

Politics in Biology

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Keynote article

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The relationship between biology and politics is manifold, ranging from politics within biology and implications of politics for biological research to intrinsic political dimensions of biological insights. Politics within biology plays out in the everyday practice of academic and applied science and has recently reached a new dimension in the context of priority and patent disputes, whereas political interventions in form of regulatory and funding policies have become major factors in shaping biological research. Here we focus on how the results of biology, and specifically modern evolutionary biology and its conceptual extensions, have shaped discussions in economics, medicine and public health and anthropology. We argue that these recent developments in the life sciences have enormous conceptual and practical implications for human society and politics as they contribute to a substantial reevaluation of some deeply entrenched conceptions about human nature and the foundations of society.

Introduction

The category 'Politics in Biology' includes rather different kinds of things. One involves politics within biology. Here biology is itself political, with scientists engaged in battles for priority and authority. As David Hull pointed out in his excellent study of systematics research, biology can in fact be extremely politicized internally (Hull, 1988). Perhaps, as some critics put it, because there is so little at stake academic biologists can become extremely committed to their particular points of view and approaches and can fight for claims of priority and credit. Yet there is much at stake in some cases, as with some areas of biomedical research, and the fights may be about patents and profits as well as

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priority (see Rabinow, 1996, 1999; Koepsell, 2009). This is politics of one sort, and we will not focus on this kind here. Instead, in the following sections we look more closely at Political Impacts on Biology, Political Implications for Biology and Biology as Politics.

We argue that biology has, in fact, always been political insofar as it shapes our understanding of ourselves and as we are participants in a political world. Yet recently, some biologists have tried to suggest that they lie outside the political world and are carrying out pure, objective pursuit of knowledge for its own sake. Others argue that the results of biological investigation call for shaping our world in particular ways dictated by our evolutionary and biological nature. In this article, we have time only to touch on the different ways that the biological and the political have intersected, and we lay out the range of views and their implications with an invitation for further reflection.

Political Impacts on Biology

In the first of these cases, the general category includes 'political intersections with biology' with the impacts going in both directions. We look first at the political impacts on biology, which shows what is wrong with the simplistic view of science as an insulated pursuit that is carried out by biologists working away only according to the internal rules of the science. In theory at least, and in the idealized view of at least some practitioners, biology in this case remains 'above' politics and retains some approximation to pure and objective production of knowledge. In this view, and for those who hold it, biology is often seen as curiosity-driven rather than use-inspired, since acceptance of a 'use' suggests an 'out there' that will use the results of research (Stokes, 1997).

Historians, philosophers and sociologists of science have long shown that the insulated purity of the research is largely imagined. Scientists long sought to establish their authority by suggesting that their work was insulated from the vagaries of external influence, but many case studies show that this simply is not true except in very rare cases. So instead of this extreme view of the insulation of science, biological research moves along driven by its own internal logic and standards, but the community also recognizes that there are political impacts on the scientific enterprise.

Clearly, at the very least, politics influences what research gets publicly funded. In some cases, politics also determines what science is legal. Stem cell research and cloning provide a case in point here. Some would say about stem cell research that if only we could avoid the undesirable political ‘interventions’, we could get on with the pure and good research and save people’s lives. Other scientists realize that science necessarily intersects with politics at times, and that the goal is to have an intelligent and informed conversation that leads to wise decisions. Some stem cell researchers such as Douglas Melton or George Daley have applauded political oversight and regulation, which they see as providing a socially approved context in which stem cell research can be done. Recombinant DNA (deoxyribonucleic acid) debates of the 1970s also fall into this category, for example, or negotiations about responsible conduct in research (Krimsky, 1982).

These are cases in which biology is taken as the stable category, in which we know what the research can do, but questions arise about how the political world will impact biology. These cases influence whether and how biologists see the need and value of regulatory rules for research behaviour. In the most successful cases, biologists accept the political impacts that shape the research that is actually done and the context in which it is carried out. **See also:** [Biological Warfare: History and Current Developments](#); [DNA Technology: Asilomar Conference and ‘Moratorium’ on Use](#); [Genetically Modified Plants](#); [Geneticization: Debates and Controversies](#); [Human Cloning: Arguments Against](#); [Human Genome Project as a Social Enterprise](#)

Political Implications for Biology

Another kind of intersection concerns cases in which biology becomes political because it is perceived as directly useful and biologists respond by pursuing the science that is needed. This use-driven research can lead to products and, at the least, it leads to research focused on the search for particular defined products. Blood transfusion in World War I is an example, in which there was a clear need and researchers focused on finding a solution drawn from recent successes with tissue and cell preservation. Likewise, the National Research Council led efforts to improve production, distribution and wise use of antibiotics in World War II. Similarly, a need for tissues and organs to replace damaged parts and lost functions led to an upsurge in research and development of culture technologies (Landecker, 2007).

