

## **Taking Evolution Seriously: Historical Institutionalism and Evolutionary Theory**

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*Social science in general and political science in particular have been resistant to the mobilization of evolutionary and specifically Darwinian ideas for analytic and explanatory purposes. This paper documents a disconnect between political scientists and standard evolutionary theory. Historical institutionalism is identified as a subfield particularly well-suited, but presently ill-equipped, to benefit from evolutionary thinking. Key concepts in evolutionary theory are then used to interpret work by prominent historical institutionalists, illustrate the under-theorized state of historical institutionalism, and suggest the potential of evolutionary theory to greatly enhance the depth, range, and power of that approach. Illustrations are drawn from studies by a range of researchers, including Gellner, Thelen, Ertman, Gottshalk, Anthony Marx, and Katznelson.*

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Politics is about efforts by groups and individuals in groups to succeed—to either change the world, or prevent it from changing. Institutions concern political scientists because they constitute the structures of belief, the stabilized sets of expectations, and the configurations of context that form the environment of these efforts and shape the competition associated with them. Since all students of politics are interested in change, and since institutions help determine the paths that change takes, most students of politics become interested in institutional change. Thus, it is mighty surprising that political scientists have been so avoidant when it comes to adapting and applying the single most important theory ever devised about how and why change occurs

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(in the living world), and how that change shapes and is shaped by environmental contexts (habitats).

By many accounts, the theory of evolution by natural selection counts as among the best ideas, perhaps the best idea ever to have been discovered or invented. In the introduction to a new edition of Charles Darwin's *Origin of the Species*, one of his leading contemporary disciples, Richard Dawkins, writes:

Suppose we measure the power of a scientific theory as a ratio: how much it explains divided by how much it needs to assume in order to do that explaining. By this criterion, Darwin's theory of evolution by natural selection is second to none.<sup>1</sup>

One might naively imagine that Darwin's theory of the "origin of species" to be "only" about animals and plants, not human affairs, and therefore presume its irrelevance for politics. But what are species? The reason Darwin's classic is entitled *Origin of Species* and not *Origin of the Species* is because his argument contradicted the essentialist belief that a specific, finite, and unchanging set of categories of kinds had been primordially established. Instead, the theory contends, "species" are analytic categories invented by observers to correspond with stabilized patterns of exhibited characteristics. They are no different in ontological status than "varieties" within them, which are always candidates for being reclassified as species. These categories are, in essence, institutionalized ways of imagining the world. They are institutionalizations of difference that, although neither primordial nor permanent, exert influence on the futures the world can take—both the world of science and the world science seeks to understand. In other words, "species" are "institutions": crystallized boundaries among "kinds", constructed as boundaries that interrupt fields of vast and complex patterns of variation. These institutionalized distinctions then operate with consequences beyond the arbitrariness of their location and history to shape, via rules (constraints on interactions), prospects for future kinds of change.

The virtual absence of serious evolutionary thinking in political science is surprising not only because institutions and institutional change are central to the interests of students of politics and other social scientists, but also in light of the fact that political scientists have been avid consumers of ideas, whose origins lay well outside the traditional domains of inquiry into matters political. Consider, for example, the massive influence on political science of theories emanating from religion, economics, mechanics, systems theory, modernization, cybernetics, neuroscience, or psychology. It is also worth remembering that Darwin's

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1. Introduction to Charles Darwin, *The Origin of Species and the Voyage of the Beagle* (New York: Alfred A. Knopf, 2003), ix.

own explication of his theory drew deeply, and not accidentally, on the “political science” of Malthus and moved easily to patterns of social change, most particularly the patterns of change exhibited by languages over time.<sup>2</sup>

In this article I will demonstrate that political scientists have largely failed to engage seriously with evolutionary theory. This is true even in that subspecies of political science focused on trajectories of institutional change and their consequences, historical institutionalism—a subfield whose focus on long periods of time, variation and stability in institutional practice, and the “heritability” of institutional structures across generations—has a particularly strong elective affinity for evolutionary theory. Drawing on work by historical institutionalists, I will argue that by exploiting the conceptual apparatus associated with evolutionary thinking, historical institutionalists can widen the breadth of their findings and increase the depth and rigor of their arguments. Indeed, I will suggest that historical institutionalism can only escape from the decreasingly edifying conclusion that outcomes are path dependent and are the product of some combination of structure and agency, by adopting, by one name or another, an authentically evolutionary approach.

The article is organized as follows. I will first report briefly on two high-profile efforts in the discipline to discuss evolution. This analysis will illustrate common misunderstandings, including how apt evolution and evolutionary processes are to be confused with development, progress, gradualism, or, indeed, any kind of “change.” In the next section, I will present a simple but adequate definition of evolution as the basis for explicating a number of key aspects of evolution by natural selection. In the final section, these conceptual devices, propositions, and points of view will be used to translate the arguments of some high quality historical institutionalist texts into the language of evolutionary theory and to identify improvements that could be achieved in these works, and in the larger field of historical institutionalism itself.

## Political Science and Evolution: Evidence of a Disconnect

In the American cultural battle space, the overwhelming majority of card-carrying political scientists have sided with evolution, and against “Creationism” and “Intelligent Design.” Indeed, along with most academics,

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2. “This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms.” Charles Darwin, “The Origin of Species,” in *The Origin of Species and the Voyage of the Beagle* (New York: Alfred A. Knopf, 2003), 539. Although this essay is an effort to illuminate the contribution that a theory, widely understood as originating in attempts to understand the biological world, could make to understanding social and cultural domains, Darwin himself took inspiration for his botanical and zoological theories from the social theory of Malthus and from philology and consideration of the trajectories of language dialects. Darwin, *Origin of Species*, 539–40 and 568.

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political scientists regard those who categorically deny the power of the theory of evolution as anti-intellectual or anti-scientific ignoramuses. That makes it all the more surprising that political science has been so resistant to the mobilization of evolutionary and specifically Darwinian ideas to frame and solve problems in our discipline. I will suggest that this is true even where the word “evolution” is deployed, and even in the particular conversations within political science where the power of evolutionary theory would appear to offer the most leverage, *viz.*, in work featuring close attention to changing patterns of political outcomes over time and at different levels of analysis.

Despite some early anticipations of the powerful contributions evolution and computer modeling could make to institutional analysis,<sup>3</sup> relevant contributions in organization theory cast in evolutionary terms,<sup>4</sup> influential and important work in evolutionary psychology,<sup>5</sup> common invocations of Schelling’s theory of the bottom-up emergence of segregation patterns,<sup>6</sup> regular but loose applications of Stephen J. Gould’s notion of “punctuated equilibrium,”<sup>7</sup> Douglass C. North’s call for social applications of evolutionary theory,<sup>8</sup> and the important work of Robert Axelrod and others in evolutionary game theory and agent-based modeling,<sup>9</sup> relatively few political scientists have treated evolutionary theory seriously. In neither the nineteen contributions of Ada Finifter’s 500-page edited volume in 1993, *Political Science: The State of the Discipline*, nor in the twenty-eight contributions appearing in the comparable 2002 volume edited by Katznelson and Milner, did the name

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3. For an extraordinary essay in this mode, see Anatol Rapoport, “Mathematical, Evolutionary, and Psychological Approaches to the Study of Total Societies,” in *The Study of Total Societies*, ed. Samuel Z. Klausner (New York: Anchor, 1967), 114–43.

4. Joel A. C. Baum and Bill McKelvey, ed., *Variations in Organization Science* (Thousand Oaks, CA: Sage, 1999); James D. Thompson, *Organizations in Action* (New York: McGraw Hill, 1967). Thompson does not explicitly use evolutionary language, but his contingency theory models the trajectory of organizations as outcomes of competitive processes within differently structured task environments (habitats, as it were). For Thompson’s empirical inspiration see Alfred D. Chandler, *Strategy and Structure* (Cambridge: M.I.T. Press, 1962).

5. Jerome H. Barkow, Leda Cosmides, and John Tooby, *The Adapted Mind* (New York: Oxford University Press, 1992); David Sloan Wilson, *Darwin’s Cathedral: Evolution, Religion and the Nature of Society* (Chicago: University of Chicago Press, 2001); David S. Wilson, “The New Fable of the Bees,” *Advances in Austrian Economics* 7 (2004): 201–20; Robert Boyd and Peter J. Richerson, *Culture and the Evolutionary Process* (Chicago: University of Chicago Press, 1985).

6. Thomas C. Schelling, *Micromotives and Macrobehavior* (New York: W.W. Norton, 1978).

7. Stephen D. Krasner, “Approaches to the State: Alternative Conceptions and Historical Dynamics,” *Comparative Politics* 16 (January 1984): 223–46.

8. Douglass C. North, “Economic Performance through Time: The Limits to Knowledge,” Nobel Prize Lecture, December 9, 1993; [http://nobelprize.org/nobel\\_prizes/economics/laureates/1993/north-lecture.html](http://nobelprize.org/nobel_prizes/economics/laureates/1993/north-lecture.html).

