culture, nonetheless continue to regard scientific methodology as a medium of objective knowledge about a real world that exists independently of cultural and linguistic constructs.

Adaptationist literary scholars reject the irrationalism of the poststructuralists and the blank-slate model of human nature that informs standard social science. They reject also the idea that science and the humanities form two distinct cultures, with different subject areas, different forms of knowledge, and different criteria of validity. In adopting the framework of adaptationist social science, adaptationist literary scholars adopt along with it an overarching rationale for the integration of all disciplines under the authority of science. For adaptationist literary scholars, nature forms a unified causal network, and science provides an integrated understanding of that network. The sciences form a nested hierarchy in which the more elementary principles of the natural order constrain the organization of phenomena at higher levels. Thus, physics constrains chemistry; chemistry constrains biology; biology constrains psychology and the other human sciences; and the evolutionary social sciences constrain the study of all cultural products, including literature and the other arts. This is the argument made by E. O. Wilson in *Consilience: The Unity of Knowledge*, and Wilson himself identifies the humanities as the last frontier for bringing all possible phenomena within the scope of scientific understanding. Unlike poststructuralist theorists of science, adaptationist literary scholars do not seek to assimilate science to the theory of “discourse.” Instead, they seek to bring all discursive and imaginative activity within the scope of subjects accessible to science.

Human Nature

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. Evolutionary psychologists commonly distinguish between inclusive fitness as an “ultimate” force that has shaped behavioral dispositions and the “proximal” mechanisms that mediate those dispositions (Symons, 1989, 1992; Tooby & Cosmides,

1992; Pinker, 1997). 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. Humans share with all animals a physiology organized in basic ways around reactive impulses of “approach” and “avoidance” (A. Buss, 1997; MacDonald, 1995, 1998). They share with other social animals dispositions organized around affiliation and dominance (A. Buss, 1997; Cummins). 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 combination of a narrowed birth canal and a large brain 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 mammals. Humans are the only animals that have paternal investment and that also live in large multi-male groups with complex coalitions (Flinn & Ward; Geary, 2005; Geary & Flinn). Males of all species have evolved in such a way as not characteristically to invest in the offspring of other males, and living in multi-male groups reduces paternity certainty. To mediate the conflict between multi-male group living and paternal investment in offspring, humans have evolved mechanisms of pair bonding that include concealed ovulation, permanent female sexual receptivity, and emotional dispositions for sexual jealousy (Bjorklund & Pellegrini; D. M. Buss, 2000, 2003; Geary, 1998, 2005; Geary & Flinn; Schmitt). Human females are also distinctive in having post-menopausal life-expectancy—a condition in which older women are relatively free to raise their latest offspring to maturity and to aid in caring for grandchildren.

Humans like other animals share fitness interests with their mates and their offspring, but 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 genetic quality than their own mates (D. M. Buss, 2003; Geary, 1998; Symons, 1979; Schmitt). 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 sometimes work smoothly enough for practical purposes, but they not infrequently break down in rejection, separation, abandonment, violent struggle, abuse, and even murder (D. M. Buss, 2000; Daly & Wilson). 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 of a share than the parent is willing to give. Parents preferentially invest in some offspring, and they must also balance off the effort they give to mating and the effort they give to parenting (Bjorklund & Pellegrini; Daly & Wilson; Geary & Flinn; Flinn & Ward; Salmon, 2005b). Siblings form a natural social unit, bonded by interest against non-related people, but 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 have preferential interests 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 (Daly & Wilson; Hamilton, 1996, 2001; Salmon 2005b; Trivers, 1972, 1985). The workings of inclusive fitness thus guarantee a perpetual drama in which intimacy and opposition, cooperation and conflict, are inextricably bound together.