Sometimes biologists responded more directly, at times with insidious results, but they are perhaps different more in degree than in kind. Demands to solve problems of immigration and the apparently declining quality in population health led to eugenics and race hygiene research of the sort done by Charles Davenport that proved of such use to the Nazis and the US government in the early twentieth century (Paul, 1995). Recently, biologists have

taken up the challenges to carry out research to make possible regenerative medicine that will help many, and biodiversity researchers have taken up the challenge of demonstrating species losses and the causes of such losses (Lanza *et al.*, 2006; Collins and Crump, 2009).

These are all cases in which biologists have accepted focused calls for action and have carried out a particular research rather than other research questions, as a result of the political call. In some other cases, biologists are ‘just’ following the funding. Political forces have determined that federal or state initiatives will pile money in some areas and not others, and scientists follow. These are cases where society and the political system stimulate biological research, and biology uses political pressures to their advantage. Of course, while some research is being selectively funded, other research is not. Therefore, the political impacts the biological work done. **See also:** [Amphibian Decline](#); [Blood Groups and Transfusion Science](#); [DNA Technology: A Critical European Perspective](#); [Eugenics](#); [Eugenics: Contemporary Echoes](#); [Eugenics: Historical](#); [History of Biotechnology](#); [Intelligence: Ethical Debates about the Search for IQ Quantitative Trait Loci](#); [Malthus, Darwin, and Social Darwinism](#); [Nazi Movement and Eugenics](#); [Public and Professional Understandings of Genetics](#); [Racism, Ethnicity, Biology and Society](#)

Biology as Political

In all these cases, biology and biologists engage in implicit and usually passive potentially political action, even when they do not articulate and may not even recognize that they are doing so. However, biologists sometimes become more actively engaged. This can mean the obvious lobbying for funding or favouritism for the particular areas of research in question. This certainly played out quite visibly when Nobel Prize-winning scientists lobbied actively for funding of stem cell research in California, or environmental scientists have lobbied for funding for their particular favourite climate-change research or biodiversity project.

Yet, there are far more interesting ways in which biology has overtly and actively sought to influence the political world. Especially in the late twentieth and early twenty-first centuries, but even well before that, biology has begun to play an imperialistic role, striving for hegemony over the other sciences and even more broadly for claims about human nature. For a number of advocates, biology and ‘nature’ are taken as carrying an imperative to behave in certain ways that accord with biological nature. Evolutionary psychology is a clear case in point. Yet, this is not a new phenomenon. **See also:** [Darwin, Charles Robert](#); [Haeckel, Ernst Heinrich Philipp August](#); [Malthus, Darwin, and Social Darwinism](#); [Sociobiology, Evolutionary Psychology, and Genetics](#); [Spencer, Herbert](#)

We have only to look back to Darwin for an example. Darwin suggests that our ethical and even religious behaviours derive from our evolutionary history. What followed from this was not clear, but perhaps biology

dictated morality. Perhaps the 'is' of nature did really in some way imply the 'ought' of human social behaviour. Whether, to what extent and how remained the subject for much debate in the latter half of the nineteenth and early twentieth centuries.

By the early twentieth century, some biologists embraced full-scale materialistic thinking, with the implications that everything about humans and human behaviour is materialistically based and caused. Ernst Haeckel's materialistic monism in Germany was widely circulated and discussed in English translations as well. Robert Richards has done a fine job of laying out Haeckel's views and their implications, so we need not repeat those here (Richards, 2008).

Instead, let us take the example of Jacques Loeb. Philip Pauly has shown that Loeb's materialism led to an engineering point of view, in which Loeb imagined using biology and the other sciences to engineer better organisms that also behave better – in some sense. At the International Psychological Congress in 1901 in Geneva, Loeb proclaimed that 'The highest manifestation of ethics, namely the conditions that human beings are willing to sacrifice their lives for an idea is comprehensible neither from the utilitarian standpoint nor from that of the categorical imperative. It might be possible that under the influence of certain ideas chemical changes, for instance, internal secretions within the body, are produced which increase the sensitiveness to certain stimuli' (Pauly, 1987; Loeb, 1912, p. 62).