9. Robert Axelrod, *The Evolution of Cooperation* (New York: Basic Books, 1984); Lars-Erik Cederman, *Emergent Actors in World Politics: How States and Nations Develop and Dissolve* (Princeton: Princeton University Press, 1997).

Darwin appear, or the name of any of his theory's most powerful contemporary interpreters.<sup>10</sup>

Dryzek and Schlosberg documented this historical disregard of evolutionary thinking in an essay that is commonly cited as assessing the historical relationship of evolutionary thinking to political science.<sup>11</sup> That their analysis tells more than they know is reflected in the essay's title: "Disciplining Darwin." Their article does *not* trace or evaluate the impact of the content of Darwinian theory (focused on how variation, competition, and partial retention of information over time and across many individuals produce change at the population level) in political science. In fact, as is hinted in their subtitle "Biology in the History of Political Science," they avoid considering Darwinian evolutionary theory altogether. Instead, their analysis avoids evolution, *per se*, in favor of "biopolitics"—an array of ideas about how biological, biochemical, or genetic processes and traits might affect political behavior.

By displacing their attention from the scientifically potent core of evolutionary theory to disreputable, obsolete, or simply much less interesting Social Darwinist, organistic, and sociobiological approaches, Dryzek and Schlosberg unintendedly explain their own finding. Although valuable work with direct implications for political science has been done in neuroscience, ethology, and population genetics, nevertheless if biopolitics, as Dryzek and Schlosberg treat it, is what it would mean to think in Darwinian evolutionary terms, then political scientists have been wise to avoid seeking much assistance from that theoretical position.

Why has the mistake of subsuming genuinely evolutionary theory within an analytically strategic category of "biological" or more or less directly genetic (sociobiological) approaches to politics been made by so many for so long? After all, political scientists and their colleagues across the social sciences have no aversion to applying principles of natural selection in biology, zoology, or botany, or in the study of bacteria, cancer, or viruses. Yet the very idea of applying evolutionary thinking to social science problems tends to evoke strong negative reactions. In this way, political scientists tend to treat the life sciences as enclosed by impermeable walls. Within those walls, explicit evolutionary thinking is deemed capable of producing powerful and astonishing truths. Outside them, in the realm of human behavior, applications of evolutionary thinking are typically treated as irrelevant, and often as obviously wrong or downright

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10. Ada W. Finifter, ed., *Political Science: The State of the Discipline II* (Washington, DC: APSA, 1993). Ira Katznelson and Helen V. Milner, ed., *Political Science: The State of the Discipline* (New York: W.W. Norton and Company, 2002).

11. See John S. Dryzek and David Schlosberg, "Disciplining Darwin: Biology in the History of Political Science," in *Political Science in History: Research Programs and Political Traditions*, ed. James Farr, John S. Dryzek, and Stephen T. Leonard (New York: Cambridge University Press, 1995), 123–44.

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dangerous. This perception is in part traceable to the revulsion at the warped interpretations of Darwin's theory advanced in the late nineteenth century by Herbert Spencer, William Graham Sumner, and other "social Darwinists," to subsequent noxious ideologies and theories of racialism, and, more recently, to confusions and overextensions of sociobiological theories of inclusive fitness.

However, conceptual confusion also helps explain the intellectual isolation of political scientists from the powerful theoretical machinery associated with what is known, among evolutionary theorists, as the "Neo-Darwinian Synthesis." This confusion was dramatically reflected in a special issue of the *American Political Science Review* (APSR) published, in November 2006, to mark its own centennial as a journal. For this issue, editor Lee Sigelman solicited contributions on the theme of "the evolution of political science" and published twenty-five of them, including his own. This collection was as explicit an opportunity to use evolutionary concepts and theories as could be imagined. Indeed, in his own introductory essay, Sigelman deployed the key concept of "coevolution" to analyze the asymmetric, dialectical, and fateful interaction of the practices of political scientists with the APSR's publication practices.<sup>12</sup> Sigelman figured the APSR as a mirror on the discipline, but a "fun-house mirror" whose impact, over time, was to exaggerate trends and, while not put this way by Sigelman, drive the profession along an erratic and highly idiosyncratic trajectory through the state space of possible ways political science could be portrayed as a discipline.

However, despite the editor's explicit call for evolutionary treatments, and despite his own significant gesture in that direction, only two others of the twenty-five contributions made any attempt, either explicitly or implicitly, to offer an evolutionary *explanation* of the trajectory of the discipline—if by evolutionary is meant any unguided pattern of change that arises from a combination of variation, competition, and retention within a population. Indeed, even Sigelman quickly abandoned his evolutionary approach. After offering the stimulating co-evolutionary model of the APSR–Political Science relationship mentioned above, he shifted to two possible ways to think about "evolution"—both of them unconnected to systematic evolutionary thinking. These two common errors are to treat evolution as any kind of "gradual change" or as any process of change that results in "betterment" or "progress."

Of the twenty-five contributions to this special APSR issue on the "evolution of the discipline," fifteen dispensed with any explicit mention whatsoever of "evolution." Implying their understanding of "evolution" as equivalent to "change," ten of these fifteen offered accounts of change or its absence observed in the discipline over time, either delineations of long-term trends (e.g., stable

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12. Lee Sigelman, "The Coevolution of American Political Science and the *American Political Science Review*," *American Political Science Review* 100 (November 2006): 463–78.

pattern of political science reflecting dominant political interests; stable pattern of tension and ambiguity in the discipline's relationship to policy studies; trends in attention to political parties; or change in usages of and attention to "ideology");<sup>13</sup> or accounts of dramatic episodes (specific examples of success or failure to advance a particular theoretical or sub-disciplinary agenda, for example the vocation of public intellectuals or Harold Laswell's vision).<sup>14</sup> The other four contributions that did not use the terms "evolve" or "evolution" framed their task as evaluating whether observed changes should be considered as "progress", and if so what contributed to that progress. For example, these treatments evaluate development of the American politics subfield, the contribution of émigré European scholars to the trajectory of political science as a whole, and suboptimal change in the amount of attention devoted in the field to women's issues.<sup>15</sup>

Similar treatments of evolution as equivalent to change, as progress, or as gradual rather than rapid transformation, were made by authors who did explicitly use the terminology of evolution—at least in its most rudimentary form. For example, one contributor chronicled changes in attention to Latino politics in different sub-disciplinary domains and traced the changes to larger changes in U.S. politics and to the agency of Latino-oriented scholars. This is described as an account of how "Latino politics research has evolved."<sup>16</sup> Explicit use of evolution as nothing more than "change" is also apparent in an essay evaluating the APSR's changing ("evolving") relevance for U.S. foreign policy.<sup>17</sup> Other essays use evolution explicitly in ways that combine meanings of "change," "progress,"

13. Michael Parenti, "Patricians, Professionals, and Political Science," *American Political Science Review* 100 (November 2006): 499–506; Peter N. Ubertaccio and Brian J. Cook, "Wilson's Failure: Roots of Contention about the Meaning of a Science of Politics," *American Political Science Review* 100 (November 2006): 573–78; Howard L. Reiter, "The Study of Political Parties, 1906–2005: The View from the Journals," *American Political Science Review* 100 (November 2006): 613–18; Kathleen Knight, "Transformations of the Concept of Ideology in the Twentieth Century," *American Political Science Review* 100 (November 2006): 619–26.

14. Emily Hauptmann, "From Opposition to Accommodation: How Rockefeller Foundation Grants Redefined Relations between Political Theory and Social Science in the 1950s," *American Political Science Review* 100 (November 2006): 643–50; James Farr, Jacob S. Hacker, and Nicole Kazee, "The Policy Scientist of Democracy: The Discipline of Harold D. Lasswell," *American Political Science Review* 100 (November 2006): 579–88.

15. Amy Fried, "The Forgotten Lindsay Rogers and the Development of American Political Science," *American Political Science Review* 100 (November 2006): 555–62; Gerhard Loewenberg, "The Influence of European Émigré Scholars on Comparative Politics, 1925–1965," *American Political Science Review* 100 (November 2006): 597–604; Sue Tolleson-Rinehart and Susan J. Carroll, "'Far from Ideal': The Gender Politics of Political Science," *American Political Science Review* 100 (November 2006): 507–14.

16. Luis R. Fraga, John A. Garcia, Rodney E. Hero, Michael Jones-Correa, Valerie Martinex-Ebers, and Gary M. Segura, "*Su Casa Es Nuestra Casa*: Latino Politics Research and the Development of American Political Science," *American Political Science Review* 100 (November 2006): 515–22.

17. Andrew Bennett and G. John Ikenberry, "The *Review's* Evolving Relevance for U.S. Foreign Policy 1906–2006," *American Political Science Review* 100 (November 2006): 651–58.

