

## **Biology, Politics, and Democracy**

*Laurence Whitehead*

### **Abstract**

Given the nature of the subject matter dealt with by the life sciences and the human sciences, there is unsurprisingly a long history of reciprocal influence between them. In particular, their respective objects of study demand methodological pluralism and an awareness of historical complexity. But comparative politics, in general, and democratization studies, in particular, have also been attracted by the causal precision and analytical rigor associated with the physical sciences. In addition, borrowings from biology fell out of favor because of their apparently antidemocratic ideological connotations. However, this essay recommends renewed openness to analogies derived from modern biology, as a corrective to overly mechanistic causal modeling, and as a means to refresh ossified metaphorical imagery that has accumulated from the physical sciences. It contests the view that biological analogies need contain antidemocratic hidden assumptions, but it accepts that since analogy is not homology, imagery borrowed from elsewhere should be used only as an aid to concept-formation, not as a straitjacket.

**Key words:** Biology, comparative politics, concept formation, democratization, metaphors, methodological pluralism, self-organization.

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A great deal of contemporary Anglo-Saxon “social science” is concerned with sheltering the disciplines of economics, politics, and sociology from the subjectivity and inaccuracy it attributes to the originators of these subjects. This tendency has been reinforced by ever-increasing specialization in each of these fields, and by the desire of many of the next generation of young professionals to differentiate themselves as clearly as possible from what is often viewed as the irrationalism, or at least the woolly mystifications in the ascendant, in various parts of the humanities and cultural studies. It is in this spirit that so much effort has been invested in the methods of precise causal attribution, quantification, and replicable verification that have been borrowed

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(often uncritically and inadequately) from the physical sciences. Other facets of the broad social scientific tradition, such as the philosophical foundations required to underpin methodological practices; the history of theory; the linguistic foundations of social explanation and social understanding; and the corroborating evidence to be derived from a familiarity with relevant historical narratives and from ethnographic observation, have all tended to atrophy as this narrowly “scientific” perspective took hold.

Against this tendency, this essay defends methodological pluralism, on the grounds that the social phenomena we seek to understand and explain demand multiple techniques of investigation. Too narrow an emphasis on an inadequate toolkit leaves so much unaccounted for, that alternative approaches are necessary to fill the analytical void. Certain topics can be fully dealt with by the use of a very limited repertoire of methods, but most of what is worth understanding about social, economic, and political behavior spills over well beyond such confines. In particular, where the comparative study of contemporary processes of democratization is concerned, the approved methods of exact causal attribution, quantification, and replicable verification need to be supplemented by these broader approaches. As argued elsewhere, the structure of comparative democratization studies relies on (or perhaps even actively invokes) unanalyzed mechanistic metaphors and constitutive analogical structures, which are often misleading and frequently become ossified, losing their explanatory power. They can be productively refreshed and indeed “enlivened” by the introduction of substitute imagery drawn not from engineering but from the life sciences. Indeed, it may be appropriate to reframe democratization studies through the wholesale adoption of analogical structures drawn from biology as substitutes for the current physicalist imagery.<sup>1</sup>

In that spirit, in earlier work I argued for “viability” as preferable to the now standard terminology of “democratic consolidation,”<sup>2</sup> and also proposed the “contagion” metaphor, in contrast to Samuel Huntington’s snowballing, which couples with “consent”—an active process of self-organization which can be viewed as broadly autopoietic in character. It involves a micro-level transmission that activates a chain of individual responses, which reverberates through the “body politic,” destabilizing the preexisting homeostasis. The overall consequences are not mechanically predictable, as they depend on the outcome of a complex dynamic process which might inoculate the collectivity against contagion (as in China after 1989) or generate collective consensus

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<sup>1</sup> Laurence Whitehead, “‘Enlivening’ the Concept of Democratization: The Biological Metaphor,” *Perspectives on Politics*, forthcoming. To avoid misunderstanding, I should stress that I also recognize the limits, as well as the benefits, of this type of linguistic exercise.

<sup>2</sup> See Laurence Whitehead, “The Viability of Democracy,” in *Towards Democratic Viability: The Bolivian Experience*, ed. John Crabtree and Laurence Whitehead (London: Palgrave, 2001).

around a democratic alternative (as in Germany after the Third Reich).

In the area of historical institutionalism, Sven Steinmo has made a similar argument about how the language of evolutionary biology is more suitable to understand a complex adaptive structure such as the state than the mechanical metaphors of physics or chemistry. In his view, historical institutionalists “are something like the environmental biologist who believes that in order to understand the specific fate of a particular organism or behaviour, she must explicitly examine that organism or behaviour in the ecology or context in which it lives. This implies a different scientific ontology than that commonly found in the hard sciences of physics and chemistry.”<sup>3</sup> As he explains,

while objects in the physical world often adhere to constant “laws” of nature, biological organisms often defy attempts to reduce them to their essential components because of their complexity. Thus, as eminent evolutionary biologist Ernst Mayr points out, the development of biology as a science has required an investigation of “additional principles” that applied only to living organisms. He argues, “This required a restructuring of the conceptual world of science that was far more fundamental than anyone had imagined at the time.” Historical institutionalism represents something like this ontological move in social science. In order to understand historically specific events and long term political outcomes, one could not strictly apply methods and epistemologies drawn from the study of invariant variables that have fixed relationships across space and time. This, of courses, does not mean that it is not science—unless one’s definition of science would exclude biology as well; rather, it implies that the scientific methods applied should fit the subject being studied.<sup>4</sup>

This essay addresses a distinct, but closely related, issue. It belongs more to the “history of theory” approach than to the “linguistic foundations” perspective, although to some extent bridging the two. There is a long, and troubled, history of importing biological ideas into the study of politics. In order to tackle resistance to my suggestion, it is appropriate to review some aspects of this history, notably the grounds it has provided for fearing that biological analogies are liable to serve antidemocratic purposes.

