Politics and Biology

A Discussion of Peter K. Hatemi and Rose McDermott's *Man Is by Nature a Political Animal: Evolution, Biology, and Politics*

Man Is by Nature a Political Animal: Evolution, Biology, and Politics. Edited by Peter K. Hatemi and Rose McDermott. Chicago: The University of Chicago Press, 2011. 352p. $80.00 cloth, $27.50 paper.

Peter K. Hatemi and Rose McDermott's *Man Is by Nature a Political Animal* brings together some of the most important social scientists working at the intersection of political science, psychology, biology, and cognitive neuroscience. Given recent advances in cognitive neuroscience and given the proliferation of work in political science that draws on these advances, we have decided to invite a range of political scientists to comment on the promise and the limits of this line of inquiry. What can scientific developments in psychology, biology, and neuroscience tell us about "human nature"? Can these discourses reckon with the variation in time and space that has traditionally been at the heart of political science, perhaps even going back to the classic text from which Hatemi and McDermott derive their title, Aristotle's *Politics*?—Jeffrey C. Isaac, Editor

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It is difficult to know how to review an edited volume, especially one that claims to represent an emerging field. Does one review the most intriguing of the 10 field-defining articles, or does one focus on the editorial approach to the emerging field of evolutionary biopolitics? The latter approach has been chosen here, one which requires a stipulation. While I have difficulties with the editors' approach to the field, there can be little doubt that it is one that political science ignores at its peril. The question is whether political scientists will have any idea how to integrate its insights. To use it is not only to know its findings but also to theorize what it means to say that man is a political animal in the sense the editors intend, which is not Aristotle's. In this regard, the editors are not as helpful as they might have been. One might argue that it is too early to integrate the insights of the field, and perhaps that is so, but it is not too early to start thinking about it.

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One wishes that a volume that sets itself the task of defining a field had been a little more sophisticated about both the philosophy of science it invokes on its behalf and the classics its contributors criticize. The subjects of these complaints will be considered in turn, but first a comment on the genre. For a number of years, when I was still teaching the scope and method of political study to graduate students, I assigned Frans de Waal's (2007) *Chimpanzee Politics,* a fascinating account of the social life of chimpanzees and bonobos, the smaller of the two species of great apes. A single chapter from de Waal's account, filled with stories illustrating the empathic capacity and limits of the bonobo, perhaps the most sympathetic of the apes, was more captivating than any chapter in the book under review. There is a reason, of course, and much of the blame falls upon the genre. Although there are many illustrations of the evolutionary approach, and a chapter devoted to primates, much of the time and attention of the contributing authors is spent explaining "here is how and why this approach is important to political science." It may be true, but it does not always make for the most fascinating reading.

First, a couple of issues that fall broadly under the category of philosophy of science deserve scrutiny. The editors argue that an advantage of the biological approach is

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that it may provide an "ontological" foundation for rational actor models, which currently lack such support (p. 4). True enough, but ontology is no more the realm of science than is metaphysics, of which it is an instance. Ontology belongs to the realm of metaphysics, the study of the categories of being that may be said to be fundamental. I had thought it was only in political theory that ontology had become a fancy word for empirical; evidently not. It is, however, worth remembering what it is that biology (or any other genuine social science) is able to provide: statements about the world that may be shown false, and thus have cognitive content (Popper 2002). It will be a long time before such statements provide us a firm foundation for anything. Indeed, that is probably not what we should be looking for. We should be looking for our old paradigms (that most frequently cited term in the social sciences) to be overcome by new knowledge, not to be grounded by them. Likely the greatest contribution of the new science of human evolutionary biology will be in telling us when we are wrong, not when we are right.

Certainly, the editors are correct that the charge of "reductionism" directed against a scientific social science, especially one that draws on units of explanation smaller than the individual, such as neurobiology, is specious (p. 8). However, it is worth being clear about what reductionism involves. Reductionism is a commitment of empiricism. It stands as an objection to holism, the claim that groups (whether the group is one of cells constituting the individual or one of individuals) possess emergent properties inexplicable by laws governing the relationships among the relevant individual properties, or by any composition laws that explain what happens when groups of cells or individuals come together. Holism almost always possesses a mystical quality, and is rightly rejected by empiricists (Brodbeck 1958).

The issue the editors seem to be struggling with under the mistaken heading of reductionism is actually the much more subtle one of what constitutes an explanation. In the end, the answer must be "that which satisfies." The problem, at least as I see it, is that some neurobiological explanations fail to satisfy. Even when we are convinced of the truth of facts, such as that in stable hierarchies, high-level males have lower cortisol levels (a biological marker of stress) than lower-status ones, there is something about this explanation that just fails to satisfy (p. 254). Is it because it is about baboons and not men? Is it because so much neurobiological research, unlike evolutionary research, seems to have the quality of barefoot empiricism, that is, lots of interesting facts but no theory (not even a borrowed theory, as rational choice theorists borrowed a theory from microeconomics) to hang them on?

Certainly this is part of it, but for many there will always be an experiential disconnect between hormones and our felt experiences of politics. For example, in one study, a small number of male political partisans were asked to chew gum so that the testosterone in their saliva could be measured as CNN reported the election results in 2008. Those partisans who supported Barack Obama had increased testosterone levels, while John McCain supporters had decreased levels (pp. 261–72). What makes this an unsatisfying study, if indeed you find it unsatisfying, as I do? One might argue that it is an intriguing fact isolated from theory. The other possibility, which is not clearly distinct, is that there is something about the human experience of politics that will never feel adequately explained by testosterone levels, even in the presence of a theory linking these levels to macro-level phenomena. This, however, remains an open question. It may well be that within a generation, explanations of voter preferences in terms of hormones will be as well accepted as explanations of depression in terms of a chemical imbalance in the brain. What people find satisfying is cultural, not timeless.

It will, in any case, require a theory that is a deductively interrelated set of propositions that make interesting and unexpected predictions, that is, which have *cognitive content.* Those who want to do social science should be held to the standards of science. This means that they should make interesting predictions about something important that can be shown wrong, and that these predictions should serve to increase our confidence in a larger theory about how the world of voting, or whatever, works. At least this is what I learned from Karl Popper, and it seems worth remembering that the goal is not the apparatus and appearance of science but bold conjectures and rigorous refutations about the world. One chapter, "The Mind-Body Connection," tells you how to set up your own biophysiology laboratory for twenty thousand dollars. But first, you ought to know what you want to do with it besides get a grant (pp. 231, 243).

A second issue open to criticism is the editors' treatment of the classics. The classics do not deserve our respect because they are old and venerable. The respect they deserve is to be understood. The editors say (p. 19) that

> Arisotle's "virtue," Rousseau's "social contract," Hobbes's *Leviathan,* or Maslow's "hierarchy of needs," to name a few . . . provide an almost arbitrary account of human nature. They lack a unifying theory for why these various needs and desires exist, or how they might be connected to one another.

