The Political Organism: Carl Vogt on Animals and States in the 1840s and 50s

Lynn K. Nyhart*

*Program in the History of Science, Medicine, and Technology, University of Wisconsin – Madison, Madison, WI 53706, lknyhart@wisc.edu

ABSTRACT: How do the discourses of biology and politics interact? This article uses the case of Carl Vogt (1817-1895), a German zoologist, physiologist, and radical political activist in the German revolutions of 1848-49, to examine the traffic across the discourses before, during, and after the revolutions. It argues that the key metaphors of the “state-as-organism” (used largely by political theorists) and the “organism-as-state” (used mainly by biologists) did different work for each group in the 1840s and 1850s. Vogt himself was the rare individual who actively played with both metaphors, in defense of both his radical political views and his materialist biology. I examine especially closely his scholarly biological studies of siphonophores—marine invertebrates that looked like single organisms but were generally agreed to be collections of individuals (“states” or “colonies”), and his use of this creature for political satire after the revolution failed. More broadly, while attention to the organism-as-state peaked in the early 1850s, the state-as-organism metaphor gained new possibilities. Whereas earlier it generally referred to an idealist or “ethical” meaning of “organism,” in the 1850s a new, “realistic” interpretation came onto the political scene, bearing a more strictly biological meaning of the term. The article ends with a brief analysis of the asymmetries between the two metaphors and their positions within nineteenth-century German natural science and politics.
In the German-speaking lands of the 1840s and 1850s, both state-makers and students of living nature found themselves on unstable ground. In 1848 and 1849 political reformers and academic revolutionaries sought to create a unified Germany under parliamentary rule. Propelled by Europe-wide calls to end monarchical rule and with urgency gained from the hunger crises of the later 1840s, in the revolutionary Frankfurt Assembly they argued over the foundations, rights, and obligations of their proposed new state, even as others manned the barricades. After its failure in 1849, German politicians and theorists alike had to regroup and assimilate to new realities. Biologists, meanwhile, were grappling with questions about biological parts, wholes, and individuality that promised (or threatened) to be no less profound, for such questions were understood to bear on the nature of life itself: was it purely physical or imbued with non-physical qualities? Across the ruptures of the revolution, members of each community sought firmer footing in one another’s language: drawing on the language of nature, many political theorists conceptualized the state in terms of an organism; drawing on political language, many biologists interpreted their most interesting organisms as “states.”

Based on well-developed ideas about the role of language in structuring thought, we might imagine the analogical traffic between “organisms” and “states” in this period to be reciprocal, each concept reinforcing attributes of the other to create a common discursive unit, and each taking on the other’s characteristics. However, the literature on the transfer of concepts
across scientific and social realms reminds us how complicated analogizing can be.¹ Evelyn Fox Keller has written, “The effectiveness of a metaphor . . . depends on shared social conventions and, perhaps especially, on the authority conventionally granted to those who use it. It also depends on other family resemblances already in place.”² With respect to organisms and states, to biology and political theory, how much was shared in the 1840s and 50s? What family resemblances existed? Who held what sorts of authority?

As this essay will argue, by the 1840s the “state-as-organism” (used by political theorists) and the “organism-as-state” (used by biologists) were two quite distinct analogies that operated in largely independent discourses. Focusing on the work of the zoologist and political activist Carl Vogt (1817–1895), this paper examines what happened when these forms of mutual legitimation came into contact. A man of oversized personality and physical proportions, whose multifaceted career as a scientist, popular writer, and politician made him exquisitely aware of


the possibilities and limitations of language, Vogt challenged analogizers in both realms. An analysis of his stance on organisms and states offers an unusually concrete historical glimpse into the shifting relations of biology and politics in the mid–nineteenth century, and into the possible discursive disruptions such a meeting made possible. At the same time, this analysis suggests connections to a broader change in German discourses of the state in the 1850s, in which the natural scientist could take on new authority. More broadly still, it suggests some of the asymmetries of organism–state analogies and the authority invested in them.

[FIRST LEVEL HEADING] THE ORGANISM AS A STATE AND THE STATE AS AN ORGANISM

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Central to the discursive exchange between organisms and states, I argue, is that analogies between the two did different work in each direction. “Organism” and “state” each had a range of properties, from which certain ones might be selected for analogizing with the other. One could liken the state to an organism, or the organism to a state: two different analogies. At the most basic level, although both states and organisms were figured as wholes comprising multiple interacting parts, the likening of a state to an organism emphasized its integrated unity, whereas the likening of an organism to a state emphasized the distinctness and partial autonomy of its parts. Each analogy performed important work, but for different communities and to different ends. Let us consider the two in more detail.

The “state-as-organism” has a venerable place in German political philosophy, dating in its modern phase to the late eighteenth century. To be sure, the ancients had written of the state as the “body politic,” and a long tradition viewed the state as a “corporate” entity involving parts coordinated into a larger metaphorical whole.⁴ But the state-as-organism metaphor drew on several features of both states and organisms that were new with the late eighteenth century.