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, social coalitions, status hierarchies, and ingroup/outgroup relations (Alexander; Cummins;

Flinn & Ward; Geary & Flinn). Three features of the distinctively human suite of characteristics, all dependent on the expanded human brain, are particularly important in mediating these social relationships: (a) self-awareness, (b) “theory of mind,” and (c) language. Self-awareness involves a sense of one’s self as a distinct person with a history—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 the peculiarly human experiences of self-esteem, embarrassment, shame, and guilt (Budiansky; A. Buss, 1997, 2001; Darwin, 1981; Hauser; Paulhus & John). “Theory of mind” is the peculiarly human capacity for envisioning the inner mental state of other humans, their beliefs, desires, feelings, thoughts, and perceptions. A key diagnostic characteristic for this peculiarly human 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 two and four (Baron-Cohen). Language is the chief medium for conveying information in non-genetic ways. That kind of informational transmission is what we call “culture.” Through culture, humans organize their genetically transmitted behavioral dispositions into elaborate systems that regulate public behavior and inform private thoughts. Culture translates human nature into social norms and shared imaginative structures—structures of meaning in art, poetry, narratives, drama, myths, religions, ideologies, philosophies, and science (Boyd, 2005b; Carroll, 2005, “The Adaptive Function of Literature,” in press; Dissanayake, 1995b, 2000).

When we speak of “human nature,” it is generally 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 have in mind. These characteristics are so firmly grounded in the adaptive logic of the human species that they exercise a constraining influence on every known culture (Brown). Individuals can and do deviate from species-typical characteristics, but the recognition of the species-typical nonetheless constitutes a common frame of reference (Carroll, 2004 part 2 chap. 6). Adaptations emerge from regularities in ancestral environments, and the basic ground plan of human motives and human feelings constitutes one of the most important such regularities within the ancestral environments of modern humans (Flinn, Geary, & Ward; Mithen). 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 constitutes 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 (Baron-Cohen; Dunbar, 2004). That adaptive capacity constitutes a “folk psychology,” and it is in literature that folk psychology receives its most complete and adequate articulation.

Adaptationist social scientists seek to give a precise, theoretically grounded, and empirically confirmed account of human nature, and that account converges with the folk psychology exemplified in literature. In the remaining paragraphs of this section, I shall describe human nature as it is understood both in adaptationist social science and in folk psychology.

It is human nature to fear physical harm and to seek physical pleasures, to need the company of other humans, to form social coalitions based on kinship and reciprocal exchange, to seek status, and to acknowledge status hierarchies. It is human nature to organize social relationships by age, sex, status, family role, and kinship groupings, and to formalize those relations in publicly recognized signals, codes, displays, rituals, and ceremonies. It is human nature always to struggle with others, kin and non-kin, over resources—material, emotional, and social.

It is human nature for men to be more aggressive and more risk-taking than women, and for women to be more nurturing and more finely attuned to personal interactions than men. It is human nature to experience sexual passion and sexual jealousy. It is human nature for men to philander, or want to, and for women to resist casual male efforts at seduction. It is human nature for men and women both to value kindness, intelligence, and reliability in mates, but for men to give preference to youth and beauty in mates, and for women to seek mates who have the status and resources necessary to help sustain their offspring.

It is human nature to love one’s self better than one’s neighbor, but it is also human nature to form long-term bonds, to love one’s own offspring, to favor one’s own kin over strangers, and to favor one’s own social group over other social groups. It is human nature for mothers and infants to form intense emotional bonds, for older children to become preoccupied with peer relations, and for sexually mature adults to break away from parental bonds and form new bonds based on sexual relations. It is human nature for parents to love their children, but to love some children more than others, and to seek to influence their children’s behavior in ways that fulfill the parent’s own needs and preferences. It is human nature for children to love their parents but also often to seek to gain from their parents more than their parents are

willing to give. It is human nature to feel close to one's siblings but also to be jealous of them and to be in competition with them.