Whatever else one may say about Aristotle's account of virtue (*arete,* ἀρετή), one can hardly claim that it lacks a unifying account of why virtue exists or should exist and how it fits into the larger scheme of things. One might not agree with Aristotle, but his argument runs something like this: Humans seek to be happy (*eudaimon*). This is not just a human characteristic but part of the goal-oriented, or teleological, structure of the universe. Unfortunately, humans are not very good at seeking their own happiness, tending toward excess, occasionally toward deficiency. In their upbringing, it is terribly important to

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develop the good habit of seeking the mean between excess and deficiency. Eventually this habit will become part of a noble character, and this noble character will seek its telos, (or goal) as efficiently as possible. Such a character can be called virtuous when seeking the mean has become pleasant. In developing this argument, Aristotle lays out the education most likely to develop good character, the subject of his *Nichomachean Ethics,* and the polity, or political order, most likely to support good character among its citizens, the subject of his *Politics.* In other works such as the *Poetics,* he discusses the art most likely to develop good character, as well as the risks life poses to it. In his *Metaphysics,* he locates his account of the good for man within an account of the larger cosmological order. Whatever else Aristotle fails to do, he does not "lack a unifying theory." I could make a similar argument about Hobbes or Rousseau, but doing so is unnecessary.

What the editors seem to mean with the claim that Aristotle, among other classic authors, lacks a unifying theory of human needs and desires is that Aristotle fails to approach "human preference structures" from a "biological and evolutionary perspective that incorporates our past development and immediate ancestry as precursors to explaining our current political preferences" (p. 19). Although one might argue that Aristotle had his own (by now outmoded) biological and evolutionary perspective, the simplest thing to say is that the classics did not approach politics as the contributors to this book do. True enough, but we know this. There is no need to trivialize and dismiss the classics, from which we learn something quite different, in order to claim that modern biology and evolution have a contribution to make.

This is particularly ironic in a book whose title is drawn from an empirical claim made by Aristotle, an empirical claim that is by no means given, an empirical claim that is by no means settled by the studies in this book. It might be worthwhile, amid all the empirical data gathering, to reflect about what it means for humans to be political animals. In the end, this is where the editors let us down most. Evolutionary biology is not just a field. If it is to be taken seriously in the long run, it will lead to a set of claims about how the social world is put together. The claims would run something like the following.

The claim that man is a political animal is not the same as saying that man is a social animal, as Hannah Arendt (*The Human Condition,* 1958) reminds us. To be a political animal, one concludes from reading Hatemi and McDermott's volume, is to be *homo hierarchicus.* In one way or another, most of the chapters in the volume, particularly those on evolution and politics, but also the chapter on "Hormones and Politics," are concerned with the forces that work to maintain stable hierarchies, from families to nations. These forces seem to run deeper than previously imagined, but not so deep that they cannot be upset. Everything that was explained in books employing "environmental" models, such as Ted Gurr's (2011) classic *Why Men Rebel,* remains to be explained and enriched by evolutionary and neurobiological models. As the editors rightly point out at the beginning, there is no inherent conflict between these approaches (p. 3).

The state of the field, as represented by the book under review, can best be defined as driven by methodology and instrumentation, resulting in interesting but isolated empirical observations. Against this claim it might be argued that these "isolated empirical observations" are not isolated at all, but come together to form the field of evolutionary biopolitics. But a field is not a substitute for a theory, or the fields of psychoanalysis and art appreciation would be hard sciences. Perhaps this way of putting it is too demanding, but an undertaking that claims to be a science should be judged like one. Sound empirical data exist for someone to begin to turn the volume's field of study into a theory. The work begs to be done, and from the results presented here it is almost time.

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The infamous Aristotle quotation that serves as the title of Peter K. Hatemi and Rose McDermott's edited volume is deceptively pithy. The clever turn of phrase (not discussed in the text) hints at the volume's underlying conclusion, that political science has overlooked the biological and evolutionary bases of many political behaviors. Yet "man is by nature a political animal" is in fact the start of a much more complex exploration of Aristotle's understanding of animals, politics, and nature. It opens up an exploration of his teleological view of nature that underpins a view of human nature that, while acknowledging the biological nature of human beings, is hardly a parismonious model for explaining the political world. For this reason—the complexity under the surface of a seemingly simple claim—the quotation may be a perfect description of the text itself.

As a political theorist, I acknowledge that I am woefully underqualified to examine most of the scientific claims contained in the text. Consequently, my discussion focuses on two important debates within which this text must be read. One is an ongoing debate about the philosophy of (social) science within the field of political science and the utility of the models imported from the biological sciences. The second is an equally important consideration of the normative implications of models of human nature, in particular looking to materialist, biological models. To begin, I consider the ways that these debates are already ongoing both within the field of political science and in interdisciplinary discussions about man as a political animal, considering both the import of the animal model and the role of politics.

While debates over epistemology and ontology and, in particular, the science in political science are hardly new, they got new attention in two quite different editorials appearing in the *New York Times* in 2012, both debating the scientific merits of the field. Jacqueline Stevens suggested that the study of politics fails to rise to the level of a science according to positivist requirements, yielding few adequately predictive hypotheses. Kevin A. Clarke and David M. Primo argued that political science suffers from "physics envy," a misperception about the nature of science itself: "The ideal of hypothetico-deductivism is flawed for many reasons. For one thing, it's not even a good description of how the 'hard' sciences work. It's a high school textbook version of science, with everything messy and chaotic about scientific inquiry safely ignored" ("Overcoming 'Physics Envy,'" *New York Times,* 1 April 2012, SR9).

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In their volume's first chapter, Hatemi and McDermott place the text in relationship to what they see as the two primary explanatory theories in political science, behavioralism and rational choice, which they describe as environmental theories, placing an emphasis on changing behaviors as a consequence of socialization or incentive structures outside of the individual: "Such models, while useful in their own environmental or cultural domains, tell only a portion of the 'human' story. None directly incorporate the innate part of the equation regarding human biological development: that is, why humans developed as they have, and how their political preferences and social actions may be decisively influenced by their biological needs and drives" (p. 19).

This focus on innate biological impulse, by identifying generalizable patterns based in biology, whether neuroscience, evolutionary science, endocrinology, or genetics, frames the goal of the book, in a search for explanations for human behavior that the authors insist supplement rather than replace traditional political science models. The goal of subsequent chapters is to explore the biological explanations for human behavior, ranging from evolutionary adaptation and hormonal levels to the genetic transmission of traits. The purpose of the research is, of course, to discover a biological rationality at work within human political behavior, seeking universal patterns with explanatory powers across the species. Ultimately, the goal is a greater predictive power yielded by greater understanding of the causal processes: "If a significant portion of individual variation in behavior is explained by non-environmental influences, then our current models are limited in their ability to accurately predict political behavior" (p. 18).

In many ways, the text demonstrates Clarke and Primo's claims about the operation of "real science." In spite of the search for parsimonious and universalizable claims, many of the chapters present discussions that emphasize the sorts of complexity and indeterminacy that we often think of as characterizing the political world. For instance, Darren Schreiber's analysis of the neuroscience of conscious and unconscious attitude formation about race demonstrates the complexity of interactions between environmental and biological influences (p. 285). This complexity does not undermine the research but highlights the ways in which scientific inquiry does not always lend itself to parsimony. For example, Evan Charney's critique of the use of the explanatory power of genetics in political preference formation highlights the ways that genetic expression is itself a complex process of biological/environmental interaction.[1] This reading of the role of biology in politics suggests that political science has much to learn substantively and philosophically from the model of the biological sciences. Of course, this insight is already operative in many of the other social sciences where the natural sciences often comingle with social science and

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social theory, as in anthropology and geography. Indeed, political theorists have recently devoted significant attention to the intersection of politics and biology, engaging with insights from neuroscience, biology, genetics, and chemistry.[2]

For a political theorist, the discussion of the nature of human life is a familiar question with normative overtones, a fact recognized by the editors. They acknowledge concerns about the reductive nature of scientific inquiry, and the specific worry about reducing human behavior to immutable natural causes. They assert that their analysis retains a role for human agency since "humans remain the only species whose understanding of ourselves allows us to change our own evolutionary trajectory and in so doing exhibit the ability to globally change our environment" (p. 8). This analysis reflects the political importance of any theory of human nature since, clearly, that understanding plays a role in policy formation and the treatment of humans (and other animals). Indeed, Hatemi and McDermott dismiss many of the most famous theoretical constructions of human nature in classic works by Aristotle, Rousseau, and Hobbes as providing "an almost arbitrary account of human nature" (p. 19).