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<sup>3</sup> Sven Steinmo, “What Is Historical Institutionalism?” in *Approaches in the Social Sciences*, ed. Donatella Della Porta and Michael Keating (Cambridge, England: Cambridge University Press, 2008), 166.

<sup>4</sup> Steinmo, “What is Historical Institutionalism,” 167.

Admittedly, biological analogies have a particularly problematic track record in this regard. An appeal to the life sciences as a source of theoretical inspiration can be resisted on at least two grounds, however. First, the mainstream social scientists assume (rather than demonstrate) that the safest, most appropriate, and most “scientific” model for their disciplines is drawn from the study of the inanimate world (physics, engineering, and the like), where the observations are “external” to the objects being observed, and where the classes of objects to be classified and enumerated are (at least supposedly) fixed and given.<sup>5</sup> The argument in favor of “enlivening” democratization studies with the deployment of a new set of biological metaphors sets out the grounds for the contention that these characteristics of the physical sciences are precisely what make that field of inquiry a poor source of guidance for the study of the human sciences, and of democratization in particular.

This essay addresses the second likely ground of resistance. Insofar as the life sciences, in general, and biology, in particular, offer additional lessons for the social scientist, a mainstream social scientific view would probably be that such lessons are the opposite of what this essay is attempting to do. From this perspective, by leaving behind “vitalism” and “phlogiston,” and such vacuous categories, scientific advance in biology has embraced evermore rigorous experimental methods, more precise quantification, and more disaggregated causal attribution. Darwin started us down the road that led to the discovery of the genetic code and all the consequent advances in medical science bioengineering, bringing the life sciences into alignment with the physical sciences and setting another high standard of methodological rigor from which the social sciences could learn. Population genetics, sociobiology, and the other new areas of study, such as the modeling of “self-organization” in complex networks, provide lessons in how to achieve cumulative advance in scientific knowledge, lessons that threaten to relegate old-fashioned social theory and moral philosophy to the same camp as the humanities—headed toward the redundancy of theology faculties. For those of this persuasion, it seems that metaphors, analogies, literary theory, hermeneutics, even the history of scientific thought are all backward-looking residues, about as relevant as the medieval schoolmen and with about the same amount of value in the modern world.<sup>6</sup>

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<sup>5</sup> However, as Steinmo’s work illustrates, recent developments in historical institutionalism are beginning to question that assumption.

<sup>6</sup> Dietrich Rueschemeyer, however, has recently counter-argued as follows: “Inspiration for new ideas has many different sources. One of the most important sources for new ideas is building on analogies...both opponents and advocates of argument by analogy have often failed to distinguish between the invention of ideas and their testing...if we separate the contexts of invention and validation, judicious use of analogy can be very helpful in theory development.” Dietrich Rueschemeyer, *Usable Theory: Analytical Tools for Social and Political Research* (Princeton, NJ: Princeton University Press, 2009), 296.

But against that view, I would argue that even the hard sciences are dependent upon vivid imagery imported from other domains (think of the “Big Bang” in cosmology or “Schrödinger’s cat” in subatomic physics). The “double helix” is just such an image, and the cutting-edge work modeling the emergence of life by Stuart A. Kauffman is littered with verbal images such as “adaptive landscapes,” “rugged fitness,” and even “order on the edge of chaos.”<sup>7</sup> (Although my focus is democracy and democratization, there are good grounds for thinking that this is the right approach in many fields, including the natural sciences, since all creative thinking involves the imaginative reinterrogation of established assumptions). However that may be, those of us whose object of inquiry is democracy and democratization should not have too much difficulty in demonstrating that these are not empty categories. Moreover, they remain subjects of the highest practical as well as scholarly relevance in the contemporary world. They raise big issues and attract strong interest from policymakers and public opinion leaders as well as academic specialists, so it is only to be expected that this field will evoke vivid imagery and, indeed, heated controversy as well as scholarly curiosity. Both facets merit close study.

Language games can be investigated with the same rigor that is applied to empirical data bases. So there should be no assumption that pursuing this type of inquiry necessarily involves opposing rigorous experimental methods, exact quantification, or disaggregated causal attribution (including replicable methods of concept formation and hypothesis testing by neutral experts). For some purposes, such methods can advance knowledge and perhaps even establish truths that would otherwise remain in doubt. But at least in the social sciences, other well-established and finely honed methods are often equally relevant—careful historical analysis may do as much to advance knowledge of democratization processes, for example; and rigorous conceptualization may be just as important. So multiple methods of investigation deserve encouragement, and that includes work on the kinds of cross-boundary borrowings and analogies investigated here.

The essential case for methodological pluralism rests on the benefits of encouraging all these techniques insofar as they help us to address the important questions that concern us. So multiple approaches are worth exploring, and this particular essay engages in comparative politics through a literary line of inquiry, one most relevant to concept-formation and causal attribution (“understanding” in my parlance). In broad terms, this concerns the hermeneutics, the analogies, the linguistic images, and the history and structure of conceptualization pertinent to our subject.