It is human nature to be curious about one's neighbors, to gossip about them, to form contracts with them, and to feel temptations to take advantage of them. It is human nature to be suspicious of one's neighbors, to pity their misfortunes, and to envy their successes. It is human nature to think in terms of "them" and "us," to identify strongly with one's own social group, with whom one shares a feeling of affinity and pride, and to view other groups as alien—as inferiors to be exploited, as competitors, or as potential enemies. It is human nature to engage in warfare, to seek to dominate other human groups, to acquire or exploit their resources, and to kill them when they resist or attack.

It is human nature to feel a sense of moral obligation based on kinship and social relations, to make fine discriminations about what is owed to each distinct social group, to feel guilt at one's own failure to sustain obligations to others, and to feel bitter resentment at the failure of others to sustain obligations to one's self. It is human nature to tell lies, and often to lie to one's self about the lies one tells. It is human nature to justify and rationalize one's own behavior, to exaggerate one's own altruism, and to disguise and conceal one's selfishness. It is thus a part of human nature always to produce some gap or tension between the inner private person and the public persona. It is human nature to act out one's public persona so convincingly that one sometimes deludes one's self, and it is human nature to expose and mock the false pretensions of others.

It is human nature to be curious about the world, to inquire into the workings of things, to devise tools and instruments for manipulating objects, and to devise explanations for how things work. It is human nature to ornament the body, to create graphic images, to sing and dance, to play with the sounds and meanings of words, to play games, tell jokes, and use metaphors and symbolic images.

It is human nature to grieve at the loss of loved ones, to feel deep chagrin at failure and defeat, to feel shame at public humiliation, joy at the triumph over enemies, and pride in solving problems, overcoming obstacles, and achieving goals. It is human nature often to have divided impulses and to be dissatisfied even in the midst of success.

And finally, it is human nature to create narratives that display the workings of human nature, explain the larger order of things, and locate humans within that order.

Contributions to Adaptationist Literary Study

Adaptation by means of natural selection is a relatively recent idea, much more recent than literature and literary theory, but the idea of "human nature" is at least as old as literature itself. Before Darwin, literary authors and literary theorists would not have recognized the evolutionary source for human nature, but the actual existence of human nature is for most of them the central fact in literary representation. It is the subject matter of literature, and it is the common, shared framework through which authors communicate with their audiences. For a number of adaptationist literary theorists and critics, recognizing the central importance of human nature has thus been a starting point for reconceptualizing the whole enterprise of literary study (Barash and Barash, 2002, 2005; Barrow, 1995; Boyd, 1998, 2005a; Carroll 1995, 2004, 2005; Cooke, 1999b; Easterlin, 1993, 1999a, 1999b; David Evans, 1998; Dylan Evans, 2005; Fromm, 2003a, 2003b; Gottschall, 2003c, 2004; Gottschall & Wilson, 2005; Headlam Wells & McFadden; Love, 1998a, 1998b; McEwan, 2005; Nieves, 2003; Nordlund, 2002a; Storey, 1993, 1996; D. S. Wilson, 2005).

One of the most prominent topics in evolutionary psychology is mate-selection strategy. As it happens, that is also one of the most prominent subjects or themes in literature. Love stories, in one form or another, probably form a preponderance of all narratives. (There is an opportunity here for a set of quantitative studies on the actual proportions of such topics in folk tales and in world literature, with an eye to differences in proportion in different cultural ecologies.) Adaptationist literary studies that focus on mate selection range over a wide spectrum of literature. Gottschall and his colleagues have conducted several empirical studies analyzing mate selection strategies and characteristics of male and female characters in folk tales, fairy tales, and literary texts (Carroll & Gottschall; Gottschall, 2003b, 2005; Gottschall et al., 2004; Gottschall et al., 2005; Gottschall et al., "Can Literary Study Be Scientific," in press; Gottschall et al., "A Census of the Western Canon," in press). Fox has examined mating conflicts between older and younger males in various epics (1995, 2005). Barash and Barash comment on sexual relations in Virgil's *Aeneid* (2002) and on a wide array of texts across different periods and different national literatures (2005). Thiessen and Umezawa (1998) analyze a medieval Japanese novel in sociobiological terms. Nordlund (2005) discusses jealousy in *Othello* (2002b) and romantic love in *All's Well That Ends Well* and in *Troilus and Cressida*. Nettle (2005) gives an adaptationist structural analysis of sexual relations in *Twelfth Night*. Cooke examines sexual relations in *Swan Lake* and in Pushkin's "The Snow Storm" (1995, 1999c). Jobling (2002) identifies a chief