Of course, critics of these accounts charge that they, like any accounts of human nature, are neither arbitrary nor neutral. Indeed, these authors' understanding of human nature provides a justificatory edifice for their conceptions of the political universe, demonstrating that the stakes are high in any theory of human nature. In particular, while authors like Rousseau describe their theories of human nature as "setting aside all facts," the grounding of human nature in the presumed neutrality of science necessitates particular scrutiny as it has significant normative consequences.

In the volume's Forward, James Druckman notes that biological approaches have often been tied to conservative ideologies, though he correctly recognizes that political consequences "[are] more complex and domain specific" (p. xi). As he notes, biological explanations of sexual orientations are often utilized as a legal and political foundation for gay rights. However, concerns about conservatism go beyond his aside that "biological approaches often privilege individual actions and responsibility rather than social situations" (p. xi). Indeed, there is much in the history of the intersection of biology and politics that should at least alert us to the normative concerns at work.

While biology itself may have no inherent political leanings, the accusation of conservatism may emerge in part from the historical experience of the deployment of science to conserve the status quo, in particular in reinforcing hierarchies of power. The history of scientific racism demonstrates the ways in which science, and in particular the field of biology, was central to the development of ideas that justified inequality.[3] Feminist scholars have examined the ways not only that the presumed neutrality of science contributed to gender and racial inequality in justifying differential treatment of certain groups but also that those unchallenged presumptions about gender and race provided an unconscious lens through which scientific observations and data were seen.[4]

In addition, political theorists have discussed the ways in which the reduction of human beings to their biological selves can have troubling consequences. Many historians have documented the ways in which comparisons with animals have been a common means of stigmatizing groups. Giorgio Agamben's *Homo Sacer* (1998) argues that the reduction of certain groups of human beings to bare life or mere life (*homo sacer*), as opposed to subjects of the law, enables their mistreatment or killing. The defining feature of "bare life" is the ability to "be killed without sacrifice," to be reduced to the status of an animal. For Agamben, the prototype of this reduction is the modern concentration camp, the ultimate site of dehumanization. Certainly, we need not posit that biological approaches lead to genocide in order to recognize that the theoretical concerns about the consequences of specific views of human nature certainly have historical precedent and that these concerns warrant attention. Comparisons or equivalences between humans and animals have often justified human atrocities. Even more famously, Hannah Arendt argued in *The Human Condition* ([1958] 1998) that a reduction of human beings to the material realm of necessity threatened the possibility of human agency, the possibility to act on and change the world.

On the flip side of these normative concerns about dehumanization is a literature that argues for the ethical possibilities opened up by the new engagement with biology and, in particular, its decentering of human exceptionalism. Certainly, scholars in animal studies would embrace the biological approach that suggests humans exist on a continuum with other animals. Indeed, Darby Proctor and Sarah Brosnan's chapter, "Political Primates: What Other Primates Can Tell Us about the Evolutionary Roots of Our Own Political Behavior," begins with an observation of male–male aggression reminiscent of chimps but that is revealed to be the Bolivian congress, a move that echoes some of the literature arguing for a revived consideration of whether humans are unique in being political animals. Much cross-disciplinary work has been done bringing together scholars in the natural sciences, humanities, and social sciences examining our understanding of the relationship among humans, animals, and the natural world, suggesting that the turn to biology, instinct, and innate capability need not be a dead end for the politics of human nature but may provide opportunities for political theorists to return to their concepts anew. Undermining the insights of humanism that underpin arguments for human rights, democracy, and equality is certainly cause for concern, but such a critique of humanism also provides new opportunities for considering the relationship

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between humans and animals and between nature and culture.[5]

The editors of this volume argue for a greater consideration of the relationship between politics and biology, strengthening the cross-pollination between science and politics. While emphasizing the role of biological rather than environmental influences would seem to undermine the place of theory within the discipline, it may in fact do the opposite. Theorists have already been engaged with many of the epistemological and normative questions that are raised by the call for a greater consideration of the biological, including the kinds of transdisciplinary scholarship called for by the editors. Perhaps most significantly, the emphasis on human *nature* invites a deeper consideration of implications of a materialist paradigm of politics. As the volume suggests, the biology of politics may be an invitation to complexity rather than a new, simpler view of political life.

Notes

1 See Charney 2008.
2 See Bennett 2009; Connolly 2002; Grosz 2004.
3 See Anderson 2007; Barkan 1993; Jackson and Weidman 2004.
4 See Haraway 1990; Harding 1986, 1998. For discussion of the intersection of science, race, and sexual orientation, see Somerville 1994.
5 The list of scholars engaging in this work is long but includes a range of disciplines. For a small sampling of the work, see Grosz 2011; Kirby 2011; Oliver 2009; Nussbaum 2007; Wolfe 2003. Searching the term "biopolitics" will bring up both literature on biology and politics and a body of literature inspired by Michel Foucault's 1978 use of the term that examines the history of the relationship between the natural and social sciences and political life.

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Does human nature determine human culture, or does our culture shape our nature? This edited volume responds with an emphatic "Both/And!" (pp. 1, 3, 17, 101, 154, 188, 201–2, 301–2). Yes, our evolutionary inheritance, genetic composition, and neurological structures significantly impact our sociopolitical attitudes, beliefs, values, and behaviors. And yes, the cultural environment affects the way human nature unfolds, triggering genetic expression, eliciting physiological disposition, and likely influencing their evolution. This interaction of nature and culture, biology and environment, editors and contributors maintain, provides one of the most promising, interesting, and underexploited fields of inquiry for political scientists today.

To this interactionist endorsement the editors add a warning. Political scientists do their profession a great disservice if they refuse to integrate insights from the life sciences. The discipline will become a biologically illiterate child scorned by its faster maturing social science siblings. There is a moral lapse involved as well, the editors assert, if political scientists do not investigate in transparent fashion and in accord with scientific standards the biological influences on human behavior that governmental and corporate actors are already exploiting—potentially for nefarious purposes.

I embrace the endorsement and the accompanying warning. Political scientists have much to learn from, and to contribute to, the life sciences. But there are notable absences in the volume that diminish its contribution to the field, narrow its range of interest, and weaken its normative position.

Notwithstanding the oblique reference to Aristotle in its title, the volume accords the ancient philosopher only a single, passing remark. No entry for Aristotle exists in the index, and he fails to appear in any reference sections. There are likely two reasons for this omission. The first reflects on discoveries in evolutionary biology and neuroscience and will be addressed in the final paragraphs of this review. The second is the common perception that science, as a cumulative and progressive intellectual enterprise, has long ago left its early practitioners behind. Just as physicists and zoologists no longer study Aristotle, notwithstanding his seminal contributions to these fields, so political scientists—especially those courting the "harder" sciences—might deem it a sign of immaturity to dwell upon intellectual ancestors. A polite bow suffices.