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and “development.” Wald and Wilcox describe the “evolving status of religion” by referring to both “growth” and “development,”<sup>18</sup> and judge it to be inadequate. In his treatment of game theory’s contribution to the “evolving study of war,” Bruce Bueno de Mesquita uses the term to mean progress and development in a distinctly Whiggish story about game theory’s contribution to an “evolution” (i.e., improvement) of the discipline that “seems like a natural progression.”<sup>19</sup>

### Defining Evolution

How can the concept of evolution be defined so that it is not wasted as a synonym for development, progress, gradualism, or simply “change” and so that social scientists can exploit and add to the immensely rich array of propositions and insights associated with evolutionary theory? To regard evolution as no more than “change” or some pattern of (incremental) change would mean that the gradual fading of a piece of fabric exposed to sunlight from one shade of red to a lighter shade of red would have to be classified as “evolutionary,” which, by any meaningful or workable definition of the term, it is not. Nor can “progress” toward some valued outcome constitute a defining or necessary feature of an evolutionary process. To the extent that observers or participants in a process may be pleased with the outcome of evolution, they may *deem* it progress. But the evolution of more resistant bacteria or more ferocious cancers when under-treated by weak or improperly administered drugs or other therapies is just as evolutionary as the emergence of human resistance to diseases associated with cumulative changes in the immune systems of reproducing populations benefiting from long-term and close contact with domesticated animals. In sharp contrast to an evolutionary process, which entails no teleology, progress *can* be measured in any process considered as a developmental sequence—since one can detect movement from one “stage” in the process to another, thereby marking “progress” toward an end state, if not necessarily a goal.<sup>20</sup>

The fact is that neither evolutionary theorists nor ordinary language registers (such as dictionaries) do a very good job of defining evolution. Since biologists,

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18. Kenneth D. Wald and Clyde Wilcox, “Getting Religion: Has Political Science Rediscovered the Faith Factor?” *American Political Science Review* 100 (November 2006): 523–30.

19. Bruce Bueno de Mesquita, “Game Theory, Political Economy, and the Evolving Study of War and Peace,” *American Political Science Review* 100 (November 2006): 637–42, at 637.

20. When many social scientists assumed that unguided economic, social, and political processes would lead to the valued end state of American-style industrial, pluralist, and liberal democracy, because they could trace the “development” of this condition in the United States through a series of stages, they were confusing these two fundamentally different, though related, processes. Indeed, the entire field of modernization studies might well have been salvaged had questions been posed earlier than they were about the conditions under which different kinds of structures could more likely evolve rather than expecting that countries followed set stages through a developmental process leading inexorably, if sometimes slowly, to a valued end state observed to have been possible.

botanists, and zoologists were most prominent in the theory's development, their widespread adoption of Darwin's definition: "descent with modification" has proved satisfactory (for them). But because the word "descent" connotes a genealogical process, it can easily convey to others the mistaken impression that genetic "descent" must be involved for evolution to be observed. The term "descent" may also convey the added (mistaken) impression of a teleological process of "ascent" in which current outcomes are explained by "progress" toward a pre-established or inevitable end state. Moreover, the word "modification" may wrongly convey the impression that change associated with evolution must be gradual. Nor does the etymology of "evolve," from the Latin to "unfold," provide useful guidance, since it connotes a pre-ordained plan or sequence, which appears over time, thereby expressing what is precisely meant by "development" rather than "evolution."

I suggest that the defining characteristic of evolution is that *in relation to circumstances patterns of change observed among units produce subsequent patterns of population change*. Whether the patterns of change observed at the unit level entail mergers, cooperation, competition by individual units against a general constraint, or competition of units, are empirical questions with possible theoretical importance, but not ruled in or out by definition. Whether the patterns of change at the population level are considered gradual or rapid and whether they are regarded as progressive or undesirable, are, likewise, not questions of definition, but of the time scale and preferences employed by the observer. Nor does this definition require a specific mechanism (such as natural selection) to be responsible for transforming changes at one unit of aggregation into changed patterns at another.<sup>21</sup> As a definition should be, it is agnostic with respect to the validity of theories employing it. It does suggest, however, that interesting patterns that manifest themselves historically at some macro level may be traced, in complex but systematic ways, to conditions operating at much lower levels of analysis.

## **An Evolutionary Approach for Historical Institutionalists**

Darwin's theory challenged, at the most fundamental level possible, the two-thousand-year-old tradition in European thinking that imagined the pursuit of

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21. In the context of this definitional exercise, it is worth noting the remarkable fact that genetics as a transmission belt for traits from one generation of plants or animals to another was unknown to Darwin. In Lakatosian terms, Darwinian theory "predicted" the "new fact" that in nature something like genetics operated, because otherwise patterns in the differential replication of traits by organisms (at the unit level) could not be expressed as patterns of changes in subsequent populations. For a methodologically different, but substantively similar treatment of the definition-of-evolution issue, see Howard E. Aldrich, Geoffrey M. Hodgson, David L. Hull, Thorbjørn Knudsen, Joel Mokyr, and Viktor J. Vanberg, "In Defence of Generalized Darwinism," *Journal of Evolutionary Economics* 18 (2008): 577–96.

truth to be the use of systematic observation to detect the permanent and original features of the world and its organization. By arguing that “species,” thought to have been created as a finite and definite list of true kinds of living things, were neither the essential building blocks of nature nor an original or stable set of “kinds,” Darwin contradicted what might be called, familiarly to political scientists, the “primordialist” paradigm.<sup>22</sup>

Historical institutionalism is but one of many branches of contemporary social science based on a fundamental understanding of human affairs that is isomorphic to Darwin’s depiction of the co-evolution of organisms and their habitats. It is quite typical, in fact, in its treatment of outcomes as the result of a complex interplay among contingent “structures” (fluid but sticky) and malleable, adaptive (but not fluidly adaptive) “agents.” However, while the Lakatosian “metaphysic” or the “negative heuristic” of Darwinism is hegemonic within contemporary social science, systematic, self-conscious use of the positive heuristics of evolutionary theory is virtually absent.<sup>23</sup> This section will highlight the elective affinity of evolutionary thinking to historical institutionalism in light of the intrinsic importance for each of history. This discussion will be followed by explication of some of the standard elements of evolutionary theory and consideration of an illustrative sample of historical institutionalist studies, as they may stand to benefit from evolutionary theory.

As an intrinsically historical phenomenon, evolution can only work by tracing out a path of the actual via vast numbers of patterned interactions through the myriad worlds of the possible. This path into what was the future is bound in some way by circumstances, but indeterminate as to detail. Some natural sciences are heavily and necessarily historical—for example, astronomy or geology, botany, zoology, or paleontology. These are natural fields for the application of evolutionary ideas. Non-historical attempts to approach these subjects would be limited and even sterile. Likewise are evolutionary theories a natural analytic approach for social scientists interested in phenomena that change over time and which are shaped by or reflect vast numbers of discrete interactions. More precisely, evolutionary thinking is likely to be valuable whenever “history matters,” that is whenever the passage of time at one level of analysis is an order of magnitude more rapid than the corresponding interval of existence of any constituent element of change at a lower level of analysis.

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22. John Dewey, *The Influence of Darwin on Philosophy* (New York: Henry Holt and Company, 1910), 1–19.

23. The negative heuristic of a body of theory or research program is its metaphysical content, that is, core assumptions taken as givens and not subject to evaluation. Positive heuristics are the lines of investigation that the theory or research program encourages and the kinds of questions it suggests are worth answering. Imre Lakatos, “Falsification and the Methodology of Scientific Research Programmes,” in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (New York: Cambridge University Press, 1970), 91–196.

For example, the passage of one organism's genetic material to another is a temporal instant compared to the vastly longer interval of time required to mold the key elements of that genetic material. Similarly, the outcome of a competitive political encounter guided by institutionalized rules is a compressed temporal episode compared to the sweep of historical time that established those institutionalized rules as the structure shaping the outcome of competitive agency.

*Darwin's Dangerous Idea*, by the philosopher Daniel C. Dennett, offers an excellent introduction to neo-orthodox Darwinian evolutionary theory. This 1995 book focuses on how vast numbers of algorithmic, unguided, interactions at micro levels, can produce trajectories of change and higher orders of functionality at macro levels.<sup>24</sup> Another way to put this is that *patterns* of unguided but competitive interactions among individual small units can, via evolutionary processes, become *mechanisms* that do work in worlds inhabited by larger composite units. These mechanisms may then interact with one another in similar fashion, and the patterns of those interactions can then become mechanisms at an even higher level of analysis, capable of performing other, even more complex, tasks (think people, groups, societies; genes, organisms, species; words, concepts, ideas).<sup>25</sup> This aspect of evolutionary explanations, that they can account for ladders of complexity without resort to unexplained Archimedean points or *deus ex machina* solutions, makes evolution an attractive approach to understanding how the social world of practices and competitive interactions can result in structures that emerge from that world, act upon it, but are not smoothly reducible to it.

Darwin's theory of evolution explains that contingent structures (political scientists would say "institutions") commonly taken as ontologically fundamental and permanent, such as "species" (or states), are more accurately understood as clouds of similarity or patterns of stability with respect to which we have rather stable sets of expectations. The boundaries of such structures are functions of previous patterns of adaptation at lower levels of analysis, the constraints and incentives of circumstances, and the sedimentation of historical accidents.