In a lecture 'Mechanistic Conception of Life', originally presented to the Congress of Monists in Hamburg in 1911, Loeb went further in concluding that behaviour results from biology. Just as we eat, drink and reproduce because of material, machine-like forces, so we behave because our nervous system tells us to. And that nervous system is conditioned through our development of instincts. 'The mother loves and cares for her children', Loeb concluded, 'not because metaphysicians had the idea that this was desirable, but because the instinct of taking care of the young is inherited just as distinctly as the morphological characters of the female body'. Similarly, 'We struggle for justice and trust since we are instinctively compelled to see our fellow beings happy'. As a result, 'Not only is the mechanistic conception of life compatible with ethics; it seems the only conception of life which can lead to an understanding of the source of ethics' (Loeb, *The Mechanistic Conception of Life*, 1912, p. 31). **See also:** [Loeb, Jacques](#)

Biology and Human Nature

Such efforts to understand the very nature of what makes us human has arguably been the single most pressing question in intellectual history. Over the millennia, various proposals have been put forward to explain both human uniqueness as well as our obvious connection to other forms of life. This Janus-faced core of human self-understanding is already clearly expressed in Aristotle's formulation of man as Zoon

Politikon (ζῷον πολιτικόν), which places us squarely within the genus of animals, yet differentiated by our fundamental characteristic of social life in form of political organizations, such as villages, cities and ultimately states (Aristotle and Barnes, 1984). Only within such a social and political organizations, Aristotle held, can humans find fulfillment of their intrinsic telos, or purpose. Aristotle's framing of human nature as both social/political and animal/biological thus marks the beginning of a long history of arguments about the appropriate relationship between these two dimensions of 'humanness' (Cassirer, 1944). **See also:** [Aristotle of Stagira](#); [Classification](#); [Systematics: Historical Overview](#)

This quest to understand humans in relation to nature has been more than a philosophical meditation or a scientific discourse; as Loeb and Aristotle clearly recognized, it also has substantial political and practical implications. Since we can only begin to scratch the surface of this multidimensional intellectual, cultural, political, religious and scientific history, we limit our discussion to the most recent episodes especially in the light of evolution.

Implications of Evolutionary Biology

We see the political impacts of biology's contribution to understanding human nature most clearly in areas where evolutionary biology is transforming the theoretical foundations of such disciplines as anthropology, psychology, medicine, computer science, engineering, sociology, political science, economics, aesthetics and even the humanities. All these developments are part of the ongoing Darwinian Revolution, which continues to explore the consequences of Darwin's original insights within the biological sciences and beyond. The basic premise of these extensions of evolutionary theory is that humans, including their cognitive and social characteristics, are a product of a long evolutionary history. Furthermore, evolutionary processes, such as natural selection, have shaped all aspects of human nature. Therefore, based on this reasoning, the principles of evolutionary theory play a major part not only in our theoretical understanding of humanness, but also and even more importantly, should guide practical action. This includes the way we treat diseases, design complex technologies or conduct our international and economical affairs. **See also:** [Aggression and Criminal Behavior](#); [Biocomplexity](#); [Darwinian Medicine](#); [Evolutionary Ideas: Darwin](#); [Neuroeconomics](#); [Philosophy of the Life Sciences](#); [Protein Design](#); [Protein Structure Design and Engineering](#)

That such claims are controversial and have often led to the acrimonious arguments will not be surprising. Social scientists, humanities scholars, policy-makers, religious leaders and followers and large parts of the general public resist what they see as inappropriate 'imperialistic' behaviour on the part of some radical evolutionary biologists. Some argue, for instance, that the implicit reductionism of any biology-based explanation of complex human behaviour or complex social systems, such as the economy,

is an inadequate simplification that does not do justice to the intrinsic complexity of these phenomena. A second argument, often considered a 'knock-out' by social science and humanities circles, fears that any evolutionary explanation of social phenomena is a revival of the evils of Social Darwinism, that any evolutionary consideration of conflict between groups raises the spectre of Nazism, or that any consideration of evolutionary and biological differences between groups in the context of medicine is inevitably racist and/or a form of eugenics and that any evolutionary discussion of behaviour and ethics is necessarily antireligious. The 'Darwin to Hitler' or 'Darwin to Hell' mantra has had quite an appeal within both the media and certain academic quarters (Richards, 2009). **See also:** [Haeckel, Ernst Heinrich Philipp August](#); [Malthus, Darwin, and Social Darwinism](#); [Nazi Movement and Eugenics](#)