Whatever the reason, the omission is unfortunate. And it is symptomatic of a larger problem. No chapters address political philosophy or theory. This weakens the volume in at least four ways.

First, the editors' assertion that political scientists have an ethical obligation to explore the biology of human behavior is left wholly unsubstantiated. Some fleshing out of the claim would be in order, and the likely candidate for the job is a political theorist. Second, the volume would have benefited from the replacement of any of its many chapters detailing how political scientists can utilize biological knowledge with at least one account of how biological scientists utilize philosophical knowledge. There is no shortage of material here. Some of the most influential neuroscience in recent years, for example, has been grounded on the same philosophic writings that occupy political theorists.[1]

Third, the editors might have included a chapter that summarizes natural scientific *dis*confirmations of political thought. For example, Antonio Damasio, a neuroscientist, has employed extensive empirical data to disconfirm Descartes's famous mind–body dualism in *Descartes' Error* (1994). There are important ramifications of this disconfirmation for political philosophy and political science. In turn, Steven Pinker, an experimental psychologist, has recently demonstrated that Thomas Hobbes was right and Jean-Jacques Rousseau was wrong regarding at least one key point of disagreement between them.

Hobbes famously declared that the state of nature was a state of war of all against all, making our ancestors' lives "solitary, poor, nasty, brutish and short." In contrast, Rousseau insisted that the noble savage seldom knew conflict. His (simple) needs were easily sated in the state of nature, and so there was no reason to battle over resources. Pinker demonstrates that violence was standard fare for early humankind, but that it has markedly decreased over time. Contradicting popular claims of the unprecedented level of violence of the twentieth century—with its two world wars, multiple regional wars, and totalitarian decimations—Pinker observes in *The Better Angels of Our Nature* that on a per capita basis, humankind is ever more peaceful.[2] Notwithstanding isolated periods with high levels of murder and organized conflict, the overall trend is clear: Our species is becoming increasingly nonviolent as a product of its ever more civil(ized) existence. The life sciences help explain why.

The fourth absence is, to my mind, the most problematic. The volume is dedicated to exploring the ways in which political phenomena are shaped by our inner (genetic, evolutionary, and neurological) nature. Unfortunately, it neglects a two millennia–old tradition of examining our inner nature and how it is shaped by political phenomena. Plato was only the first of a long line of philosophers to explore the *politics of the soul.* Soulcraft and statecraft were inherently related, Plato insisted, because the soul itself was a *polis* of sorts. In the *Republic,* Socrates declares that the man of wisdom chiefly minds the "constitution" not of his country but of his soul,

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the city-state within himself.[3] The relationship between statecraft and soulcraft has been an enduring concern for political theorists ever since. Even philosophers who vehemently reject Plato's idealism, such as Friedrich Nietzsche, have focused on the dynamics of our inner politics—a multiplicity of competing drives, each vying for hegemony.[4] Unfortunately, this volume offers no investigations of the ways our inner constitutions are formed, or how they get amended.

To address this unfortunate lapse—and to give the title of their volume a little more weight—the editors might have included a chapter on the relationship between neuroplasticity and Aristotle's understanding of our inner constitution. Although it gains no attention by editors or contributors, the plasticity of the brain is an area of increasing interest to life scientists. It refers to the brain's capacity to adapt and remodel itself in response to environmental demands, experiences, and trauma. Scientists now acknowledge that neuroplasticity, previously believed to be limited to young children, is regularly evidenced in adults. Brain imaging technology, such as MRIs and PET scans, demonstrates that our "neural architecture is not a fixed structure."[5]

The adult brain manifests plasticity in various ways: Synaptic linkages become stronger or weaker, the generation and release of neurotransmitters and hormones are altered, neurons and neural connections that are underutilized get pruned, and new synaptic connections as well as entirely new neurons develop. Neuroimaging of London taxi drivers, for instance, demonstrated growth in the posterior of the hippocampus proportionate to the number of years the cabbies navigated the city. Most neurogenesis in adults, studies suggest, is associated with the hippocampus, and in particular the region of it known as the dentate gyrus, where new memories are formed.

Learning reflects the development and reinforcement of neural pathways in the brain and, oftentimes, the co-optation of pathways that are underutilized. As Joseph LeDoux observes: "[S]ynapses in the brain, like animals in their environments, compete to stay alive. Synapses that are used compete successfully and survive, while those that are not used perish."[6] The brain's linkages develop by way of a process akin to natural selection. A neural Darwinism is at play, and the law of the synaptic jungle is "survival of the busiest."[7] Neurons that frequently interact will survive. The rest atrophy or are co-opted. As brain scientists observe, intoning what is commonly know as Hebbian plasticity: "Cells that fire together, wire together." When synaptic events (firing together) become synaptic probabilities, structural change (wiring together) is at hand.

An even more robust sense of brain plasticity occurs in neurogenesis, when wholly new neurons grow. The London cabbie example demonstrates how the mental activity of memorizing and recalling the names and geography of city streets can have this effect. Studies indicate that voluntary physical exercise also increases the number of new neurons that form in the hippocampus. Environmental stimulation may then help these new cells to survive and become dominant—by keeping them busy. From an evolutionary point of view, this phenomenon would have obvious benefits, rewarding the physical exploration of new environments with enhanced learning capacity.

The brain is regularly remodeled by experience. As self-conscious creatures, however, much of what we experience occurs within our own minds, the product of mental activities. Important, then, is the role of self-consciousness in "cortical remapping." A self-reflective mind within a nutritive environment can significantly modify its own brain structures and functions. Shifting your thoughts can reshape your brain. In turn, reshaping your brain alters your behavior, which impacts ongoing brain function and structure. A virtuous (or vicious) cycle may form. It is easy to exaggerate the human capacity for neural remodeling. Still, to no small degree we are the architects of our own brains. In this respect, neuroscience can and should inform our ethics and politics.[8]

Aristotle brings this point home. We read in the *Nicomachean Ethics*: "Habit . . . is practice long pursued, that at the last becomes the man himself."[9] This, essentially, is Aristotle's habit theory of virtue. Virtues are like any other habits or acquired skills. "The moral virtues we do acquire," he observes, "by first exercising them. The same is true of the arts and crafts in general."[10] We become virtuous, in other words, by (re)wiring the brain in specific ways through repeated practice. These newly formed brain maps then incline us to certain activities in particular circumstances, and make it easier (both physically and emotionally) to perform these deeds.

Contradicting the teachings of his mentor Plato, Aristotle insisted that the disposition to do the right thing on a regular basis is not a feat of cognitive conviction. Rather, it is an embodied habit grounded in repeated practice. As Aristotle notes, the knowledge that allows for the practice of virtue "must be worked into the living texture of the mind, and this takes time."[11] To develop a virtue, we must co-opt neural territory for new purposes and regularly reinforce these synaptic connections. To develop a virtue is to engage in brain sculpting.

Aristotle gave the original "Both/And" statement when articulating his habit theory of virtue: "The moral virtues, then, are produced in us neither *by* Nature nor *against* Nature. Nature, indeed, prepares in us the ground for their reception, but their complete formation is the product of habit."[12] Aristotle is saying that nature and nurture, biology and environment, work together at the level of our inner constitution to reconfigure it. Through our actions and thoughts we become, neurologically speaking, certain sorts of people disposed to certain sorts of behavior. The "true moral act," neuroscientists suggest, is self-conscious brain sculpting.[13] In this respect, a "neuro-Arisotelean" approach to the study of brain plasticity and its relation to human

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virtues, habits, skills, and dispositions should be of great concern to political scientists.