This essay makes some borrowings from biology in order to free us from the ossified imagery we have accumulated from the physical sciences, rather

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<sup>7</sup> Stuart A. Kauffman, *The Origins of Order: Self-Organization and Selection in Evolution* (Oxford: Oxford University Press, 1993).

than to subordinate our field to an alternative source of “scientific” authority. I therefore need to sketch out what aspects of biological reasoning I have in mind, given my view that the life sciences cannot be reduced to sociobiology and genetic engineering alone. This also permits me to picture the reciprocal influence between the life sciences and the social sciences (both of which should—and do—practice more methodological pluralism than some of the stricter political science disciplinarians realize). This essay also aims to dispute the historically established belief in the social sciences that borrowings from biology necessarily serve an ideological purpose (typically conservative and indeed antidemocratic).

### **Science and Metaphor: Back to the “Origin”**

Ideas about political behavior have been intertwined with views about human nature, and by extension, about the place of humanity in the hierarchy of life, ever since the earliest days of social theory.<sup>8</sup> A useful reminder of this foundational imbrication of political theory and biological reasoning can be found in Larry Arnhart’s attempt to rescue Aristotle’s conception of man as “political animal” from the assault launched by Hobbes. This author’s main aim is to align Darwin with Aristotle and in contrast to Hobbes. For this purpose, he seeks to rescue what he calls Darwin’s “original position” from Huxley’s misrepresentation, according to which the biological “struggle for existence” must be understood as a war of all against all, in which there would be no ground for social cooperation or moral concern.

Huxley’s distortion followed the Hobbesian claim that, whereas cooperation among some animals was due to their nature, humans as articulate bearers of reason were fundamentally different, and any agreement between them would therefore be by covenant only, and so would not exercise restraint on conflict in a state of nature. What Darwin himself tried to defend was a more Aristotelian position, according to which many animals, to varying degrees, satisfy their needs through social learning and flexible behavior, in which respects humans differed—in degree but not in kind—from other animals. At the same time, in Darwin’s view, the greater complexity of human learning and social interaction provides the foundation for morality. Indeed, in contrast to Hobbes and Huxley, Darwin thought that an asocial human being lacking in sympathy for other human beings would be “an unnatural monster.”<sup>9</sup>

Darwin has some claim to authority within the biological sciences, so let us consult the *Origin of Species*. Here is what he says about two of his crucial terms:

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<sup>8</sup> For a perceptive new overview, see Francis Wolff, *Notre Humanité: D’Aristote aux Neurosciences* [Our humanity: From Aristotle to the neurosciences] (Paris: Fayard, 2010).

<sup>9</sup> Larry Arnhart, “The Darwinian Biology of Aristotle’s Political Animals,” *American Journal of Political Science* 38, no. 2 (1994): especially 472 and 479.

I look at the term species as one arbitrarily given, for the sake of convenience, to a set of individuals closely resembling each other, and that it does not essentially differ from the term variety, which is given to less distinct and more fluctuating forms. The term variety, again in comparison with mere individual differences, is also applied arbitrarily for convenience's sake.<sup>10</sup>

Readers will note the “stipulative” nature of these definitions, but also that they are derived from induction and cognizant of the overlap between categories (and also the justification of this on the Aristotelian grounds that its rigor corresponds to what can be observed about the topic under investigation).

How about the use of metaphors? Here again is Darwin:

In the literal sense of the word, no doubt, natural selection is a false term; but who ever objected to chemists speaking of the elective affinity of the various elements...who objects to an author speaking of the attraction of gravity as ruling the movement of the planets? Everyone knows what is meant and implied by such metaphorical expressions; and they are almost necessary for brevity. So again it is difficult to avoid personifying the word Nature; but I mean by Nature, only the aggregate action and product of many natural laws and by laws the sequence of events as ascertained by us.<sup>11</sup>

It would therefore seem that Charles Darwin, at least, practiced a disciplined form of methodological pluralism, and consciously invoked metaphorical imagery to galvanize his process of concept formation. Darwin explicitly acknowledged his debt to Herbert Spencer for the term “survival of the fittest,”<sup>12</sup> and some analysts of his thought claim that his theory was inspired by Malthus (although this is controversial). It was not long before Walter Bagehot took up his ideas in his *Thoughts on the Application of the Principles of Natural Selection and Inheritance to Political Society*, and thus promoted the crossover that interests us here. What facilitated this boundary

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<sup>10</sup> Charles Darwin, *The Origin of Species* (New York: Mentor, 1958), 67.

<sup>11</sup> *Ibid.*, 88.

<sup>12</sup> Stephen J. Gould adds that it was Spencer rather than Darwin who popularized the word “evolution” (in place of “decent with modification”) and shows that it was Spencer who took the idea of describing society by means of organic analogy to the most implausible extremes (e.g., “The likening of a primitive all-powerful monarchy with a simple brain, and an advanced parliamentary system with a complex brain composed of several lobes.” Stephen J. Gould, *The Lying Stories of Marrakech* (New York: Vintage, 2001), 262. Evolution is discussed on pages 258-259.

crossing was not just the shared gentlemanly culture of these Victorian authors, but also the fact that Darwin combined a commitment to “objective” and systematic comparative research with an underlying value orientation.

As noted above, much of social Darwinism seems clearly at variance both with his scientific conclusions, and also with his humanitarian political outlook. As the scion of a family committed to the cause of antislavery, he was in part motivated by his attachment to the doctrine of human brotherhood, and therefore to the associated belief in human racial unity. This may also help to explain why Marx expressed such enthusiasm for the *Origin* in a letter to Engels (although using such untranslatable and unappreciative German adjectives as “grob” and “plump, clumsy, clownish” to characterize English methods). At any rate, Marx was positive enough to invite Darwin to accept the dedication of *Das Kapital* on its first publication. Although keen to avoid such controversy, Darwin was clearly aware that his contribution to biology, evolution, and social thought was not purely the product of a disembodied neutral scientific inquiry. Indeed, according to Desmond and Moore, he knew his findings were profoundly value-laden.<sup>13</sup>

But of course, that was Victorian Britain. Since then, the sciences have become more specialized and professionalized. We now know, as he could not, that all living organisms are regulated by genetic codes which can be clearly deciphered and indeed replicated. At first, some biologists may have drawn the inference that Darwin’s initial loose metaphorical images could thenceforth be superseded, possibly even converting biology into a science characterized solely by mechanistic-type models of genetic or molecular reductionism. But although that outlook can still be detected in some publications, it is far from being the dominant viewpoint in the modern life sciences.