component of the Byronic ethos as the “cad” mating strategy, and Kruger, Fisher, and Jobling use passages from Byron and Scott to test short and long-term mating strategies in a contemporary population. Carroll has analyzed mate selection in several Victorian novels (2004, part 2 chaps. 3 & 6) and the significance of homosexuality in *The Picture of Dorian Gray* (“Aestheticism,” in press). Nesse (1995) examines three Victorian versions of the Guinevere myth. Saunders (in press) discusses male reproductive strategies in a Sherwood Anderson story. Ellis, Symons, Salmon, and Whissel have analyzed the way male and female mate-selection strategies shape pornography and romance fiction (Ellis & Symons; Salmon & Symons; Whissel).

Mating is only one phase of reproduction, and reproduction itself is a subset of “inclusive fitness,” which includes the propagation of genes in kin—siblings and cousins, for instance—as well as in offspring. Several adaptationist studies have examined family relations in literary texts. Dissanayake (2001b) identifies mother-infant interaction as a source for imaginative development, and Miall and Dissanayake give a metrical, phonetic, and foregrounding analysis of “motherese.” Storey (1996), Easterlin (2000), and Scalise Sugiyama (2001c) all critique the Freudian Oedipal conception of parent-child relations and offer alternatives from adaptationist findings. Gottschall (2003a) uses adaptationist theories of sex-biased infanticide to illuminate the sexual demographics in Homer’s narratives. Boyd (1999, 2005a), Nettle (2005b), and Scalise Sugiyama (2003) have all discussed the disrupted family relations in *Hamlet*. Boyd examines the interactions between power and kinship in Shakespeare’s *Titus Andronicus* (“Kind and Unkindness,” in press). Headlam Wells comments on family relations in several Shakespeare plays, including *King Lear*. Carroll discusses disrupted childhood development in the novels of Dickens (2004, part 1 chap. 6), and Saunders (2005) in Wharton’s novel *The Children*.

Social relations beyond the connections among kin form a chief field for the organization of human behavior. A group of adaptationist scholars has analyzed social group sizes and used those analyses to identify basic structural characteristics in the organization of drama (Stiller, Nettle, & Dunbar, 2004; Stiller & Hudson, 2005, Matthews and Barrett, 2005). One key feature in the evolution of human sociality is the development of the uniquely human capacity for “theory of mind” or looking into the minds of other people. Dunbar, Barrett, and Lycett have made this concept a central component in their theory of literature (Barrett, Dunbar, & Lycett, 2002; Dunbar, 2004, 2005; Dunbar, Barrett, & Lycett, 2005). Scalise Sugiyama (1996) has examined the manipulation of audience from an adaptationist perspective, and Carroll

has strongly emphasized the interplay among points of view as a central feature of literary meaning (2004, part 2 chap. 6, 2005).

Certain literary works make social issues a central theme, and some adaptationist studies have focused on such themes. Carroll discusses three novels that depict encounters between two radically differentiated human groups—Neanderthals and Cro-Magnons (2004, part 2 chap. 5). Barash and Barash (2005) examine social themes in several works from world literature. Gottschall (2001) discusses dominance behavior in *The Iliad*, and Nettle (2005) in *Richard III*. The ethics of social relations form a central theme in Headlam Wells’s *Shakespeare’s Humanism*. Jobling (2001a) uses an adaptationist analysis of political ideology to identify a major pattern of characterization in the novels of Sir Walter Scott. Cooke (2002) examines socio-political themes in the Soviet dystopian novel *We*. Boyd (2001) interprets a Dr. Seuss story in light of a specific set of socio-political issues, and Perchan discusses the interplay of sex and politics in Graham Greene’s *The Quiet American*.