I promised to speculate as to why Aristotle, and more generally political philosophy, found no place in this edited volume. The reason might have to do with the way the brain itself is structured. Our brains are lateralized. Although the extent and nature of lateralization is often exaggerated and overly simplified in popular literature (as by early neuroscientists), the hemispheres of the brain *do* specialize. The left hemisphere develops most denotative language functions and syntax. It is where fact retrieval and linear, sequential reasoning, along with many other calculative (mathematical) functions, occur. The right hemisphere learns to recognize faces, interprets speech intonation, and activates metaphoric and poetic thought. It is more densely connected to limbic (emotional) and brain stem (instinctual) functions and plays a dominant role in the learning of new skills.

The right hemisphere specializes in holistic perception, such as pattern recognition, while the left hemisphere is more analytic and detail oriented. In turn, the right hemisphere perceives and accommodates novelty, while the left tends to work within set paradigms. To grossly simplify: The left hemisphere seeks the analytic certainty that allows control, while the right hemisphere discerns the context and fosters the compassion that allows creativity and connection.[14]

Man Is by Nature a Political Animal demonstrates a predominantly left-brained approach marked by the systematic effort to secure intellectual control through detailed analysis and the use of established quantitative methods. Absent are more holistic meditations that capture contextual significance and meaning. It would be a shame if political scientists, in their haste to integrate the data and adopt the methodologies of the life sciences, forgo the benefits to life—and to their discipline—of well-balanced, whole-brain thinking.

Notes

1 See, for example, Damasio 2003; McGilchrist 2009; Thompson 2010.
2 Pinker 2012.
3 Plato 1989, 819; 591c–592b.
4 Thiele 1990.
5 Boyke et al. 2008, 7031.
6 LeDoux 2002, 73.
7 Schwartz and Begley 2002, 117.
8 See Thiele 2006, 2012.
9 Aristotle 1953, 217.
10 Ibid., 55–56.
11 Ibid., 200.
12 Ibid., 55, emphasis in original.
13 Schwartz and Begley 2002, 325.
14 Gazzaniga 1998; Goldberg 2001; McGilchrist 2009; Ramachandran and Blakeslee 1998.

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Nature and Nurture

In the Introduction to this volume, Peter K. Hatemi and Rose McDermott assert that "nature–nurture" is an "outdated juxtaposition," an "atavistic dichotomy," and a "dualism [that] remains absurd on its face" (p. 3). This a surprising assertion in a book titled "Man is *by Nature* a Political Animal." In rejecting this dichotomy, they claim to "support the dominant interpretation across sciences which assumes the inextricable interaction between biology [by which the authors intend both genes and "physiology"] and environment in determining the growth and development of any given biological organism within a particular ecological context" (p. 3). It would be characteristic of this dichotomy to assume that genes could contribute to phenotypic variation in a manner that did not involve "inextricable interaction" between genes and the environment; likewise, it would be absurd to assume that a given physiological response could develop in a manner that did not involve environmental interaction. Such assumptions, however, are ubiquitous in this volume.

For example, Lindon J. Eaves, Hatemi, Andrew C. Heath, and Nicholas G. Martin (Chap. 4), after considering how to partition the contribution of genes versus environment to variation in political behavior, note a "potential limitation" of their models: "[T]hey are linear and additive [and] do not take into account . . . interactions between genes and environments" (p. 157). But if biology (which includes genes) and environment "remain codependent and interactive," what is the value of a model that treats them *as if they are not interactive*? It is one thing to acknowledge the shortcomings of a model; it is another to construct a model on the basis of a principle that one simultaneously claims is "absurd on its face." A similar "atavistic dichotomy" is found in Kevin B. Smith and John R. Hibbing's (Chap. 7) account of the development of "physiological" differences: "The evolutionary process has imbued all humans with an autonomic nervous system, but genetic variation has instilled a remarkable amount of diversity in the specific response levels of individuated nervous systems to standardized stimuli" (p. 225). Hence, diversity in autonomic responses is ascribed entirely to "genetic variation" (inasmuch as "genes build physiology" [p. 225]) in defiance of "the inextricable interaction between biology and environment."

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Consider the role of the environment in shaping the autonomic nervous system's stress response (the "fight or flight" response), inasmuch as it provides an illustration of the kind of biology–environment interaction that is conspicuously absent from this volume, as well as the evolutionary significance of such interaction. Differences in early maternal care translate into differences in the stress response of offspring, and cross-fostering studies have shown repeatedly that the key determinant is the rearing rather than the biological mother.[1] Offspring that receive low levels of maternal care exhibit, as adults, increased levels of stress as measured behaviorally and physiologically, with females also exhibiting earlier mating behavior and lower levels of maternal care, while high maternal-care offspring exhibit, as adults, the opposite phenotypes. Significantly, these behaviors are associated with postnatal alterations to the epigenome, the complex, environmentally reactive, biochemical system that regulates the accessibility of genes to transcription factors and, thereby, the extent to which any given gene can be transcribed. The observed epigenetic changes, and corresponding changes in gene transcription rates, are consistent with increased and decreased stress responses. In other words, the environment reprograms the epigenome and the epigenome reprograms gene transcription rates.[2]

This is an example of *phenotypic plasticity,* the ability of an organism to modify developmental trajectories and change phenotypic state or activity in response to variations in environmental conditions. Developmental phenotypic plasticity evolved because it is *adaptive,* promoting Darwinian fitness by enhancement of survival and reproductive success by using environmental cues to optimize the life-course strategy. A heightened stress response and diminished maternal care enhance the mother's chances of survival in a dangerous ("high stress") environment, but by shaping the stress response and mating and rearing behavior of her offspring, she enhances their survival as well. Offspring behavioral plasticity enables the mother to adjust offspring phenotype in response to the environment she inhabits. Adversity during perinatal development can forecast an increased level of demand in the environment the offspring will occupy. Under such conditions, the animal's best interest is to enhance its behavioral (e.g., vigilance, fearfulness) and endocrine responsiveness to stress. These responses promote detection of potential threat, avoidance learning, and metabolic/cardiovascular responses that are essential under the increased demands of the stressor.

Such environmental shaping of physiological response is not to be confused with either "G × E" ("gene × environment" interaction or "gene-environment interplay" [Chap. 5]) or what Eaves and his colleagues refer to as the "ontogenetic process" (p. 154). G × E is the idea that a particular polymorphism will result in a given phenotype in one environment and a different phenotype (or no

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phenotype) in a different environment. The "ontogenetic process" refers to purported (and inexplicable, both in terms of physiology and adaptive value) changes in the heritability of a particular phenotype at a particular point in life as indicated by the twin-study methodology. Neither G × E nor the ontogenetic process involves phenotypic plasticity, that is, modification of developmental trajectories to meet the demands of a particular environment and, hence, neither has any apparent adaptive value. Neither epigenetics nor phenotypic plasticity—mechanisms that embody "the inextricable interaction between biology and environment"—is mentioned anywhere in this volume, although the former represents the most important development in molecular genetics and the latter the most important development in evolutionary biology over the past 50 years.