## The New Biology

When Steve Jones, a leading professor of genetics, produced a tribute to Darwin’s *Origins* intended to incorporate the modern synthesis, he scanned many fields of research: “The clues from fossils, genes, or geography-differ in each case, but from all of them comes the conclusion that life is kin. That is no mere assertion, but a chain of deduction with every link complete.” Jones constructs an account which gives full recognition to all the gaps in the evidence, and the many plausible objections that can be countered only by a plurality of methods. For example, he argues that the science (and art) of cladistics (impartially mapping affinities of extinct and extant groups of organisms with shared traits) has transformed our view of life’s tree to an extent comparable with the findings of genetics. Similarly, to explain the grand leading facts of

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<sup>13</sup> Adrian Desmond and James Moore, *Darwin’s Sacred Cause: Race, Slavery, and the Quest for Human Origins* (London: Allen Lane, 2009).

the geographical distribution of varieties of life requires systematic analysis of the various types of barriers that impede their migration, together with the physical characteristics of the new locations they may selectively occupy.<sup>14</sup>

Both the techniques for constructing an inclusive classificatory schema and the models of spatial diffusion and differentiation that have been developed by modern biologists should be of as much direct interest to students of comparative politics as the genetic reductionism that too many of our professional colleagues currently associate with scientific “best practice.”

Thus, it seems that in this field it is still the nature of the phenomenon under study, rather than the professional techniques available to the researcher, that determines the range of methods worth pursuing. In addition to those mentioned above, one could add embryology, cell science, neuroscience, mathematical modeling of self-organizing systems, ecology, evolutionary developmental (evo devo) biology, and no doubt many more overlapping and mutually reinforcing research approaches. This pluralism of perspectives and methods need not give rise to fragmentation of the overall field of inquiry. To the contrary, all these flourishing subdisciplines come together around a unifying set of research questions still rooted in Darwinism. So, if the political sciences aspire to borrow from successes in the natural sciences, rather than confining themselves to an extremely narrow and misspecified transfer of one technique only, contemporary life sciences provide an encouraging stock of resources from which to draw.<sup>15</sup>

But perhaps I should supply some further evidence for the claim that, contrary to the frequently naïve assumptions of social scientists with an inferiority complex about “real” science—the genetic reductionists have not swept all before them. As Sean B. Carroll, professor of genetics at Madison, Wisconsin, outlines in his popularization of the “new science” of evolutionary development, embryologists now construct “fate maps” of early embryos to reveal how initially undifferentiated individual cells react to their relative positions and thus give rise to complex organic structures:

“Fate maps” reveal that, by some point in development, cells “know” where they are in an embryo and to what tissues or structures they belong. In terms of our “geography” analogy, cells, tissues and organs have a specific position on the globe

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<sup>14</sup> Steve Jones, *Almost Like a Whale* (New York: Doubleday, 1999), chaps. 12 and 13.

<sup>15</sup> Here I am only echoing W. J. M. Mackenzie’s old ambition to place political science “end-on” to the biological sciences. Following Sir Peter Medawar, he regarded political science (insofar as it is to claim scientific status) as a “special case” of biology, which in turn was a “special case” of chemistry, itself a derivative of physics. “As we go down the line, the sciences become richer and richer in their empirical content...but at the same time they are looser in texture, fuzzier in outline, subject to revision.” J. J. M. Mackenzie, *Biological Ideas in Politics: An Essay on Political Adaptivity* (Manchester, England: Manchester University Press, 1979), 92-93.

of the embryo defined by their longitude, latitude, altitude (if projecting out from the body) and depth (within layers of the body), as well as a “national” identity (nerve cells, liver cells, etc.). All cells are descended from the initial single fertilized egg. It is obvious that a whole lot of information must be generated in the course of development to create unique addresses for dozens of cell types, tissues, and organs at specific positions in the embryo. How do cells “learn” their positions and identity?<sup>16</sup>

This passage was worth quoting at length from a contemporary (popularizing but nevertheless serious and respected) guide to current biological research, first because it pinpoints the limitations of static atomistic causal attribution (“reductionism”) for explaining complex developmental processes; and second because it contains such a rich harvest of metaphorical images and analogies drawn from social life.

Stuart A. Kauffman’s challenge to genetic reductionism comes from a very different direction. He develops theoretical models of self-organization and selection for adaptive evolution, in which it is the “ruggedness of the fitness landscape” rather than the self-templating character of the genetic molecule that guides the emergence and development of life. His is a view of what theory says is possible, rather than a demonstration of what the evidence shows to be the case. Not surprisingly, then, it is controversial and may not in the end prevail over more traditional interpretations. Still, from our point of view, it demonstrates the benefit of addressing fundamental issues using diverse analytical techniques. And, his major conclusion—concerning the utility of random grammar models—has the widest possible relevance, not only in the life sciences but also potentially in social science. Here is his key claim:

Such grammar models afford a new framework for thinking about the emergence of functionally integrated systems which interact with, and represent, and know their worlds. These systems provide models for the emergence of competition and collaboration between self-reproducing molecular systems and perhaps even functional integration and transformation in economic and cultural systems. Indeed, grammar models are natural test-beds for understanding the interweaving of historical contingency with its avalanches of consequences cascading from frozen accidents, and the dominion of law, in biology and other deeply historical sciences.<sup>17</sup>

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<sup>16</sup> Sean B. Carroll, *Endless Forms Most Beautiful: The New Science of Evo and Devo and the Making of the Animal Kingdom* (London: Phoenix, 2006), 89-90.