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24. Daniel Dennett, *Darwin's Dangerous Idea* (New York: Simon & Schuster, 1995). There are of course wide-ranging and passionate debates within evolutionary theory—a vigorous conversation with its own schools of thought, heroes, anti-heroes, inside-baseball controversies, and rival lines of inquiry. The version of evolutionary theory Dennett espouses—the "neo-Darwinian synthesis"—is associated with theorists such as Richard Dawkins and John Maynard Smith. For a useful review of rival schools of thought within contemporary evolutionary theory see Richard Morris, *The Evolutionists: The Struggle for Darwin's Soul* (New York: W.H. Freeman, 2001).

25. Development of this ladder of complexity, which ascends from patterns to mechanisms, and descends from mechanisms to patterns, is the crucial element in the theory of "emergence" that is at the center of complexity science. Evolution itself is understandable in this way as an emergent property of the universe we happen to live in, the laws of which make complex adaptive systems possible. See John H. Holland, *Emergence: From Chaos to Order* (Reading, MA: Helix Books, 1998).

However, the truly revolutionary aspect of Darwin's theory is the mechanism of natural selection. In evolutionary theory natural selection is a mechanism—an algorithmic process—that operates under very particular, but commonly obtained conditions, and that searches for more effective ways to operate in the world. Effectiveness is identically conceived in any domain where natural selection occurs. To be effective, very simply and abstractly, is to reproduce, to “replicate” more successfully than other ways of doing something. Simplifying only a bit, the mechanism of natural selection drives evolution whenever three conditions are met: *variation* in traits among large numbers of units, *competition*<sup>26</sup> among those varied traits, and a substantial degree of *retention* of those traits over time.

If variation, competition, and retention are present in a domain, what automatically occurs is *not* anything that should necessarily be considered “progress”—that depends on the values used to determine preferred versus less preferred states of the world. Instead, what *must* occur is transformation in the distribution of types that reflects different rates of replication. Evolution is “substrate neutral,” meaning that the domains in which natural selection may operate can be biological, but need not be. Wherever and whenever different rates of sufficiently stable variation in a competitive environment are observed, natural selection will operate, leading, as my definition of evolution indicates, from patterns of unit changes to patterns of subsequent population change in relation to circumstances.

Variation, selection, and retention can occur wherever large numbers of competing elements operate overtime. Think not only of types of plants, but types of words; not just types of genes, but types of ideas, recreational activities, painting styles, rhetorical devices, political strategies, weapon systems, etc. As variants of particular seedlings reproduce more or less successfully to shape the context of competition and the requirements for replicability in subsequent generations, so do fads, competing products, turns of phrase, jokes, and ideas shape the information and social contexts that will constrain subsequent competition.

As an illustration, consider language. Millions of speakers of any particular language interact under conditions that select, from all possible sounds, certain sounds that survive and are reproduced by subsequent speakers, at the micro level, as “words.”<sup>27</sup> Other sounds, that for previous generations of speakers may

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26. Note that competition among traits does not connote, though it may include, direct struggles between the individuals carrying the competing traits. Competition among traits at the unit level is best understood as expressed by the relative ability of those traits to replicate themselves in future individuals under the constraints of prevailing circumstances.

27. Dennett and others use Richard Dawkins's neologism, “meme,” as the analytic equivalent of “gene” in the pool of ideational material within which a distinctively rapid form of evolution, cultural

have been understood and treated as words, may disappear. Thus do languages, at a macro level of analysis, evolve, producing distinctive trajectories through worlds of possible vocabularies and grammatical regularities.<sup>28</sup>

To be sure, evolution in general, and evolution by natural selection in particular, cannot account for all outcomes and can never be used to make detailed point predictions. For example, whenever specific outcomes of interest are directly traceable to strategic interaction among small numbers of competitors or cooperators, it would be a mistake to apply evolutionary theory. In any domain, including any political domain, the applicability of evolutionary theory will depend on the extent to which outcomes of interest are epiphenomena of large numbers of boundedly rational (adaptively oriented) but collectively unguided interactions. Since that condition is so commonly met in comparative politics, it should not be surprising that many of the best conceptual and theoretical “gadgets” in that subfield involve deployment of key elements of evolutionary theory.

## **Exploiting Evolutionary Theory: Good Tricks, Frozen Accidents, and Exaptation**

### *Good Tricks and Convergence*

There are two basic strategies for explaining patterns of similarities discovered across domains—homology and analogy. Similarities can be explained as homologous when evidence of descent (or copying, sharing, or imitation) can be identified to document the processes that led to the replication of the observed pattern across individuals, types, locales, or time periods. Similarities that cannot be explained this way (i.e., patterns of similarity manifested despite the absence of evidence of information transfer or even of opportunities for such transfers) can be explained by analogy. For example, whether post-colonial states produce institutional forms that resemble those of European metropolises because they were copied from or inherited via the colonial state, or whether they arose as a result of similar political predicaments being “solved” via analogous “good tricks,” is a serious challenge. In the first instance, careful process tracing can determine the answer. But only a conceptual framework that

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evolution, arises. See Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1989). Words are excellent examples of memes. See also Susan Blackmore, *The Meme Machine* (Oxford: Oxford University Press, 1999).

28. Whether this direction is to be considered “progress” is another question entirely. Snits for example, including me, are often outraged at the “decline” in the English language associated with evolutionary trends reflected in replication rates of split infinitives and use of “amount” rather than “number” that are all too high for our taste.

explicitly distinguishes these two kinds of possibilities can enable theory-building to account for how they might interact, and can enable different kinds of insights, some based on homology and some on analogy, to be generated from consideration of European political history for application to the third world.

From an evolutionary perspective, Daniel Dennett offers the concept of a “good trick” to account for the power of this kind of “analogous” explanation. A good trick is a recipe for action that attracts regular use in certain kinds of situations whenever the ingredients are readily available and the opportunity costs are extremely low. As evolutionary algorithms apply in a substrate neutral way, so can “good tricks.” For example, any poet is familiar with the “good trick” of metaphor—of using associations and patterns that are familiar in one context as projections into a domain or phenomenon to be explored in order to generate new ideas, emotions, or ways of thinking. Scientific researchers in all fields call their metaphors “models,” and, indeed, they perform the same function. Thus, social scientists often seek to learn by transposing into a new domain a coherent set of familiar principles associated with a mathematical or formal description, or a well-understood process, episode, or set of relationships.

A deeper understanding of the relationship between good tricks and explanations by homology begins with the standard natural science image of a “state space.” This concept provides a way to think about an ordered world as the set of all attainable configurations and behaviors as defined by the laws of that world, whatever they may be. An important feature of a state space, as opposed to simply a “set,” is that it is arranged multidimensionally so that movement in the space from one location to another is constrained, meaning that the paths available that connect elements in the space are as important as the set of all elements itself.<sup>29</sup> One asks about such a space, not just what is in it, but how what is in it is arranged to make some things more or less “accessible” from some points in the space than others. So, the state space of chess, with standard rules, is the set of all arrangements of pieces that it is possible to arrive at using legal moves, including the “forced moves” of escaping from check. Despite the enormous number of games of chess that have been played, or imagined, most of these legal arrangements have never been realized. Still they exist in the state space of chess. A large number of these possible configurations are far down isolated sequences of legal moves that chess players would almost never follow, no matter how brilliant or moronic the level of play. Many arrangements, however, are encountered regularly. In these areas of the space, sequences of legal moves intersect in dense clusters, producing patterns of relationships among pieces that are readily recognized by good players. Indeed,

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29. A lawless world, that is a universe without any order, would be a state space of positions, of ways the world could be, in which each location is equally accessible to every other one.

it would be difficult to play a dozen games of chess at a moderate skill level without encountering either the opportunity or the threat of a knight fork or a discovered check.

Of course, exploiting such opportunities is not a requirement of the rules of chess. Indeed, a poor player may not even notice that conditions are ripe for one of these “good tricks.” But no player can become a good player without learning them and learning to recognize the situations that tend to produce them. Indeed, we can expect that even without any manual for how to play good chess, players who have mastered the legal rules and played enough times will stumble upon these opportunities, and, with somewhat different swiftness, add these tricks to their repertoire of stratagems and calculations. Across large numbers of players and chess games, in other words, we should be able to predict that these particular good tricks will be performed regularly and that those who refuse or fail to learn them, will be, in chess tournaments at any rate, quickly eliminated.

As it is in the chess universe, so is it in the natural world. There, we see, for example, that organisms endowed with locomotion and vision are almost, but not absolutely, required to place their “eyes” facing forward. There is nothing in the laws of physics that would prevent eyes facing backward, but the “good trick” of seeing where you’re going, to avoid danger and find food or mates, has such a high payoff compared to eyes facing backward, to see where you’ve been, that unguided processes of competitive replication and retention under conditions of variability will naturally produce a pattern of “eyes forward,” regardless of whether we consider antelopes, fish, frogs, automobiles, or humans.