Humans are social animals, but in a wider perspective they are living organisms in a physical world. Adaptationist literary study thus borders ecological literary study, and several scholars have contributed to both fields or commented on the relations between them. Two founding figures within “ecocriticism,” Harold Fromm and Glen Love, have argued for the integration of the two fields (Fromm, 1996, 1998, 2001; Love, 1999a, 1999b, 2003). Love (2003) critiques several works of American fiction from within an adaptationist perspective. Carroll and Easterlin have both discussed the question of “anthropocentrism” and “biocentrism” in the two fields (Carroll 2004, part 2 chap. 4; Easterlin, 2004). Easterlin examines the significance of environmental conditions on the construction of meaning in a story by Hans Christian Andersen (2001), and Carroll examines environment as “setting” in Victorian novels (2004, part 1 chap. 8).

Literary works can be grouped into larger classes or “genres” on the basis of formal organization, subject matter, and tonal or emotional quality. Using concepts of formal organization, Turner has examined poetic meter. Scalise Sugiyama (1996, 2001b, 2005), Easterlin (1999a), and Steen have examined narrative. Nettle (2005b) has examined drama. Studies of genre within specific subject areas include Jobling on the hero-ogre tale (2001b), Cooke on science fiction (1994, 1996), and Easterlin on postmodern fiction (2005). Cooke examines a specific form of satire, that of dystopian fiction (2002), and David Evans (in press) examines a specific genre of poetry. Pornography and romance fiction have been correlated, respectively, with male and female forms of sexual psychology (Ellis & Symons, 1990; Salmon,

2005a; Salmon & Symons, 2001; Whissel, 1996). Analyses of emotion or tone include Storey (1996) and Nettle (2005a) on tragedy and comedy, and Storey and Boyd on humor (Boyd, "Laughter and Literature," in press; Storey, 2001, 2003). Carroll uses Ekman's theory of "basic emotions" to distinguish tragedy, comedy, and satire (Carroll, 2004, pp. 127, 158, 2005; Ekman).

Adaptationist literary study overlaps at a number of points with the general theory of aesthetics and the philosophy of art. Within the field of evolutionary aesthetics, the most widely discussed issue is the adaptive function of art. Pinker argues that art is a non-adaptive side-effect of adaptive cognitive functions (1997, 2002). Miller (2000), Voland (2003), and Power (1999) characterize art as a form of sexual display. Coe argues that art in traditional cultures conveys information about kin relations. Dissanayake, Cooke, Coe, and Boyd argue that art serves to focus attention on adaptively salient concerns (Boyd, 2005b; Cooke, 1999a; Dissanayake, 1995a, 1995b, 2000, 2001a, 2001b). Dissanayake, Coe, Dunbar, and Boyd argue that art serves to affirm social bonds (Dunbar, 2004, 2005). E. O. Wilson, Carroll, and Tooby and Cosmides argue that the arts mediate between innate dispositions and contingent circumstances (Carroll, 2004 part 1 chaps. 6 & 7, part 2 chap. 6, "The Adaptive Function of Literature," in press, "The Human Revolution and the Adaptive Function of Literature," in press; Tooby & Cosmides, 2001; E. O. Wilson, 1998, pp. 225-26).

The majority of the studies under discussion in this section assimilates information from adaptationist social science but adopt the traditional humanist methodology of discursive interpretive analysis. Some of the studies seek not just to incorporate information from the social sciences but also to adopt methods that are quantitative and empirical. The studies on social group size and drama, cited above, use quantitative analysis to delineate the organization of characters in drama. Wilson, Near, and Miller use a creative writing experiment to examine the relations between Machiavellian personality and the content of narratives. Kruger, Fisher, and Jobling use literary works to assess responses to mate selection cues. Miall and Dissanayake use empirical methods in the analysis of "motherese." Wilson, Near, and Miller correlate tests on Machiavellianism with the character of written stories. Scalise Sugiyama (2001a) gives a quantitative analysis of the information about resources in the tales of a native people. The studies of pornography and romance fiction, cited above, offer a quantitative analysis of themes and characteristics across multiple texts. Gottschall and his colleagues, in the studies of mating strategies cited above, use quantitative methods to assess broad patterns of characterization across multiple texts.