<sup>17</sup> Kaufman, *The Origins of Order*, 286. He acknowledges that some of his key concepts, such as

On a different but perhaps equally controversial note, let me add some evidence that contemporary biology includes serious work of a kind compatible with my approach to comparative democratization. This is the recent book by Steven Rose, which aims to reintroduce philosophy into biology. Rose is a controversial figure in this field, but as a neuroscientist and professor of biology, he has the credentials to demonstrate that this discipline still accommodates multiple perspectives on theory and methods. I have selected the following three passages from his concluding ten-point manifesto, aimed to “make biology whole again”:

2 *One world, many ways of knowing* For any living phenomenon we observe and wish to interpret, there are many possible descriptions. ... These accounts cannot be collapsed into “one true” explanation in which the living phenomenon becomes “nothing-but” a molecular assemblage, a genetic imperative, or whatever. It all depends on the purposes for which the explanation is required... . Biology, and the life process it studies, will not conform to the proud manifesto of physics that the task of science is to reduce all accounts of the world to unitary theories of everything... .

6 *Stability through dynamics* Organisms are open systems, far from thermodynamic equilibrium, in which continuity is provided by a constant flow of energy through them. Every molecule, every organelle, every cell, is in constant state of flux, of formation, transformation and renewal. Dynamic stability of form persists, although every constituent of that form has been replaced. This stability, often maintained through oscillatory processes, depends on the capacity of complex interacting systems to self-organize, so as to maintain both short- and long-range order... .

10 *Life constructs its own future* Thus for humans, as for all other living organisms, the future is radically unpredictable. This means that we have the ability to construct our own

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“grammar models” are actually heuristic metaphors. In a further nod toward the social sciences, he sums up his bold proposals for a theory to explain the morphology of living organisms with the following observation: “One is always aware of the intellectual error, whatever it was, which allowed James Mill, John Stuart’s father, to deduce from first principles that a constitutional monarchy remarkably like that in England was the highest form of government. We stand in considerable danger of falsely deducing the inevitable existence of what we observe. What might we want in our theory? Design principles, of course...” Ibid., 641. Theoretical biologists draw lessons from the history of political thought, and that traffic can usefully flow in both directions.

futures, albeit not in circumstances of our own choosing. And it is therefore our biology that makes us free.<sup>18</sup>

Those three excerpts are taken from a longer manifesto that should be read in its entirety as a corrective to the idea that modern biology offers only one narrow model of scientific rigor that could be of any relevance to the social sciences. It is not necessary for nonbiologists to embrace Rose's vision of biology. All that is needed is an acknowledgement that this debate is ongoing. If the social sciences are to borrow from the natural sciences, then, at a minimum, they need to be informed about the current controversies affecting the subjects from which they wish to draw. If more developmental and holistic perspectives still have some traction in the life sciences, then they cannot simply be ruled out as "antiscientific" when seeking lessons for our field.

Readers will also have noted that all four sources quoted above—Darwin, Carroll, Kauffman, and Rose—have drawn some of their inspiration from outside their own discipline, including from the social sciences (as these were known to them). Darwin refers to Spencer; Carroll invokes metaphors from geography; Kauffman discusses James Mill; and Rose alludes at least indirectly to themes in social theory. There is a process of reciprocal exchange here, not just one-sided borrowings. If such exchanges are to be productive, they require each side to take a serious interest in the epistemological challenges confronting the other side.

From this quick sketch, it would seem to follow that there is still scope for the social sciences, in general, and for students of comparative democratization, in particular, to exchange imagery and conceptualizations with the natural sciences, in general, and the life sciences, in particular. But to conclude this essay, I also need to confront the reasons why social scientists of my generation had come to resist the import of biological metaphors into their field. In particular, during much of the twentieth century, it seemed that, however innocently intended, such transfers had acquired transparently ideological overtones. The kind of biology that inspired the last generation of political metaphors was often found to be deeply conservative and indeed even antidemocratic in its implications. However, my concluding point is that contemporary biology is not the same as before. Current theories and concepts in the life sciences are therefore not necessarily tainted with these illiberal associations.

## **Politics and Biological Metaphors**

Although it is always vital to guard against the hidden assumptions that can be smuggled into any type of model of a social explanation, there is no reason in

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<sup>18</sup> Steven Rose, *Lifelines: Life beyond the Gene* (New York: Vintage, 2005), 304-309.

principle why metaphors and analogies drawn from current biological thinking need to carry antidemocratic connotations. From the physiocrats through to Alfred Marshall, biological analogies were frequently invoked in the history of economic thought, just as from Hobbes onward, political theorists compared the state to a person, and Spencer and Durkheim compared society to an organization, and so on. Similarly, the “new liberalism” of pre-First World War England was heavily influenced by Darwinian ideas about evolution.