The problem with these lines of criticism is 2-fold. First, they are generally based on simplistic accounts of evolutionary theory that are woefully inadequate representations of current ideas. Evolutionary theory has moved far beyond the simple formulation that the dynamics of genes in populations provides the only explanation of complex phenomena. Indeed, the main emphases in current evolutionary theory are complex adaptive systems, complex interactions between the genome and the environment and the integration of developmental processes with evolutionary processes (Holland, 1992; Carroll *et al.*, 2005; Gilbert and Epel, 2009). Common to all these areas of research is an emphasis on regulatory processes (including complex feedback loops), which is a far cry from the simplistic assumption of genetic determinism that is the basis of all the statements presented in the preceding sections (Davidson, 2006; Barabasi, 2009; Vespignani, 2009). Second, claims that the current development of an extended evolutionary theory (and its possible contributions to understanding human nature and social actions) is a simple continuation of earlier (and undesirable) events not only simplifies the historical complexity of these events but also ignores the multifaceted interactions between science and society that have shaped each other. **See also:** [Biocomplexity](#); [Developmental Evolution](#); [Evolutionary Developmental Biology: Developmental and Genetic Mechanisms of Evolutionary Change](#); [Evolutionary Developmental Biology: Homologous Regulatory Genes and Processes](#); [Genetic Networks](#)

Economics

Take, for example, economic theory. Economists, commentators and the public at large are still unsure what has led to the fast unravelling of the world economy after its historical peak in 2007. Traditional economic theory with its emphasis on the 'invisible hand' of the market and the assumption of 'rational economic actors' neither provides an easy way to understand how multiple 'bubbles' develop, nor how similar 'irrational' forces contribute to the rapid reversal of fortunes. Because economic theory is, therefore,

at best incomplete, a group of economists have begun to include the complexities of human behaviour into economic models and explanations. These behavioural economists (sometimes also called experimental economists since they also rely on behavioural and psychological experiments to ascertain actual human responses to standard economic situations and decision-making) aim for a more realistic account of economic activities as the actual product of human actors (Akerlof and Shiller, 2009).

This emphasis brings economical theory within the explanatory framework of evolutionary psychology and evolutionary theory more generally. According to this approach, causes for the observed actions and decisions of economic actors lie in deep layers of the human mind and psyche. These are, in turn, the product of the accidents and contingencies of our specific evolutionary history. As a result, they do not always agree with the idealized notion of rationality as it is defined by classic economical theory. Building economical models on more realistic assumptions leads not only to better insights into economic activities and processes but also suggests a different set of policies than those that have become dogmas in western capitalist societies (e.g. 'deregulation is good as the market will regulate itself'). However, it also implies that an evolutionary understanding of human nature is the foundation of economical theory and decision-making. In that sense, insights from the biological sciences have the potential to shape political decision-making in the twenty-first century.

The history of such developments, of which economics provides just one example, yields another important lesson about the intricate relationship between the biological sciences and the politics. Thanks to a lot of first-rate scholarship on the history of evolutionary theory, it is now widely known how Darwin's major insights into the dynamics of natural selection have been shaped by his reading of Malthus and the larger socio-economical context of nineteenth century Britain (e.g. Desmond and Moore, 1991; Browne, 1995, 2002). Indeed, Darwin's core theory is often seen as an application of economical reasoning applied to nature. Darwin's insights have then set in motion a line of inquiry that has ultimately led to the current understanding of the deep evolutionary roots of human behaviour, which, in an ironic turn of events, is now beginning to revolutionize the foundations of economical theory. In the relationships between biology and politics we thus have come full circle. **See also:** [Darwin and the Idea of Natural Selection](#); [Darwin, Charles Robert](#); [Evolutionary Ideas: Darwin](#); [Human Behavioural Ecology](#); [Malthus, Thomas Robert](#); [Neuroeconomics](#); [Spencer, Herbert](#); [Sustainable use of Populations and Overexploitation](#)

Medicine and public health

Medicine and public health are two additional areas where we see a close interaction between the biological and political domains. According to some leading scientists, recent developments within evolutionary theory have the potential to revolutionize both the theoretical and the practical

foundations of medicine (Nesse and Williams, 1994; Stearns and Koella, 2008; Gluckman *et al.*, 2009). Not only does an evolutionary perspective provide a deeper understanding of disease – from the dynamics governing infectious disease, the workings of the immune systems, the development and distribution of cancer and the existence of aging and age-related degenerative diseases – but also suggests in many cases a different therapeutic approach.

Most prominently, such a perspective on health emphasizes evolutionary history (including genetic history), population dynamics and a conception of the organism as a set of evolutionary compromises and constraints (in contrast to the prevailing view of the organism as a finely tuned machine). Therapeutically, this perspective implies that in cases of infectious diseases we focus more on breaking the chain of transmission – which will require a much larger investment in vaccine research than we see under the current business model of the pharmaceutical industry and the patterns of specializations in medical schools – and in the case of systemic diseases, including age-related degenerative diseases, the evolutionary perspective casts some serious doubts on the emphasis on the ‘one size fits all’ approach that is the basis of our current system of drug approval. Recent developments that take into account the genetic history of patient groups and also take steps towards personalized medicine are to a large degree inspired by this emerging evolutionary framework.