Prospects for Institutional Change

The body of work I have described here is already considerable, and the momentum in its production has been gaining steadily over the past several years. Some established contributors have major works in progress, and a number of graduate students and younger scholars are doing research in this area. The established scholars are for the most part working on the margins of the mainstream academic literary establishment, but they have had no great difficulty in finding venues for publication. The younger scholars, students and assistant professors, face a more difficult challenge. The large majority of tenured literary scholars are still hostile to adaptationist literary study, and it is thus often difficult for younger adaptationist scholars to find support and encouragement within their own departments. They continue to pursue this line of research not because it offers any very encouraging prospect of public, professional reward, but because it seems to them the most intellectually promising and stimulating area in which to develop their own expertise as professional scholars.

At least some of these younger scholars will survive the search for employment and tenure, and each new survival will open the field a little more for yet other young scholars, thus gradually expanding the network of established scholars who are responsive to this kind of study. I cannot calculate with any confidence the speed at which this process will take place. There are massive entrenched obstacles still to overcome. But the rate of change has been increasing, and it could at some point begin to make exponential gains. Probably the strongest force working to increase the rate of change will be the sheer potential of the subject itself. There is a vast fund of information now available about human nature, and the exciting, progressive character of research in this area will continue to elicit the attention of many curious and genuinely creative scholars. The work that has already been done in this field is by no means so extensive as to discourage further efforts. It is just extensive enough to give convincing evidence that this kind of work can in fact be done, and to offer stimulating suggestions for ways in which it could be developed further.

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Social Contagion and the Concept of *Culturome*: Biomedical Metaphors in Understanding Culture

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Precisely here, in this very block where I now write, five hundred years ago a colossal process of contagion took place. Here stood the architectonic complex dedicated to Tezcatlipoca, one of the main deities of the Aztec pantheon up to 1521. Here, in 1524, lived Jerónimo de Aguilar—the first European to learn the Maya language and of crucial help as translator to the conquistador Hernán Cortés. Here also did the Viceroy Don Antonio de Mendoza establish the House of the first printing press of the Americas in the year of 1536. And here was the Monastery Santa Teresa de la Orden de las Carmelas Reformadas and the Real y Militar Orden de Nuestra Señora de la Merced Redención de Cautivos de la Ciudad de México. Each and every one of these instances implied a process of contagion, whether linguistic, viral, ideological, and religious or even academic.

Contagion

Back then, during the fifteenth and sixteenth centuries, it was impossible for European explorers and conquistadors to foresee the epidemiological consequences of their expansion to the "new world," affecting tens of millions of natives who lacked immunity against European diseases, and so reducing the indigenous population, in the case of Mexico by 95%, from 16,800,000 in 1532 to 1,075,000 in 1605. (Bora & Cook 1962-63, 5, cited in Semo 1973, 29). We may add malnutrition and stressed living conditions, plus ecological damage from the introduction of bovine herds that destroyed the cornfields that were the basic source of nourishment for the Amerindians. For Fray Toribio de Benavente and Fray Motolinía there were 10 "plagues" that reduced indigenous population: 1) diseases, 2) deaths in the process of conquest, 3) famines after the destruction of Tenochtitlan, 4) abuse and exploitation 5) overpayment under duress, 6) unhealthy conditions in the mines, 7) forced labor for building Mexico City, 8) slavery, 9) mistreatment in agriculture and mining, 10) the utilization of Indians in Spaniards' conflicts. (Semo 1975, 33).