As Michael Freeden notes,

evolutionary theories could be harnessed in important ways to different political ideologies. Conservatives could, and did, seek support from evolution for their stance of non-intervention in a social balance, based on what they believed were natural aggressiveness and competition, and justified a limited role for the state in supporting the disadvantaged. Left-liberals and evolutionary socialists saw the emergence of regulatory social institutions as the very reflexion of the rise of collective reason which the evolutionary process dictated.<sup>19</sup>

For example, D. G. Ritchie concluded that “the conception of society as an organism seems to admit of more easy applications to defence of just those views about the State which Mr. Spencer most dislikes,”<sup>20</sup> and for L. T. Hobhouse, “the organic theory of society assisted in establishing the dual centrality of liberty and sociability. It implied that individuals—as parts of a whole called society—would be “destroyed or vitally altered” when removed from society. It equally asserted that “society consists wholly of persons. It has no distinct personality separate from and superior to those of its members.” It associated rationality and harmony, suggesting that the drive to harmony was “a persistent impulse of the rational being.” And it linked these with the furtherance of the collective life of a society, so that it was “harmonious interaction, the response of each to each, that makes a society a living whole.”<sup>21</sup> And under J. A. Hobson:

Individualism was ingeniously detached from the individual as the unity of analysis and extended to serve the interest of society—now installed as the second, co-equal social unit.

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<sup>19</sup> Michael Freeden, *Ideologies and Political Theory* (Oxford: Oxford University Press, 1996), 198. He also reviews the different impact of Darwinian ideas on political theory in France and Germany.

<sup>20</sup> D. G. Ritchie’s *Darwin and Hegel*, quoted in Freeden, *Ideologies and Political Theory*, 204.

<sup>21</sup> Hobhouse’s *Social Evolution and Political Theory*, as glossed in Freeden, *Ideologies and Political Theory*, 204. Hobhouse also wrote *Social Evolution and Political Theory*.

Liberty and social welfare was aligned through the organic resolution of the tension...between individual rational activity and the general interest. The pursuit of personal liberty was an integral aspect of social health; the guaranteeing of welfare was indispensable to a concept of liberty that embraced growth, development, and flourishing.<sup>22</sup>

It is also well known that, before the Second World War, biological ideas were recurrently enlisted in the cause of racial oppression and discrimination against the handicapped (“eugenics”), and that metaphors about the social “health” of a nation and its need for defenses against “infection” were used to justify authoritarian and fascist political programs. There was also a significant strand of eugenic thought on the left, until Nazism exposed its implications. Even after the Second World War, some biological analogies persisted through inertia in various areas of social thought. They penetrated the social sciences at least until the liberal counter-attack of the 1960s.

The example of the Harvard “Pareto Circle” can serve as an illustration.<sup>23</sup> Sponsored by the professor of biological chemistry, Lawrence J. Henderson, it counted among its disciples such celebrated sociological functionalists as Robert Merton, Talcott Parsons, and George Caspar Homans, together with the well-known historian and political analyst of comparative revolutions, Crane Brinton, and the celebrated economist Joseph Schumpeter. Professor Henderson lent his authority as a biologist to the study of society through his *The Order of Nature and the Fitness of the Environment*. Henderson was actually a haematologist and his main contribution was on the physiology of blood, so it is hardly surprising if he focused on homeostasis and how circulation can serve to maintain stability within an organism. As a result, he was drawn to Vilfredo Pareto’s theory of elite circulation to stabilize society. Pareto’s ideas were taken up by his circle as a social science counterpart to this approach, because Pareto saw society as “a system of mutually interacting particles which move from one state of equilibrium to another.” The related ideas of system functionality and equilibrium were thought to provide the bridge between biological and societal processes, with the implication (as expressed by Homans) that “society is an organization and...like all organizations if a threat is made to its mode of existence, a society will produce antibodies which tend to restore it to its

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<sup>22</sup> J. A. Hobson, *Work and Wealth*, published in 1914, as summarized in Freedon, *Ideologies and Political Theory?* 205.

<sup>23</sup> See Barbara S. Heyl, “The Harvard ‘Pareto Circle,’” *Journal for the History of the Behavioural Sciences* 4, no. 4 (October 1968). Geoffrey M. Hodgson has highlighted the part played by Talcott Parsons and Richard Hofstadter in building the resistance to the importation of biological metaphors into the social sciences. See his “Social Darwinism in Anglophone Academic Journals: A Contribution to the History of the Term,” *Journal of Historical Sociology* 17, no. 4 (December 2004): 428-463.

original form.”<sup>24</sup>

For the purposes of this essay, the most significant member of the Pareto Circle was Joseph Schumpeter, who, although by profession an economist, has provided political science with a canonical stipulative definition of democracy. In keeping with the tenets of the Circle, Schumpeter proposed to limit the concept of political democracy, restricting it to a procedural arrangement designed to smooth, regularize, and legitimize the circulation of ruling elites.<sup>25</sup>

Against this background, it may suffice to note that such a static and naturalized view of equilibrium is no longer the master concept in biology and the life sciences (if it ever was, even in Henderson’s time). It has since been “punctuated” by Stephen Jay Gould, sidelined by evolutionary development (Carroll), challenged by homeodynamics (Rose) and by negative entropy (James Lovelock),<sup>26</sup> and pushed aside by co-evolution and adaptation “to the edge of chaos” (Stuart A. Kauffman).<sup>27</sup> What all these various contributions to modern biology have in common is that they propose techniques for analyzing and explaining the diversity, complexity, interconnectedness, and directional thrust of living organisms—even including the larger biosphere—by identifying underlying regulatory principles that generate change, rather than restore traditional stability. Whatever difficulties these contributions may still confront, and however much they may differ between themselves, these techniques and conceptualization have in common not just the desire to isolate regularities in nature (“natural laws”). They also share the recognition that the living realities that they study are dynamic, developmental, and in a permanent process of emergence. For that reason, the stable categories and given laws that may still characterize inanimate matter may no longer be adequate for the life sciences.<sup>28</sup>

This contention can be briefly illustrated by reference to the contributions to modern biology made by James Lovelock (concerning the most aggregate and holistic characterization of life); by Stuart Kauffman (on the question of the dynamics of co-evolution between multiple interdependent species in a complex ecology); by Sean Carroll (evolutionary development of organisms

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<sup>24</sup> George Casper Homans and C. P. Curtis, *An Introduction to Pareto: His Sociology* (New York: Knopf, 1934). Later on, Homans drew back from this position.