Notice how in this example, as in any application of evolutionary theory, a key question is to ask by what route a stable pattern we observe could have occurred. In this respect, the “historical turn” that spread from cultural studies to the social sciences, including political science, is a turn toward questions that evolutionary theory is particularly well suited to answer. The metaphysics of evolution demands time and entails history. Looking at politics in evolutionary terms means rejecting explanations as physics (though not cosmology, of course) often poses them—the outcome of abstract, timeless bodies, and forces of different magnitudes yielding solutions of maximum efficiency under ideal conditions. From the “engineering” perspective typical of evolutionary approaches, no explanation of a political pattern—whether of effective rule, stability, governance, stalemate, development, breakdown, or revolution—can be satisfying unless it includes a depiction of the mechanisms that could have produced it. In this respect historical institutionalism, with its insistence that satisfying explanations of outcomes must include the mechanisms by which causal effects are obtained, has a fundamental elective affinity with evolutionary theory. Conversely, evolutionary theory challenges all approaches, whether statistical or formal, which satisfy themselves with correlations as the

basis for causal attribution even if no mechanism for linking variables said to be important can be observed or imagined.

Equipped with the state space concept, we may now consider how it could help historical institutionalists distinguish between patterns explainable by homology, a pattern of replication arising from inheritance or copying from an earlier available referent, versus those explainable by analogy, a pattern of replication or similarity arising from a parallel but unrelated response to a particular kind of problem. Indeed, it would appear that historical institutionalists differ, *ceteris paribus*, from historians, partly by virtue of their stronger interest in explanation by analogy rather than by homology. Generally speaking, social scientists are less interested in “genealogical” accounts of the transformation of a particular form in the past to a particular form in the present than they are in the identification of similarities in the contours of state spaces that produce the regular discovery of “good tricks”—striking patterns of convergence across a wide variety of particular domains or polities where the mechanisms of homology are absent or insufficient.

For example, in *Nations and Nationalism* Ernest Gellner argues that the writings of nationalist ideologues are not worthy of serious study. Such writings are filled with exuberant and prideful nationalist rhetoric with pretensions to spiritual or intellectual depth about ancient origins, tragic oppression, heroic resistance, and future territorial and political redemption.<sup>30</sup> Such formulations may vary in their details across the entire range of nationalist movements and particular nationalist dramas, but bear striking resemblances to one another in the plots and emotional motifs that animate them. By emphasizing the pattern of economic, demographic, administrative, and technological conditions that made nationalism an attractive principle for political entrepreneurs, Gellner explains the regularity of this kind of political pattern as a “good trick” for ambitious politicians (Gellner calls them “political conjurers”). Convergence on the same practice, across many different cultural divides, is thus explainable analogously, without any need to assume processes of mimesis or diffusion, but also without any bar to finding evidence for homologous transmission of nationalist ideas from European countries, via European education, to elites in colonized areas who replicate the pattern in different circumstances.

The serious and oft-noted problem with Gellner’s account is its functionalism. Nationalism arose because industrialism “required” it. Gellner identifies state-sponsored vernacular education systems as a key element in producing nations and as serving the needs of industrialism. However, absent a mechanism allowing the future to cause the past, Gellner’s account fails to link his key independent variable (industrialism) to his dependent variable (nationalism). By using

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30. Ernest Gellner, *Nations and Nationalism* (Ithaca, NY: Cornell University Press, 1983).

evolutionary theory Gellner could have more easily recognized how factors he dismisses as largely irrelevant (a particular kind of political discourse and the activities of those who promote and seek to benefit from it) are actually key mechanisms in the processes that connect industrialization to the nation-state.

Rendered in evolutionary terms, Gellner's argument about the origins of nationalism is that the gradual availability of industrial techniques of production transformed the selection criteria for different kinds of political movements. Under these conditions, nationalist-style legitimacy appeals fared increasingly well in competition with older appeals for loyalty to the feudality or agrarian empire. The latter appeals offered fewer and less dependable rewards for elite contenders, who used them because of their decreasing resonance in the socially, technologically, and culturally changing communities to which they were directed. The result was co-evolution, in similar patterns in separate places, of an industrial society and a nationalist-justified authority structure—in other words, the emergence of the territorial nation-state. The fact that Gellner's account is couched in functionalist language (nationalism arose because industrialism “required” it), rather than evolutionary language, deprives him of the ability to identify the mechanisms that connect the “needs” of industrialism to the standardized vernacular mass-education system the national state provides. This serious weakness in his work could have been avoided altogether had he been ready to mobilize evolutionary theory for the task.

Another example of the contribution evolutionary theory can make to the identification of missing mechanisms is Thomas Ertman's magisterial treatment of the rise of coherent states in late medieval and early modern Europe. He notes that despite the use of mercenaries in addition to feudal levies as early as the 1000s, until the twelfth century “troops of various kinds performing unpaid service still comprised the core of all western European armies.” He observes that during the 1270s and 1280s “the English and the Italians . . . almost simultaneously hit upon a more durable and effective way of organizing for war.”<sup>31</sup> Ertman goes on to describe how Edward I in England as well as the Italian communes drew up contracts with nobles to provide and lead their own recruited and paid companies of fighting men. The price paid by France for delaying embrace of this “good trick” until the 1350s was the French defeat at Crecy (among many others). Spain, having moved only partially in this direction, swiftly followed suit under the competitive strain of the Hundred Years War.

Ertman does not identify the exact mechanisms accounting for the replication of this practice across much of Europe; a question he could usefully have framed by posing analogy versus homology-based explanations against one another. On the other hand, he does highlight several elements that would be key in any

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31. Thomas Ertman, *Birth of the Leviathan* (Cambridge: Cambridge University Press, 1997), 63.

evolutionary account, including documentation of intermediate stages in the series of practices within the state space of military mobilization techniques available in feudal Europe from the tradition of personal service by vassals to “contract” recruitment. Ertman thus shows that this practice was not a completely new, revolutionary innovation, but resembled and indeed could be seen as a result of minor tinkering with a variety of older practices. This image of a range of variations operating at any time, and allowing changes in overall conditions to elicit transformation in the prominence or replicative success of different variants is a rather exact recapitulation of a key dynamic of natural selection.<sup>32</sup> By surfacing the work done by natural selection to identify the good trick of paid military service, Ertman could have identified the mechanism of change otherwise missing from his argument.<sup>33</sup>

In his analysis of Edward I’s expulsion of the Jews from England in 1290,<sup>34</sup> Ira Katznelson explains what happens when the environment of politics changes, and a strategy that had served particular kinds of ruling elites well in the past ceases to be as effective. Katznelson asks how the rise of liberal institutions (replacement of the monarch’s feudal prerogatives with the “king-in-Parliament”) produced what would apparently be an “illiberal” act of ethnic cleansing. He rejects the approach of attributing the expulsion to princely preferences—the sheer “agency”—of King Edward I. Instead, he contends that the King’s state-building ambitions expanded with the transformation of the political institutions of England in the thirteenth century. Able to expand and strengthen his dominions by accepting his reliance on parliament for money and men, Edward abandoned his personal protection of the Jews—a good trick used by many European monarchs during the feudal period to maintain a reliable source of funding without becoming dependent on a politically dangerous group. Instead,

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32. The conditions he cites are decline in widespread military competency and decreasing willingness of those with bonds of fealty to honor them with military service. See Ertman, *Birth of the Leviathan*, 63.

33. A related argument about the origins of republican government in Europe has been advanced by many historical institutionalists, including Hintze, Tilly, North, and Moore. In their account, representative assemblies comprised of merchants or nobles ready to trade tax payments to monarchs for chartered rights or legislative prerogatives laid the institutional basis for democratic government. See Otto Hintze, “The Formation of States and Constitutional Development,” in *The Historical Essays of Otto Hintze*, ed. Martin Gilbert (New York: Oxford University Press, 1975), 157–77; Douglass C. North, *Structure and Change in Economic History* (New York: W.W. Norton, 1981); Charles Tilly, *Coercion, Capital and European States, AD 990–1992* (Cambridge: Blackwell, 1990); Barrington Moore, *Social Origins of Dictatorship and Democracy* (Boston: Beacon Press, 1966).

For discussions of adaptationist and non-adaptationist explanations for patterns of convergence in contemporary European democracies see Maria Green Cowles, James A. Caporaso, Thomas Risse, and Thomas Risse-Kappen, eds., *Transforming Europe* (Ithaca, NY: Cornell University Press, 2001), 15ff.

34. Ira Katznelson, “‘To Give Counsel and to Consent’: Why the King (Edward I) Expelled His Jews (in 1290),” in *Preferences and Situations: Points of Intersection Between Historical and Rational Choice Institutionalism*, ed. Ira Katznelson and Barry R. Weingast (New York: Russel Sage, 2005), 88–128.

Edward sealed his bargain with the nobles by giving in to their demands for an expulsion of the Jews that would free the nobles of the debts they had accumulated. Thus, in Katznelson's account, this decision by Edward was not so much his choice, or a function of his preferences, but a result of the transformation of the political environment from politics separated from society (and allowing for alliances between the monarch and a pariah group) to a politics joined with society (and its hatred for and interest in eliminating the Jews). Katznelson's analytic move is a standard one for historical institutionalists, to trade the granularity of an agent-centered story about the changing calculations of a skilled and ambitious politician into a story about the implications of an institutional change that shifts the structure of incentives in ways that would have strongly if not decisively influenced the behavior of any leader at that time and place.