Both absurdly high heritability estimates—60% for political participation (p. 215), 60% for strength of political partisanship (p. 216), 50%–70% for attitudes toward homosexuality and gay rights—and the assumption that single polymorphisms can predict complex political behaviors (Chaps. 5, 6, 8) reinforce, rather than overcome, the traditional nature–nurture dichotomy. If we were to take such heritability estimates seriously, then we would have to conclude that humans were less biologically influenced by, and reactive to, their environments than fruit flies (heritability of aggression in fruit flies is ~10%).[3] Aggressive strains of fruit flies exhibit differences in transcription rates of more than 1,539 genes as compared to controls.[4] In a situation such as this, no single gene could possibly predict aggressive behavior, yet we are told that a single polymorphism can predict, for example, voting (pp. 218–19, 268).

The assumption that a single polymorphism could predict a behavior such as voting results from conceptualizing complex behaviors in the manner of "simple" genetic disorders (p. 27):

> [D]owns syndrome results from just a small genotypic and biological variation, a relatively small variation that can alter an entire set of social and physical behaviors. Considering that we have endless small genetic differences across the entire population, the logical assumption would be that these differences also affect attitudes and behaviors, including political behaviors.

This is not a logical assumption but, rather, a profound error. Huntington's disease is a neurological disorder caused by a mutation on a gene (HTT) that is coded for the protein huntingtin. Symptoms include changes in personality and cognitive ability and, over time, the eventual loss of the ability to walk, talk, think, and reason. Can we infer from this that polymorphisms of single genes are likely to influence a wide array of complex normal behaviors associated with the healthy human brain (such as, e.g., voting)? Certainly not. An HTT gene mutation has far-reaching phenotypic consequences because the end result of an abnormal huntingtin protein is neuronal degeneration. But voting, for example, is not a monogenic disorder, or an oligogenic disorder, or a complex polygenic disorder. Normal complex human behavior is not a cluster of disorders, nor is it a cluster of distinct "behaviors," each behavior predicted by a gene or set of genes. Rather, normal behavior is the integrated output of a highly integrated biological system interacting with a particular environment.

Physiology

In their discussion of physiology and political ideology, Kevin Smith and John Hibbing reference a study by Douglas Oxley and his coauthors[5] in which the latter "used SCL [skin conductance levels] to detect physiological differences in response to threatening stimuli between conservatives and liberals" (p. 233). The Oxley coauthors assumed that what they were measuring using SCL was a "threat response" because they showed participants what they classified as three "threatening images." But whether or not an image, for example, of a woman laughing at a large spider crawling on her face, is "threatening" is certainly in the eyes of the beholder. This point is important because measures of SCL are *nonspecific* measures of arousal *of any kind;* for example, surprise, joy, disgust, empathy, or interest can all be manifested by *identical* increases in SCL. Furthermore, Smith and Hibbing claim that this study showed differences in "threat responses" between "conservatives" and "liberals," when, in fact, associations were purported (and highlighted) for only a few items of the Wilson-Patterson "conservatism" index. Nonetheless, the general takeaway of this study seems to have been that "conservatives have greater threat responses than liberals." But, of course, what distinguishes liberals and conservatives is not that one or the other has greater levels of "fear" in some general sense, but that (to continue with the language of fear) they fear different things: Liberals fear global warming and gun violence; conservatives fear the economic impact of environmental restrictions and the loss of Second Amendment rights.

Smith and Hibbing (p. 233) also reference a study by K. Smith and colleagues[6] purporting to show that "conservatives" exhibit greater "disgust responses" than "liberals" (based upon the same dubious methodology), and the authors of this study speculate that greater disgust responses toward, for example, homosexuality, might explain conservatives' opposition to gay marriage. But how does one get from a feeling of disgust to a political point of view? In and of itself, a reaction of disgust has no political implications whatsoever. The fact that I find the smell and taste of Limburger cheese disgusting does not entail that I think Limburger should be banned and those who make or consume it imprisoned (or that its consumption by adults should be tolerated, but behind closed doors). There is simply no way to derive political

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principles from a sensation of disgust without presupposing a host of principles to which the sensation of disgust itself is supposed to give rise (e.g., how far-reaching the authority of governmental power should be, or whether disgust is a legitimate reason to ban an activity and punish those who engage in it). Furthermore, what does my disgust with Limburger cheese have to do, for example, with my disgust at the current state of American politics (besides the use of the word *disgust* in both instances)? The latter is a consequence of my political and moral views regarding American politics; the former is a consequence of my sense of taste and smell.

Politics and Religion

To be a member of a particular religion (as distinguished from "religiosity" in some abstract sense [p. 35, Chap. 4]) is the only complex behavior that, as far as I can tell, practitioners of behavior genetics appear reluctant to claim is heritable or predictable by a polymorphism. But this is not, despite what Hatemi and McDermott (and many others) claim (p. 35), because this behavior has not been found to be heritable. For example, being a Born Again Christian is, we are told, 65% heritable,[7] Sabbath Observance is 35% heritable,[8] a belief in Biblical Truth is 25% heritable,[9] and religious affiliation in general exhibits a moderate, "statistically significant" heritability.[10]

Note how such findings are handled, however. For example, despite the fact that *Sabbath* observance and belief in the *Bible* are said to be heritable, they are treated not as *Christian* religious doctrines but as examples of "religious *conservatism*" (minus the specific religious affiliation).[11] In reporting that being a Born Again Christian is 65% heritable, the authors note that "the wording of this particular question forces us to interpret this finding with caution (i.e., it combines a generic commitment to Jesus Christ that may be shared among all Christians with the conservative Protestant-specific concept of being 'born-again')," [12] and they classify this not as the heritability of being a Born Again Christian but the heritability of "transformations and commitment." When A. B. Heath and colleagues[13] found that polymorphisms of the ADH2 gene predicted *Anglicanism,* they did not publish a study titled "Gene Predicts Anglicanism," but rather speculated (quite sensibly) that these findings were driven by population stratification.[14] And when Brian D'Onofrio and his colleagues discovered that the heritability of religious affiliation was "statistically significant," they speculated that genetic factors play a role in "determining which children decide not to follow in the religious traditions of their parents."[15] In other words, following the religious tradition of one's parents was distinguished from the religious tradition itself!

Why are religion and politics treated in such different ways? It is likely because the absurdity of claiming, for example, that a gene predicts Anglicanism, or Confucianism, or Zoroastrianism, or that they are "heritable," is manifest even to practitioners of behavior genetics; that is, the historical and cultural particularity of religious commitments is as manifest as their mode of transmission. That twin studies generate results that even partisans of the methodology acknowledge as absurd is further evidence that they are to many what they have always seemed to be: an obviously confounded, unreliable methodology. Yet political ideologies, which exhibit the same rate of parent-to-child transmission as religious "ideologies," are just as culturally and historically particularistic and manifold, a fact obvious to anyone even casually acquainted with the history of political beliefs and practices.

This particularity is masked by the almost universal tendency to speak of "liberalism" and "conservatism" as if these were the two necessary and universal modes of political behavior (while typically using measures of twenty-first-century American liberalism and conservatism; *passim* in the current volume). Assuming that all political ideologies that have ever existed are manifestations of either liberalism or conservatism is like assuming that all religions that have ever existed are manifestations of either Christianity or Judaism. A claim that being a (twenty-first-century American) liberal or conservative is 50% heritable (p. 35) is as absurd as the claim that being a Born Again Christian is 65% heritable (construed as a claim about *Christianity*); the claim that a gene predicts (twenty-first-century American) liberalism (p. 219) is as absurd as the claim that a gene predicts (twenty-first-century) Anglicanism.