<sup>25</sup> For seventy years, the PRI in Mexico observed a fixed electoral calendar and the no re-election rule, thus promoting political stability through the smooth circulation of an elite, without in other respects practicing full democracy.

<sup>26</sup> John Gribbin, *Deep Simplicity: Chaos Complexity and the Emergence of Life* (London: Penguin, 2004), 197-198.

<sup>27</sup> Kauffman, *The Origins of Order*, 29-31.

<sup>28</sup> There are grounds for doubt whether even the physical world is completely exempt from these objections to a mechanistic worldview. See, for example, Werner Heisenberg, *Physics and Philosophy* (London: Penguin, 1989), especially chaps. 10 and 11. But all I need here is to show that mechanistic reductionism is under challenge in the life sciences. On the broader issue, see Gribbin, *Deep Simplicity*.

within each species); and Steven Rose (biology within an organization but beyond the gene, i.e., homeodynamics). These very diverse sources all share the one characteristic that matters for the purpose of this essay—they offer parallels and analogies that can be ruined by students of democratization without importing illiberal preconceptions or the reactionary connotations.

For example, James Lovelock’s test for the existence of life (initially on Mars, but in practice anywhere) is “negative entropy” (i.e., the reverse of thermodynamic and chemical equilibrium). The essence of life is that it feeds on an energy source, to make entropy “run backwards,” at least within a localized biosphere. It is thus the opposite to the state of equilibrium postulated in the physicalist models of causal determination that are still unthinkingly celebrated by too many traditional social scientists.

Similar considerations apply to modern theories of co-evolution and the development of ecosystems. Here, too, equilibrium is no longer the norm.

Over an extremely wide range of possibilities, whatever conditions you start out with and whatever shocks you apply to the living system (external or internal, or both) you arrive at the self-organized critical state on the edge of chaos, where even a small trigger can on occasion, produce a very large change in the system as a whole. Life really is like that.<sup>29</sup>

This perspective—elaborated by Kauffman, for example—incidentally offers a source of biological analogies for modeling the spread, and also the reversal, of democratization processes both within and between political communities. The Yale geneticist, Sewall Wright, elaborated the analogy with a “landscape” in order to model the spread and distribution of successful evolutionary strategies—a dynamic and context-sensitive image that has evident social and political applications. All this offers another sharp contrast to the “system-maintenance” functionalism that characterized mid-twentieth century conservative social theory.

Sean Carroll’s analysis of evolutionary development within species is of necessity fairly “functionalist” in approach. However, it differs markedly from the restrictive homeostatic type of functionalism that so appealed to the 1930s conservatives of the Pareto Circle. For example, here is what Carroll identifies as the “four secrets of evolutionary innovation”:

The first secret of evolutionary innovation is without a doubt, to work with what is already present...nature works more like a tinkerer, by working with and cobbling together available materials and constantly modifying and retouching structures

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<sup>29</sup> Ibid., 197-198.

over eons, and not as an engineer would with a preconceived plan and specialized tools... . The second and third secrets, multifunctionality and redundancy, were first recognized by Darwin. ...Any part of a multifunctional structure that is at least partially redundant in function sets the stage for specialization... . The fourth secret is modularity...[which] allows for the modification and specialization of individual body parts, sometimes in the extreme, independent of other body parts.<sup>30</sup>

So, correctly understood, modern biological functionalism is far more flexible and pluralist than the tightly regulated imagery that so appealed to social conservatives. Democratization theorists can feel comfortable borrowing appropriate analogies from here.

Moreover, modern biology differs from the version practiced during the fascist era, in that the integrative and homeostatic characteristics of the whole organism are now mainly analyzed from the bottom up (along the lines favored by Hobson, as quoted above), whereas previously they were mostly studied from the top down. The authoritarian model of the healthy organism was always a distorted way to analyze political life, but for a period it gained plausibility from the assumption that all living organisms should be viewed as integrated self-equilibrating entities. Under modern conditions, even this slender shred of plausibility is lost, since it is the component cells in any multicellular life form that must provide the key focus of attention—not that any style of biological thought (“survival of the fittest,” the “selfish gene”) translates mechanically into the analysis of social life. It bears repetition that analogy is not homology, and should never be used as such.

So, my general view is that all interpretative imagery can, in principle, be appropriated for questionable purposes—that is why political language should always be subject to critical scrutiny. But the “social Darwinism,” “corporatism,” and hierarchical functionalism of earlier biological importations into political analysis need not deter us from taking a fresh look at how this discipline compares with mechanics as a source of concept formation in politics. The relevant stock of contemporary biological concepts and ideas contains much that is both refreshing and appropriate for the comparative study of democratization processes. There is another example that reinforces the argument that analogies drawn from biology need not be biased in an antidemocratic direction. Thomas D. Seeley’s study of the behavior of honeybee swarms demonstrates how collective decisions are taken by consensus through an elaborate process of information gathering and sharing, competition among alternatives, and the formation of a quorum. Seeley views

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<sup>30</sup> Carroll, *Endless Forms Most Beautiful*, 194-195.

the swarm as a “super-organism” governed by democratic principles, and he compares honeybee democracy with the proceedings of a New England Town Hall meeting.<sup>31</sup>