From an evolutionary theory perspective, Katznelson explains a change by noting that when the habitat (political environment) within which a particular strategy (royal alliance with the pariah Jews) was a good trick changed, the strategy failed to replicate itself. It was replaced by another—expulsion and enforcement of a ban on Jews living in England. But this formulation itself suggests a line of analysis related to, but distinct from, the traditional duo contrasted by Katznelson: structure and agency. In general, historical institutionalism has suffered from the constant struggle to include, and accord proper weight to, institutional (structural) as well as agency variables. The typical problem is that structural explanations are unsatisfyingly indeterminant, while agency explanations are unsatisfyingly overdeterminant. A standard technique in evolutionary theory can help solve this conundrum—a shift of emphasis to the strategy itself. This shift entails a focus not on that which constrains choice (structure) or that which chooses (agent), but on that which is chosen. Adding this perspective means trading the now somewhat stultifying duality of “structure and agency” for a triplet—structure, agency, and strategy.

The intuition encouraged by a strategy-centric perspective would be that the idea of the expulsion of the Jews had been present in English society for a long time, competing unsuccessfully against other conceptions of the rightful place of Jews in English-Christian society. The institutional change emphasized by Katznelson would, on this account, have greatly advantaged this idea in its competition for popularity and replication in the thoughts, writings, and conversations of Englishmen and women. More or less as Katznelson figures him, Edward could be assumed to have been an unenthusiastic instrument for the ascendance of this idea and would be predicted to have temporized before embracing it. This approach would also emphasize/predict that intermediate stages in the treatment of the Jews in the mid- and late-1290s could be discerned by researchers focused on that question, so that the decree did not suddenly

reverse decades of stable tolerant policy. Finally, the approach would emphasize that even after the decree was promulgated and the expulsion accomplished, ideas about Jews other than those that seemed to warrant their removal would be present in English society, and be capable, under changed conditions, to gain ascendance over the strategies and moral formulas whose success, on this account, explain the expulsion.

In no specific way does this strategy-centered analysis contradict a finding of Katznelson, but it does enrich the analysis by highlighting the importance of certain de-centered elements in his account. It also helps solve the puzzle of Edward's seeming centrality to a story in which, ultimately, his personal preferences end up counting for very little. Compared to an agency-and-structure or agency-in-structure approach, it also offers more systematic opportunities to examine what Katznelson refers to as "the period's matrix of possibilities."<sup>35</sup>

### *Frozen Accidents and Path Dependence*

Historical institutionalists are fond of using the success of an institutional form that was accidentally or contingently established in an earlier period as an explanation for stable but seemingly arbitrary or suboptimal institutions in subsequent periods. A biological example of this phenomenon (dubbed by Frances Crick, the co-discoverer of the double-Helix structure of DNA, as a "frozen accident") is the location of the heart in the human body, slightly to the left of center. There is no apparent functionality or selection advantage for that pattern (why not on the right?), but once established, perhaps as no less an accidental outcome as the victory of VHS tape technology over BETA in the 1980s, there was no impetus for changing it.

We know such explanations as strong examples of the broader principle of "path dependence." In evolutionary theory, historical outcomes marked by limited exploitation of possibilities comprising the state space meant that once certain adaptations were implemented, marginal returns on modifying them in directions which ultimately might have been more "efficient" were deselected because the immediate results of such modifications entailed heavy costs or high risks. A famous case in point is Paul David's famous explanation for the technologically outmoded but still pervasive QWERTY keyboard.<sup>36</sup> This kind of predicament, where a well-institutionalized form is suboptimal but extremely difficult to change, is known in evolutionary terms as being "trapped on a local maximum." The term "maximum" refers to the relative merit of a variant on a "fitness landscape," which imagines

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35. *Ibid.*, 119.

36. Paul A. David, "Clio and the Economics of QWERTY," *Economic History* 75 (May 1985): 332–37.

the height, in terms of fitness, across a multi-dimensional array of variants, each slightly different along particular dimensions from its neighbors. Evolutionary pressures result in predominance of variants that are accessible by a series of slight changes. Sometimes, however, the really productive variants are separated by chasms from the high fitness portions of the landscape—those achieved historically by a particular organism, species, institution, or institutional type. Individuals or institutions in that circumstance bearing that suboptimal, but hard-to-change-by-small-steps trait can become frozen in time, “trapped,” as it were, on a local maximum. To improve competitiveness would entail short-term reductions in performance. But, if the individual or institution responds myopically to its environment, its change toward a more adaptive state would be stymied. Of course, humans can “look ahead” and “know” that substantial change in a particular direction could well serve their adaptive purposes. Nevertheless, such movement is commonly discouraged because acting “rationally” is easily opposed by those with vested interests in the *status quo* and who can correctly warn that in the short run, at least, change is likely to be more costly than not changing.

Much of the field of evolutionary psychology is based on this particular syndrome. Suboptimal contemporary behavioral dispositions (e.g., tastes for obesity-producing sweets and artery-clogging fats), the difficulty of combating those dispositions, and the absence of human adaptation (e.g., toward preferences for healthy foods) are explained by the high rewards in the hundreds of thousands of years of the “ancestral environment.” In those eons of intensive selection pressure, when human variants that did not gorge on available sweets and fats failed to reproduce at a rate competitive with human variants who did gorge, that (now desirable) trait effectively vanished from the human genome. The result is a gene pool of traits that leave humans living in advanced industrial societies—where sweets and fats are plentiful—stranded on what was once a maximally fit trait but which is now manifestly non-adaptive.

Marie Gottschalk, in her historical institutionalist study of employer-based health care in the United States attributes a radically suboptimal labor strategy for securing health-care benefits (employer provided, union bargained insurance plans) to decisions that were adaptive in the short-run in the late 1940s, early 1950s, and 1970s by labor leaders anxious to preserve their own interests and union membership in a political environment hostile to welfare state expansion. The historical gravitation by unions toward employer-based health care produced institutional barriers to expanded and improved government systems of health care for workers. Gottschalk shows that these barriers, the intellectual habits they bred, and the vested interests they created, contributed

powerfully to the absence of the kind of government sponsored health-care system in the United States so familiar in Canada and European welfare states.<sup>37</sup>

The path dependence of a contemporary “non-adaptive” trait or practice, whether in regard to food preferences or health-care insurance systems is obvious from an evolutionary point of view. Long-term processes of unguided competition at the level of organisms and genes, in the one case, or at the level of politicians, union bosses, ideas about proper health insurance programs, and legislators, in the other, move the dominant patterns through the state space of possible ways things could have been. As “branching points” are negotiated, especially in ways that lead toward relatively inaccessible areas of the state space, the possibilities for what may subsequently be viewed as more rational, adaptive, or preferable arrangements diminish. To be sure, humans *can* imagine the future, and can strive to rearrange institutions consciously, purposefully, and with long-term benefits in mind to compensate for short-term costs. In other words, political design and political rationality can allow people and organizations to overcome the pressures toward suboptimality of purely incremental adaptiveness. This accounts for the emphasis (including in Gottschalk’s book) on agency, ideas, and “leadership” that often characterizes the hortatory aspects of historical institutionalist analysis bemoaning the “frozen accidents” that path dependence analysis regularly discovers. A standard lesson of this kind of social science is that, although history is not efficient, the exploration of the inefficient world we do inhabit implies, since it was contingent on the path taken at an earlier juncture, the existence of other counterfactual worlds. These worlds were accessible, and, given the right dose of insight, leadership, sacrifice, and courage, we might still find them accessible and substantially more habitable than the world of our frozen accidents.

I have used the same explanatory gadget to account for different twentieth-century responses by Britain and France to the regime-challenging crises associated with Catholic Irish resistance to British rule from London in 1911–1914 and Muslim Algerian resistance to French rule from Paris 1957–1960. I treated these predicaments as institutionally similar, in that governments in both the parliamentary democracies were trying to contract the borders of the state in order to remove a burdensome issue from the national agenda—the failed incorporation of outlying territories (Ireland and Algeria) that were culturally antagonistic, but heavily settled by powerful metropolitan populations. In each

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37. Marie Gottschalk, *The Shadow Welfare State* (Ithaca, NY: ILR Press, 2000), 5–6. Very recently Nicholas D. Kristof offered a variant of this same frozen accident explanation for the American health-care system. “The absurd system of health coverage we now have is a historical accident from World War II. Because of wage controls, employers competed for workers by offering health insurance as a fringe benefit—and so we’re stuck today with a system in which the loss of a job is compounded by the loss of health insurance”; see “Franklin Delano Obama,” *New York Times* (February 28, 2009).

case the governments faced extra-legal, regime threatening challenges by coalitions of settlers, military officers, and right-wing politicians. In each case tough and risky options were developed for confronting the regime challenge directly and dramatically as a vehicle for eliminating British rule in Ireland and French rule in Algeria. But in the British case, Prime Minister Asquith chose to back down and embrace delay and compromise, while in the French case, President de Gaulle chose direct confrontation. I then traced the absence of Algerian issues in late twentieth-century French politics and the continuing heavy burden of Irish issues in late twentieth-century Britain, to the different institutionalized power arrangements (complete French withdrawal from Algeria and the evacuation of European settlers versus British division of Ireland and continued rule over a Protestant-dominated North) that were frozen in place by the radically different, but more or less equally available, courses of action adopted by Asquith and de Gaulle.<sup>38</sup>

### *Structure, Agency, and “Exaptation”*

There is nothing wrong with path dependent arguments that explain problematic outcomes as functions of temporally remote choices or circumstances. However, by translating these “findings” into the language of evolutionary theory we can aggregate our insights and expand our ambitions beyond noticing the ironies of history in particular cases, or how leadership can sometimes stretch or overcome the constraints of structure. Instead, for example, we can search for patterns in the survival or replacement of decreasingly efficient practices.