All of these shifts in medical theory and practice also have substantial political implications. Regulating medicine and health care has been a major concern of all societies throughout history and as Michel Foucault and others have shown, power relations within societies have always been closely tied to the definitions of normal/abnormal, healthy/sick or sane/insane. Insofar as an extended evolutionary theory thus affects our understanding of these questions, it will inevitably shape these organisational principles of human societies (Foucault, 1973). **See also:** [Ageing](#); [Ageing – Future Directions for Research in the Biology of Ageing](#); [Darwinian Medicine](#); [Drug Metabolism: Evolution](#); [Using Evolutionary Biology in the Medical Sciences](#); [Foucault, Michel](#); [Gene–Environment Interaction](#); [Genetic Disorders in History and Prehistory](#); [Humans: Demographic History](#); [Thrifty Genotype Hypothesis and Complex Genetic Disease](#)

Philosophical anthropology

Finally, we discuss briefly the implications of the new biology for fundamental questions in philosophical anthropology. The Darwinian Revolution has always had deep implications for human self-understanding. Indeed, the major public battles after the publication of the *Origin of Species* 150 years ago were all about the consequences of common descent and our ape-ancestry. Although these debates are still with us, as the growing creationist movement attests to, the more interesting philosophical implications are connected to the move to naturalize human social and cognitive abilities. Again, Darwin and his

immediate followers led the way: Darwin with his forays into comparative behavioural biology, Haeckel with his consistent materialism and monism, Freud with his naturalistic approach to the human psyche and a whole group of brain researchers with their quest to localize higher cognitive and social functions in specific regions of the neocortex.

These trends combined into a scientific conception of the ‘new man’, which became the foundation of utopian movements at both sides of the political/ideological spectrum. The failure of these systems, in turn, led to a backlash and an increased scepticism of all things biological with regard to human affairs. The highly controversial reception of sociobiology in the mid-1970s was a clear expression of these largely political and ideological debates. Today we can observe an interesting ideological divide; on the one hand we have an ever-expanding array of studies into the biological and evolutionary roots of all human features, from language to the economy and from religion and the law to cognition. On the other hand we also find a strong resurgence of all kinds of religious and metaphysical belief systems that are seemingly immune of factual evidence (e.g. Boyd and Richardson, 2004; Boyd, 2009; Dawkins, 2006; Gazzangia, 2008; Hauser, 2006; Tomasello, 2008; Wilson, 1975, 1998).

Again, these debates are hardly just academic. How we interpret ‘free will’ for instance, is not just a debate between neuroscientists and philosophers. It has tremendous implications for our legal system, and for how we understand our evolutionarily conditioned cognitive abilities (or lack thereof, as in our inability to grasp complex causal phenomena quickly). These limitations also have huge implications for designing and implementing sustainable environmental practices and regulations or, as we discussed earlier, sound economic behaviour. **See also:** [Are Humans still Evolving?](#); [Cognitive Neuroscience](#); [Consciousness: Mechanisms](#); [Human and Chimpanzee Transcriptomes: Comparative Evolution](#); [Human Behavioural Ecology](#); [Human Evolution: Radiations in the Last 300 000 Years](#); [Intelligence and Cognition](#); [Modern Humans: Origin and Evolution](#); [Primates and the Origin of Culture](#)

We could go on with many similar examples but the basic argument should, by now, be clear. Biology, and evolutionary biology in particular, have dramatically altered the way we have come to think about what it means to be human, what fundamental human attributes are, and how we define ourselves vis-a-vis nature and society. These developments are intrinsically political as the implications of biological ideas are now at the forefront of many decisions (about health, environment, economy, etc.) that are of utmost importance for the future of human societies.

It is therefore not at all surprising that opposition to such a naturalized conception of humanness and society has also increased over the last decade. As societies have become increasingly fragmented and tribal (a development that incidentally can be explained very well within an evolutionary anthropology and psychology framework) religion and similar fundamentalist ideologies have dramatically increased all around the globe. Biology as a

rational science, together with all other Enlightenment values, is now seriously threatened. This comes at a time in human history when our only hope of survival as an advanced society depends on the rational and balanced use of science and technology. The stakes are, thus, indeed high for biology (and science more generally) in politics.

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