Conclusion

Although the editors begin with the promising claim that nature-nurture is an "atavistic dichotomy," this dichotomy is reinforced throughout the volume for at least three reasons: 1) "Genes" and "environment" are treated as independent causal forces whose contribution to variation in complex behaviors can be precisely quantified; 2) claims that polymorphisms can predict phenotypes ignore, for the most part, the entire developmental (i.e., environmental) history starting with fertilization and ending with, for example, entering a voting booth; and 3) "physiology" and "environment" are treated as if the former develops in a manner independent of the latter. I agree that political beliefs are not simply, or even mostly, a matter of reason and reflection, but the assumption that political behavior is reducible to, or derivable from, physiological responses is clearly incorrect. Finally, the difficulty of discussing the biology of politics is compounded by the fact that specific political beliefs and practices resemble what most practitioners of behavior genetics claim are not "biological" (despite findings to the contrary based on their own methodologies), namely, specific (doctrinal) religious beliefs and practices.

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Notes

1 Champagne and Curley 2009.
2 For an overview and references, see Charney 2012.
3 Edwards et al. 2009.
4 Ibid.
5 Oxley et al. 2008.
6 Smith et al. 2009.
7 Bradshaw and Ellison 2008.
8 Ibid.
9 D'Onofrio et al. 1999.
10 Ibid.
11 Bradshaw and Ellison 2008; D'Onofrio et al. 1999.
12 Bradshaw and Ellison 2008, 542.
13 Heath et al. 2001.
14 Population stratification refers to differences in allele frequencies among populations due to genetic ancestry. For population stratification as a source of spurious correlations in gene association studies, see Charney and English 2012 and 2013.
15 D'Onofrio et al. 1999, 967.

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> People nowadays think that scientists exist to instruct them.
> Ludwig Wittgenstein[1]

Ludwig Wittgenstein famously stated that "the confusion and barrenness of psychology is not to be explained by calling it a 'young science' . . . for in psychology there are experimental methods and *conceptual confusion.*"[2] The kinds of confusions that he referred to are much in evidence in *Man Is by Nature a Political Animal.* The type of claim advanced in the volume has a long history in the field of political science, but that does little to overcome the conceptual difficulties of past ventures, ranging from social Darwinism to biopolitics. Although the kind of approach represented here has often been criticized as reductionist, antihumanist, determinist, and so on, the more significant problems are theoretical and logical.

The first confusion arises from the title's invocation of Aristotle. There may, indeed, be lessons that can be derived from Aristotle, but they are not those suggested in the various chapters of the book. Aristotle's designation of humans as political animals, or, more accurately, animals whose nature is to live in a *polis,* had two related but distinct dimensions. He assumed that there was a biologically natural foundation of human behavior, including the empirical facts that humans belonged to the class of gregarious animals and that the polis was a natural, but not inevitable, outgrowth of basic human needs and tended to evolve from more primitive but necessary associations, such as the household. But, more importantly, he also characterized politics as natural in the sense that political life allowed, especially through the medium of citizenship, for both the development and exercise of the distinctly human capacity for language, which in turn was the basis of action, reason, philosophy, and normative judgment about matters such as justice. According to Aristotle, what happened in a polis was both constrained and made possible by biology, but what was more definitively and essentially natural, though contingent, was the emergent conventional character of political life. For him, other animals were only metaphorically or analogically political, and what was natural in the sense of biology was not an explanation for the particulars of political life. There is no a priori reason to take Aristotle as authoritative in these matters, but his *Ethics* and *Politics* are certainly not a springboard for the kinds of arguments advanced in this volume.

The conceptual difficulties continue when the editors reject what they refer to as the "'classic'" meaning of the term *politics,* that is, the practices and institutions that, in various societies, are typically self-ascribed and distinguished as political. "Politics" is instead defined generically as an analytically distinguishable form of "human behavior," which could apply to virtually any form of social interaction (such as, the editors suggest, "when lovers argue"). This excludes the concept of politics as designating any theoretically autonomous subject matter or form of inquiry. In one respect, this might be a welcome alternative to the tendency in some of contemporary political theory to confer an ontological status on politics and to speak of "*the* Political," but it not only diverges from Aristotle but also leaves open the broader and crucial theoretical question of what constitutes that class of "social and political behaviors" of which politics is an instance.

The basic argument of the volume is that various aspects of the "biological organism" serve to "help shape and guide" politics and that, consequently, the subject can be studied by "biology, endocrinology, evolution, genetics, neurology, and physiology" (p. 2). This approach is in part designed to sidestep or overstep the "nature/nurture" debate and to complement, and in some respects transcend, the recent popularity of rational choice analysis, as well as more traditional studies based on "environmental" factors, such as institutional structures and "socialization." But since the concept of politics, and social behavior as a whole, is left theoretically empty, the issue concerning how such phenomena are shaped and guided by biology cannot be clearly addressed. While the concept of behavior remains porous, there is a tendency in these chapters to assume the "giveness" of biological facts, as if these were independent variables, but much of the material in natural science on which they draw is both theoretically disparate and internally contested. The individual authors also seem to have quite different concepts of "shaping" and "guiding," and there is often no clear indication of their disciplinary identity, even though in addition to political science, they apparently include sociology, anthropology, psychology, and genetics. Most, however, are not natural scientists but somewhat selective and random borrowers, who often appear to be less serious students of biology than intellectual foragers seeking support for prior agendas.

In their chapter on "Evolution as a Theory of Political Behavior," Peter K. Hatemi and Rose McDermott claim that "evolution offers a potential foundation for a unifying theory of human behavior" and that this not only complements and, to some extent, transcends current approaches but also reconciles "human universals" and "individual differences" (p. 20). What is meant by a "unifying theory" of evolution is, however, unclear. The authors are apparently not subscribing to what is now often referred to as "universal Darwinism," that is, the claim that evolutionary theory can be extended to nonbiological phenomena, a claim which has been advanced by scientists such as Richard Dawkins and philosophers such as Daniel Dennett. The latter argue

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that the process of human evolution has resulted in the emergence and autonomy of social and cultural phenomena ("memes") but that Darwin's general theory, as well as the theory of genetic replication, can be extended to the explanation of the interactions and changes among such cultural units.

On two occasions, Hatemi and McDermott quote Edward O. Wilson's statement that "the boundary between the natural sciences on the one side and humanities and humanistic social sciences on the other is not an epistemological fault line, but a domain of poorly understood material phenomena that invites cooperative exploration from both sides" (pp. 17, 38). This quotation, however, unlike the book's basic argument that biological facts affect social facts, assumes that we are dealing not with theoretically distinct phenomena but with levels of the same kind of phenomena, that is, "material phenomena." But the use of this quotation also indicates a failure to recognize that natural facts are far from given and constant. Wilson has now (e.g., *The Social Conquest of the Earth,* 2012) abandoned a central premise of his earlier work (*Sociobiology,* 1975), as well as of modern evolutionary biology in general and of much of the literature cited in the chapter. This is the assumption that natural selection works principally on the genes of individuals and that forms of social behavior, such as altruism, among both animals and humans, derive from genes. Wilson now claims that group selection and the replication of eusocial behavior is the basic explanation of altruism, as well as of the dominance of the human species. Oleg Smirnov and Tim Johnson also advocate "evolutionary modeling," but although they distinguish their "formal approach" from more "figurative" uses of the term *evolution* by some social scientists, their model of "evolutionary game theory," is, as they actually indicate, more a heuristic and ideal typification based on various general evolutionary concepts than an actual application of biological evolutionary theory.