Historical institutionalists are certainly familiar with the tension between legacies that confine the present within solid molds, and contingencies that offer the promise or at least potential of radical change. The analytic center of gravity of the approach is structure; the long-term shaping effects of stabilized sets of expectations, whether in the form of norms, conceptual frameworks, organizations, rules, or authority systems. With consolidated but impermanent structure at the core of their analyses, historical institutionalists are typically challenged to accord a sufficient role to leadership, policy choices, and new ideas so that the congealed consequences of path dependence can be overcome and so that change—including change of institutions, not just change in institutions—can occur. We may rephrase this challenge as the need to cultivate and preserve, within a systematic treatment of historical processes, awareness of how human agency and contingent decisions, accidental events, or shifts in prevailing

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38. Ian S. Lustick, *Unsettled States, Disputed Lands: Britain and Ireland, France and Algeria, Israel and the West Bank/Gaza* (Ithaca, NY: Cornell University Press, 1993).

strategies, can move a situation to positions in a state space that were thought or could have been thought to have been inaccessible.

From an evolutionary theory perspective, this problem entails reversing the analytic angle of approach to the phenomenon of frozen accidents. From the present looking backward, random, or highly contingent but consequential events appear as frozen accidents, but from the past looking toward the present, or from the present looking toward the future, they appear simply as accidents, or as the intrusion into the causal stream of acts of creativity, irrationality, or randomness. Evolutionary explanations based on natural selection, *per se*, can account for but do not imply such surprises. In combination with two other mechanisms of evolutionary change, however, non-linear patterns of change are readily explainable. From evolutionary biology, we know one of these mechanisms as mutation—which may be regarded as sudden change in variation arising from factors lying below the analytic horizon. The other is “genetic drift”—fluctuations in the retention of information about the past associated with exogenous impacts (e.g., meteors or plagues), the stochastic results of the absence of selection pressure, or the isolation of distinctive fragments of a population (Scandinavian rats boarding a merchant vessel and disembarking in the tropics or a particular Siberian hunter-gatherer band isolated in America after crossing the Bering Straits). Closely related to natural selection—via variation and retention—these mechanisms of “*bricolage*” are analytically distinct from it, but do fit our definition of evolution by enabling change at a unit level of analysis to be transformed into changes in the composition of subsequent populations.

Many political scientists who loosely speak of evolution as “change” are, in effect, treating such processes as “drift.” An excellent historical institutionalist example of evolutionary drift through isolation of a particular variant is Louis Hartz’s theory of fragment societies. Variations on that theory have supported rich analyses of the United States, Canada, New Zealand, Australia, South Africa, Israel, and other “fragment” or “quasi-fragment” societies. In these cases cultural/political pieces of Europe, as it existed at a particular time and place, relocate to another continent and then found societies much narrower in their cultural, political, and institutional endowment than the environment from which they came. The explosive potential of “mutation” within the social world is well illustrated by the appearance and meteoric rise of “great leaders,” such as Hitler, de Gaulle, or Khomeini. In the appropriate historical German, French, or Iranian contexts it may be imagined, for example, that people with attributes and outlooks like Hitler, de Gaulle or Khomeini were always present in the vast distribution of political types present within those political communities, but that such unusual “mutant” variants would normally not survive competition with more “normal” politicians in the standard cut and thrust of competition over marginal gains and marginal losses. However, within the context of a

revolutionary situation, such highly unusual, or idiosyncratic political styles can have a far greater likelihood of rising to prominence and finding a field of expression for their bizarre sort of genius.

With these concepts in our toolkit, we can proceed to consider the evolutionary concept of “exaptation”—often referred to, misleadingly, as “preadaptation.” A classic example of exaptation in evolutionary biology is the theory that the use of feathers by birds to facilitate flight was occasioned when early forms of feathers evolved as warmth providers for species that did not fly. Following changes in the habitat or skeletal arrangement of these species, variants of these organisms competed successfully by using their feathers as primitive wings, and not just for warmth. Their success led over time to the displacement of most, but not all, feathered species that did not take advantage of flight opportunities by species of feathered flying birds with which we are familiar. Accordingly we may say, not so much that feathers were “pre-adapted” for flight (as if some master designer had planned all along for this transformation to occur) but that they were, by unguided evolutionary processes, “ex-post adapted” under newly available circumstances, that is, “exapted.”

By combining the concepts of drift and mutation, we can see how natural selection can exploit and bring relatively rapidly into prominence new formations, processes, and gadgets, whether biological or social. If propitious circumstances appear for exogenous reasons, or if a potent mutant variant suddenly appears, the constant efforts by individual organisms to multiply and prosper can be rewarded by the transformation of old habits, which had been ineffective or irrelevant under previous conditions, into highly competitive or dominant strategies under fresh circumstances. If these routes to nonlinear change are available without imagining forward-thinking entrepreneurs, how much more so should we expect to see this kind of mechanism at work in social and political worlds where conscious exercise of imagination is possible?

Indeed, exaptation is an exceedingly common species of historical institutionalist explanation. For historically oriented scholars, the stability, not to say rigidity, of the wholly “artificial” and non-historical borders drawn by colonial powers in the post-colonial world is a fascinating outcome. It is an ironic testament not to the irrelevance of history, but to the decisiveness of the processes that determine which history, or historical period, gets to be relevant. In this case, proto-nationalist political entrepreneurs—either raised up by the colonialists, or who raised themselves to political power by leading or riding the anti-colonialist movement—could outmaneuver non-nationalist, traditional elites. They did so in part by sacralizing the shape of the political community to advantage them in competition with elites whose constituencies were divided or swamped by these borders. Thus did political opportunists exapt these “lines on a map” drawn by “extra-terrestrial” Europeans.

A specific example of this kind is David D. Laitin's account of the depoliticization of the Muslim-Christian religious cleavage in Yorubaland. Laitin cites the decisions of British colonial administrators to privilege ancestral city and other non-religious affiliations in the institutions they built to govern Nigeria. Generations later, with some cleavages endowed with political meaning and others relegated to politically irrelevant social or cultural background information, competing politicians in Yorubaland did not find it rewarding to raise religious banners to mobilize support from constituents. In this sense, the legacy of the quasi-Hartzian "drift" into Yorubaland of strategic decisions by British colonialists included institutional and culturally hegemonic norms that could, many years later, be exapted for tribal or ancestral city political mobilization, but not for religion-based movements.<sup>39</sup> A similarly exaptationist argument is part of Jason Brownlee's explanation for post-third wave patterns of durable authoritarianism, or the vulnerability of authoritarianism. For example, in his treatment of the Philippines, Brownlee describes how U.S. colonial administrators brought American "institutional transplants" to the Philippines. In the Philippines context, however, this small example of Hartz-style institutional drift could be and was exapted by local patrons to "buttress" domination of politics by a closed elite and foster an anti-democratic political culture of rampant factionalism and pervasive clientilism.<sup>40</sup>

In *Making Race and Nation*, Anthony Marx employs an exaptation argument in classic form to explain how the United States turned strongly in the 1950s and 1960s toward racial equality enforced by federal government power. Racism, he explains, was entrenched culturally and was institutionalized after Reconstruction by the deal in 1876 that traded southern acceptance of Rutherford B. Hayes's claim to the Presidency for Jim Crow and an end to Reconstruction. Against this background, southern whites were ready to accept the vast expansion in the power of the central state occasioned by the New Deal, including TVA and other developmental projects beneficial to the region. But the period after World War II witnessed the rise of the Civil Rights movement, the new importance of television news, and liberal ideas about racial equality. Under these conditions of cultural and technological "drift," supporters of racial equality were able to "exapt" the centralized, powerful, Roosevelt-built federal government and to enforce the fourteenth amendment, integration, and voting rights, thereby ending Jim Crow.<sup>41</sup>

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39. David D. Laitin, *Hegemony and Culture* (Chicago: University of Chicago, 1986).

40. Jason Brownlee, *Authoritarianism in an Age of Democratization* (New York: Cambridge University Press), 72–73.

41. Anthony W. Marx, *Making Race and Nation: A Comparison of the United States, South Africa, and Brazil* (Cambridge: Cambridge University Press, 1997), 128–57.