There is evidently still much scope in modern biology for top-down or holistic perspectives on the structure of life, but these no longer focus on static equilibrium and functional integration. Instead, they tend to stress dynamic adaptation, co-evolution, and the emergence of successive complex interactive networks that are largely governed by principles of self-organization. James Lovelock’s still controversial “whole earth” approach to planetary biology was stimulated by the images of a blue orb sent back by the first spacecraft. This, plus the question how to tell whether there was life on Mars, prompted him to reexamine very familiar material from a radically different perspective, generating first the “Gaia hypothesis” and what may now be more properly called Gaia theory. Whether or not his particular proposals stand the test of further research, the agenda he established has reinvigorated the life sciences and demonstrated the viability of scientific research into all known life as a unity.<sup>32</sup>

Of course, different techniques are required to grapple with the subject on this scale as opposed to at the level of the species, the organism, the cell, or the gene. It is the nature of the phenomenon under investigation that should determine the techniques to be applied, rather than vice versa. There are lessons here for the social sciences, in favor of methodological pluralism and openness to borrowings from other disciplines. For example, anthropogenic climate change is a phenomenon that urgently requires the attention of, among others, the political science community. The techniques required to analyze the politics of humanity’s global environmental impact are not necessarily at all similar to those on which we insist for research into voting behavior or the production of legislation. They may be more holistic, more cross-disciplinary, and may require theoretical innovation. Modern life sciences offer encouraging examples of the kind of eclecticism we need to encourage in the political sciences as well.

Holism also has much to offer at the level of the individual organism, as well as that of the biosphere. As argued by Steven Rose, it is how component cells and organs develop, specialize, communicate, and cooperate that largely determines the viability of the whole living organism. Without stressing the parallel too far, his imagery does bear some limited comparison with the

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<sup>31</sup> Thomas D. Seeley, *Honeybee Democracy* (Princeton, NJ: Princeton University Press, 2010). See also Martin Lindauer, *Communication among Social Bees* (Cambridge, MA: Harvard University Press, 1961), which contains a vivid example of an inconclusive debate within a hive, followed by a renewed assembly (p. 43).

<sup>32</sup> James Lovelock, *The Ages of Gaia: A Biography of Our Living Earth*, 2d. ed. (Oxford: Oxford University Press, 1995).

modern understanding of democracy as a collective enterprise, founded on the creativity, adaptability, and capacity for co-operation and specialization of the individual citizens who constitute the indispensable basis of all democratic political organization, however tightly bound together they may also be.

### **Concluding Remarks**

Overall, then, if the social sciences, in general, and political science, in particular, wish to reaffirm their allegiance to best practices in the modern natural sciences, they could do worse than to open themselves to the nonequilibrium, methodologically pluralist, conceptually innovative, and reality-driven concerns and practices of the contemporary life sciences. As noted by Kauffman, biology is a deeply historical discipline. It may therefore have more to offer to the social sciences than much of the physical sciences, where developmental processes are less crucial. (Perhaps for this reason, in the French academic tradition the “science of man” provides an encompassing linkage).

Biological theories and discoveries are also charged with normative significance in much the same way that political findings and explanations carry value implications with them. Disciplinary training in such areas should not be purely technical and instrumental, but need to include the provision of guidance on how to deal with the social meaning of the scientific work to be undertaken. Hence, for example, this essay has advocated methodological pluralism, including training in the historical development of the discipline or disciplines in question. My brief sketch history should at least serve to illustrate the reality that social and political factors have continually interacted with “in-discipline” developments to shape the course of thinking about the life sciences, and more generally, the “science of man.” Thus, for Darwin antislavery underpinned his scientific project; Henderson’s excursion into sociology was prompted by anti-Bolshevism; Lovelock was galvanized (and indeed employed) by NASA; Dawkins uses his science to dethrone religion; and battles over what science can tell us about “human” nature, or what evolution implies for social cooperation, rage around us to this day.

In view of this, a professional training in political science that only valued precise causal attribution, quantification, and replicable verification would not equip the next generation of researchers with the plurality of methods required to do justice to their subject matter. Certainly, progress in the life sciences has owed a great debt to these methodological virtues, but it has also drawn from many other sources, some of them quite literary, historical, and philosophical. If the natural sciences are to be invoked as a model for the social sciences to emulate, my argument has been that modern biology and the life sciences, more generally, provide a source of inspiration favoring openness, eclecticism, and the deployment of multiple methods. This essay has illustrated its point by eschewing quantification and tight causal claims, and by instead offering

a bird's-eye survey and a loose interpretative sketch. The underlying claim is that study of the history of thought can also contribute productively to the development of a discipline, and is therefore worth including in the repertoire of skills that should be transmitted to its practitioners.

However, a final caveat is also in order. I have argued biological analogies may help social scientists to reconcile their desire for rigor and the accumulation of objective knowledge with the need to guard against ossified concepts and mechanistic reductionism. But analogy is not homology, and the study of man is not reducible to the life sciences. Political behavior is shaped by historical and cultural processes that have increasingly superseded the constraints of evolutionary necessity. And human beings, in contrast to all other animals, rely on speech and related forms of group interaction to construct a realm of causal understanding, social interpretation, and imaginative discourse that motivates their behavior and offers them a margin of freedom to act in accordance with their intentions far outside the constraints derived from their animality.<sup>33</sup> Thus, politics and democracy can learn from biology, but cannot be reduced to it.

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<sup>33</sup> Raymond Tallis, *The Knowing Animal: A Philosophical Enquiry into Knowledge and Truth* (Edinburgh, Scotland: Edinburgh University Press, 2005).