Whatever Wilson may now believe about the basis of human altruism, his arguments exemplify a basic recurring conceptual problem in the literature of sociobiology that is manifest in this volume. This is the assumption that when we take terms that refer to characteristically human forms of social interaction, such as altruism, competition, and so on, and apply them naturalistically to what seems to be functionally similar behavior in other creatures such as ants, we have discovered either a theoretical similarity or a causal link. Darby Proctor and Sarah Brosnan fall into this fallacy by describing the behavior of chimpanzees in anthropomorphic terms, that is, "how the human ideals of politics and political behavior can be translated into useful concepts for other species" (pp. 47–48), and then abstractly defining politics, using Harold Lasswell's stipulative definition, in a manner that would apply to any creatures. They then ask what nonhuman "primates can tell us about the evolutionary roots of our own political behavior" and conclude that because the former precede humans on the evolutionary scale, studying their behavior and noting similarities with humans can explain important aspects of the origins and character of human social interaction.

The long multiauthored chapter (83 pages) by Lindon Eaves, Hatemi, Andrew Heath, and Nicholas Martin is devoted to challenging the claim that "the origin and transmission of behavioral differences is social" (p. 101), but no one has ever claimed that all behavior can be explained socially—only that social behavior can be explained socially, as apparently Wilson has now concluded. The authors, however, argue that genes are linked to the political ideas and behavior of twins and nuclear families. Two other chapters (Jason Boardman; James Fowler, Peter Loewen, Jaime Settle, and Christopher Dawes) also explore the possibility of tracing a connection between genes and politics. What is involved in these studies, however, is primarily a matter of positing correlations, but noting such correlations does not establish a causal connection between the two separate theoretical realms of biological and social phenomena.

It is also difficult to discern how such an individualistic approach could be applied to the study of collective political behavior. A chapter by Kevin Smith and John Hibbing on the "psychophysiology" of the "mind-body connection" leaves the terms *mind* and *psychological states* conceptually empty but urges on the reader a post-Cartesian form of dualism that presents mind and body, that is, political "orientations" and their biological correlates, as two autonomous but causally and interacting "domains." A chapter on "neuropolitics" by Darren Schreiber also argues that "brain activity is correlated with mental life" but again leaves the concept of "mental life" theoretically unspecified and largely substitutes the old mind/body dualism with a brain/body dualism. Schreiber also perpetuates the book's unredeemed claim that we can, in more than a metaphorical or heuristic sense, "observe politics . . . in a wide variety of animals."

The most persistent problem in the volume is the lack of clarity regarding its conception of the relationship between natural and social facts. It would be intelligible, and, from Aristotle to the present, largely beyond question, to claim that, in various respects, biological structures and processes both constrain and enable social life and that if the biological world were fundamentally different, many of our political concepts and actions would surely be different. What is being advanced in the volume, however, is the stronger claim that political facts are affected in some manner by biological and physiological facts.

The difficulty with this claim is that we are dealing with two theoretically incommensurable realms of fact. It

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would be similar to saying that chemical facts have a causal impact on biological facts, but, for example, biochemistry is really a matter of studying the chemical processes in biological organisms, rather than a matter of explaining the latter facts in terms of the ways in which they are affected or guided by the former. The latter proposition is also very different from, for example, the manner in which genetics has been incorporated as an important extension of the theory of evolution. In biochemistry, we are talking about biological facts all the way down and assuming that the organisms have various indigenous levels of existence. Biological phenomena do not, however, constitute a level of political phenomena, or if they were in some manner construed as such a level, it would be in the sense that a biologist might study the organisms that manifest political behavior. Politics, and conventional objects in general, such as language, are what philosophers might speak of as strongly emergent, that is, phenomena whose qualities are not traceable to their components but supervene on them. Even the rules of chess, let alone the biology of the players, do not causally explain the particular moves the players make—whatever correlations we may find between such moves and various neurological and physiological events.

A somewhat similar confusion is apparent in the claim advanced by some of the authors that political behavior can be explained in terms of "beliefs," "attitudes," and "preferences" that have biological causes. The first problem is that the meaning of these terms is left undetermined. One might ask if these are psychological states, physical brain states, reports of surveyed individuals, operationally defined responses to certain questions, and so on. But however these terms may be theoretically explicated, we would again be confronted with two different theoretical realms and attending but incommensurable factual content. There is no third, or common, object of inquiry that is the bearer of both mental and biological attributes. Politics, as construed by the authors, is juxtaposed to various physiological phenomena, but it is difficult to make sense of the claim that biological facts interact with social facts unless a theory is advanced that subsumes both classes of fact. It might be argued that social phenomena are gross or macro manifestations of an underlying micro reality or that political actions and ideas can be explained scientifically. This would seem to suggest, however, that social phenomena are appearances, just as various proponents of neuroscience have attempted to specify "what emotions really are," that is, physiological states, despite their manifestation in the form of certain aspects of social behavior, but the editors claim to reject any charge of reductionism as "specious." One might possibly argue that just as a substance such as matter has both physical and chemical properties, social phenomena possess both biological and conventional properties, but this would again raise the question of the theoretical constitution of social phenomena and conflict with the premise that natural facts and social facts are two interacting domains.

The human sciences and the natural sciences may be construed in many ways as complementary endeavors. Certainly, as chapters on "hormones" by McDermott and by Coren Apicella and David Cesarini suggest, biological factors relating to evolution, genetics, hormones, brain states, and so on are relevant for explaining how an individual acts in, for example, the game of baseball or any other form of human social interaction. Steroid injection and blood doping demonstrate how biological facts can have an impact on various sports, and few would doubt that testosterone plays a role in "classic" politics as well as in arguments between lovers, but the investigation of such matters is applied biology, which should not be confused with the claim that biology is a way of studying baseball.

What is missing in the volume, but what is necessary before there can be a serious engagement of the issues involved, is a theoretical argument about political phenomena, rather than just an arbitrary definition of politics, as well as a more focused discussion about the differences and similarities between natural science and social science. Social scientists continue to argue about whether or not the methods and/or theories of natural science can be applied to social phenomena, but these arguments have tended to skirt the crux of the matter. The fundamental difference between natural and social science is not, in the first instance, methodological but simply that while what is conceived as the facts of natural science are internally generated within the theories and discourse of natural science, social facts, no matter how they are described by the social scientist, are also conceptually constituted in the conventions that compose the language and practices of social actors. The implication of this difference is that no matter what methods social science deploys to investigate social phenomena, it is an interpretive, representative, reconstructive, and (potentially) critical endeavor as opposed to the constructive presentational character of natural science. If natural factors are construed as guiding and shaping social behavior, it is in the sense that, for example, an injury to the brain might lead to an inability to engage in emotional expression, which is not the same as suggesting that emotions are physiological states. Social science is more like natural history than natural science. Natural history presupposes biology, but even animal behavior constitutes an emergent class of facts.[3]

Notes

1 Wittgenstein 1980, 36.
2 Wittgenstein 1958, 232, emphasis in original.
3 For a more extended critical discussion of some of the issues raised in this volume, see Gunnell 2007, 2012.

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