From a broader analytic perspective, exaptation is an explanation for change in otherwise stable patterns that separates the reproduction of a trait or institutional form from its origins. In *How Institutions Evolve*, Kathleen Thelen develops this point. Having shown how distributions of traits (the mastery of production techniques by skilled workers over generations) are replicated over time in industrial countries, she notes that patterns of stability and change in these patterns cannot be explained by arguments capable only of explaining stability. She offers her “evolution” approach in contrast to either culturalist accounts (these people have a distinctive way of doing things), path dependent arguments (what happens now was made inevitable by what happened then) or functionalist arguments (whatever purpose seems to be served by something in the present is the purpose that elicited it in the past). Citing others whose work has noted this problem—Stinchcombe, Pierson, and Mahoney—Thelen formulates her findings broadly:

Against functionalist accounts that read the origins of institutions off their current functions, a somewhat longer time frame will often be necessary for us to see how institutions created for one set of purposes can be redirected to serve quite different ends. Alongside power-distributional accounts that stress how powerful actors design institutions to anchor their position, we often need a longer time frame to see how institutions created by one configuration of power or coalition of interests can be “carried forward” on the shoulders of some other coalition entirely.<sup>42</sup>

Thelen’s book is much more explicit in its use of evolutionary terminology than most. It refers to “adaptation,” the unintended consequences of patterns of incremental change, intense competition driving choices and distributions of outcomes, punctuated equilibrium, and the implications of differences in cross-national context for evolutionary processes within what she could have figured, but did not, as different “habitats.” But from the perspective I am seeking to establish in this paper, what is truly striking is that Thelen does not employ the conceptual inventory or dynamics of evolutionary theory—a body of work toward which she repeatedly gestures and which she implicitly invokes.

Consideration of Thelen’s critique of functionalist accounts highlights the costs of failing to exploit evolutionary theory for historical institutionalist purposes. As noted earlier with regard to Gellner’s work, the functionalist position has had irresistible attractions for historical institutionalists, even as it has made them uncomfortable by its mechanism-less explanation of the past by the

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42. Kathleen Thelen, *How Institutions Evolve: The Political Economy of Skills in Germany, Britain, the United States, and Japan* (Cambridge: Cambridge University Press, 2004), 294.

present or the present by the future. Thelen uses Stinchcombe's hoary observation that "processes responsible for the genesis of an institution are different from the processes responsible for the reproduction of the institution" to argue against functionalist accounts in favor of seeing "that the creation and existence of the institution at one juncture can have a formative impact on actor strategies, interests, identities, and orientations."<sup>43</sup>

This is a valid point, but note how the formulation remains an argument from "homology," expecting that the replication of an institutional form is to be explained by temporal diffusion, albeit along a quite complex path, rather than imagining exaptation possibilities associated with argument based on analogy. Processes of natural selection, combined with the mechanism of exaptation, provide a more effective and satisfying solution to the functionalist fallacy, one that can preserve the heuristic power of the approach while eliminating its logical lapses. Indeed, a great strength of evolutionary theory is that it can solve the problem of how designs are produced that solve particular problems without having been produced *with the intention* to do so. By failing to mobilize evolutionary theory, Thelen, like Gellner and others engaged in the debate over functionalism, have no process-traceable way to explain "functions" performed by some structures "for" other structures without assuming intelligent (indeed clairvoyant) design. Nor, without building a theory of exaptation in the social sphere, can they discipline thinking about the circumstances with which agents of exaptation can adjust the range of forms inherited from the past, for the present, or the range of present forms that will constrain the future.

## Conclusion

Exploiting, one might say "exapting," evolutionary theory for historical institutionalist purposes entails explicating and expanding existing lines of thinking in more precise and universally accessible ways. This will require using concepts discussed here to leverage thinking—concepts such as state space, fitness landscapes, good trick, evolutionary drift, mutation, frozen accident, and exaptation—in ways similar to but more systematic than has been done with "punctuated equilibrium"—the one term imported from evolutionary theory that has gained traction among historical institutionalists.

However, to move a field beyond images of its limitations, and to move practitioners off the local maxima associated with the difficult-to-acquire skills that are the basis of their success, will require more than the translation of disparate works into a common evolutionary language. To affect not just historical institutionalism, but political science and related social sciences

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43. *Ibid.*, 295.

more broadly, will require demonstrating (1) the capacity to pose exciting and otherwise unavailable problems for research; and (2) the substantial deficits in existing work that could be overcome by mobilizing evolutionary theory and the methods associated. These tasks are only just begun in this article. The intellectual objectives involved go well beyond understanding Darwinian concepts and mechanisms and cultivating the habits of thought associated with evolutionary theory. What is implied is a partial transformation in the social physics (akin to metaphysics) that undergirds the stance of social scientists toward their domains of interest.

We need to expand our thinking to include populations (not just individuals), distributions of outcomes (rather than outcome points), and spaces of possibilities with different patterns of accessibility within those spaces (rather than judgments of possibility versus impossibility). Consider how relationships between genes and organisms (not the detailed mechanics, but the fundamental relationship between available information and individual action), and between patterns and mechanisms, could enable historical institutionalists to interact with work by evolutionary game theorists and with computer simulations produced by agent-based modelers. These researchers regularly experiment with the circumstances under which some strategies evolve, prevail, or disappear from use, and with thresholds of transformation in the stability of institutional forms that conceal potential for transformational change beneath apparent solidity. At an even more basic level this kind of work can take the ingredients of evolution by natural selection—variation, competition, and retention across large numbers—and, by attending to the enormously more rapid pace of evolution when it is ideas, or “memes,” that are replicating rather than genes, produce exciting new hypotheses about the particular dynamics of evolution in social and cultural spheres. In this way, historically inclined social scientists can not only achieve deeper and more widely appreciated explanations, but also contribute to the general advance of evolutionary theory.

I would be contradicting my own argument if I claimed that I am here making a wholly original point. Gradually, political scientists, especially those with historical interests, who focus on institutions are breaking free from the prejudices and misconceptions that have deprived most of social science from responsible applications of evolutionary theory. To the extent that the payoffs for historically minded social scientists to become just a little more literate in evolutionary theory become apparent, the trend toward more explicit and systematic application of these models will accelerate. We can also see “agency” at work here, as noted scholars such as Robert Axelrod and Douglass C. North have moved explicitly in this direction and issued exhortations similar to mine.<sup>44</sup> Explicitly evolutionary treatments, such as Hendrick Spruyt’s *The Sovereign State and Its Competitors*, are rare, but have been recognized for their

contribution. Instructively, Thomas Ertman concludes his study by citing complexity theory and evolutionary biology as key inspirations, and he hopes that others will follow as they seek improved understandings of state-building in medieval and early modern Europe.<sup>45</sup> Other researchers have tried to draw the field's attention to the tremendous potential of agent-based computer simulations to enable the kind of systematic exploration that both complexity and evolutionary theory suggest are necessary to appreciate the scales over which both change and order are distributed in human affairs.<sup>46</sup> Even the APSR'S flawed collection of articles on its own institutional evolution featured three contributions that effectively deployed sophisticated evolutionary concepts.<sup>47</sup>

As I have argued, historical institutionalists are particularly well positioned to understand and apply the tools evolutionary theory has made available to the broader scientific community. But, along with those tools comes an entire way of thinking about the world that is transmitted and absorbed as this kind of thinking takes hold. This is a perspective that captures the insights of possible world thinking for counter-factual analysis; that thinks in terms of spaces of possibilities, patterns of accessibility, and distributions of outcomes rather than discrete covering-law explanations or point-to-point predictions; that highlights the essential similarities between understanding the past and understanding the present from the position of a zone of the present; that treats level-of-analysis problems as opportunities to model ladders of complexity and emergence rather than as elemental barriers to insight; and that establishes the basis for using computer technologies to ask questions about the social world more ambitious than most have thought possible.

However, despite the enormous potential, evolutionary theory encourages us to expect scholars trained for long years in difficult methods and modes of thinking to be slow to expand analytic repertoires, no matter how promising new ideas and techniques may be. Such "retooling" would require moving off local maxima in the meta-analytic state space by reducing short-term competitiveness and satisfaction. More adaptive scholars, whether trained in rational choice,

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44. Douglass C. North, *Institutions, Institutional Change, and Economic Performance* (Cambridge: Cambridge University Press, 1990).

45. Ertman, *Birth of the Leviathan*, 320.

46. Lars-Erik Cederman, *Emergent Actors in World Politics: How States and Nations Develop and Dissolve* (Princeton: Princeton University Press, 1997); Ian S. Lustick and Dan Miodownik, "Abstractions, Ensembles, and Virtualizations: Simplicity and Complexity in Agent-Based Modeling," *Comparative Politics* 41 (January 2009): 223–44.

47. Lee Sigelman, "The Coevolution of American Political Science and the *American Political Science Review*," *American Political Science Review* 100 (November 2006): 463–78; Mark Blyth, "Great Punctuations: Prediction, Randomness, and the Evolution of Comparative Politics," *American Political Science Review* 100 (November 2006): 493–98; John Ishiyama, Marijke Breuning, and Linda Lopez, "A Century of Continuity and (Little) Change in the Undergraduate Political Science Curriculum," *American Political Science Review* 100 (November 2006): 659–66.

archive-based research, aggregate data analysis, post-structuralism, or ethnography, will need courage and imagination to overcome inevitable incentives to continue the virtuoso practice of familiar but under-performing techniques.

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