First, as Tobias Cheung has noted, the term “organism” itself was changing its meaning at that time. In the seventeenth and eighteenth centuries, “organism” referred to a “principle of

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order” existing in certain kinds of beings that gave them vitality and resulted in the coordinated, system-like character of the interaction of parts into a whole. Thus eighteenth-century scholars spoke of “the organism of a body” in which “organism” was a property of living bodies, rather than a term for the bodies themselves. Cheung traces the shift in which “organism” came to refer to the living body itself to Kant and the proponents of Naturphilosophie. Kant focused attention on the mutual teleological relation between parts and wholes—the whole existed for the parts and the parts for the whole. In his schema, “organism” applied to this formal characteristic, not confined to individual living beings (our “organisms”) but to anything that bore these part-whole relations. The Naturphilosophen attributed this characteristic to the “organism” of both the macrocosm and microcosm, allowing for a semantic slippage from the macrocosmic principle of order to a new microcosmic “organism,” namely the living individual that possessed the organismal attributes. Following this mixed use of the “organism of” the macrocosm and microcosm, Cheung argues, one begins finally to see the term “organism” used in the plural, marking its new reference to individual living beings, rather than to a property of them. This appears to have become common in Germany in the early 1800s and in France a little later. While Cheung treats the trajectory as a shift from one to the other, it appears that the older locution persisted outside of biology, as we will see.

As Ernst-Wolfgang Böckenförde argued long ago, the state was one exemplification of the Kantian conception of the “organic being” (organisches Wesen) in which the parts and the whole were co-determining cause and effect. Although Kant himself treated the state somewhat casually among his examples, Fichte and others would take it up more rigorously. Hegel emphasized further the organismal attribute of development (mentioned by Kant, too), arguing that the state was an Idea that was developing through its history toward perfection, and that as the state became more perfect (which entailed its parts becoming more differentiated), its citizens would enjoy greater freedom—through the state. This German organismal concept of the state contrasted with older notions of the state as a necessary (if evil) consequence of human sociality, and also with the state as an extension of the monarch (“the king’s body,” “the imperial body”). It also differed from the state concept developed in the French Revolution, in which the “body” of the state was organized from below and gained legitimacy through the aggregated will of the people.⁶

In the German rendition most fully developed by the 1840s, the state was an “ethical organism,” not a biological one. It differed from a biological organism in being the product of

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the conscious action of free individuals, but it still shared the teleology of Kant’s part-whole causal relations. Thus in 1839 Friedrich Schmitthenner, professor of history and state-theory at the University of Giessen, argued that the state, properly understood, was a threefold unit that addressed the person’s physical well-being, his need for freedom and justice, and his intellectual growth. According to Schmitthenner, “each of these three systems mediates between the other two and is at the same time determined by them, so that one cannot exist without the other.” They are, as he put it, “coagents” of each other in the production of the perfect state.\footnote{Friedrich Schmitthenner, \textit{Zwölf Bücher vom Staat, oder systematische Encyklopädie de Staatswissenschaften.} Vol 1: \textit{Grundlinien der Geschichte der Staatswissenschaften, der Ethnolojie, des Naturrechtes und der Nationalökonomie}, 2\textsuperscript{nd} edition (Giessen: Georg Friedrich Heyer, 1839), 5-6.} By the same token, because humans require other humans to satisfy their existential needs, they need the state to coordinate the satisfying of those needs, so that their modes of satisfaction do not conflict with one another. The state was thus an organism in the sense of a whole whose parts or organs were coordinated by an internal will (versus a mechanism, organized by an external will or a disorganized aggregation). Schmitthenner argued that humans required the state in order to realize their potential for freedom, physical well-being, and cultivation of the mind. Explicitly claiming to follow Aristotle but implicitly echoing Hegel, he wrote, “In the state the human first becomes truly himself.”\footnote{Schmitthenner, p. 14. For more on this attitude, see Leonard Krieger, \textit{The German Idea of Freedom: History of a Political Tradition} (Chicago, University of Chicago Press, 1972 [originally 1957]); and Dohrn-Van Rossum and Böckenförde, “Organ,” (ref. 6). On ethical}
Among nineteenth-century theorists of the state, such idealist state-as-organism concepts were most often used to defend a range of positions around a constitutional monarchy, for if the state were an organism, the reasoning went, the monarch was but an organ, just as the administration was another organ. Both served (with a greater or lesser degree of authority) the will of the people. The argument, then, was over how these organs were to be coordinated, what functions they were to have, and which would override which. In the Frankfurt Assembly of 1848–49, in which delegates from a number of German states met to propose a constitution for a newly united Germany, variations of this organicist concept of the state were prominent.9

Yet even as politicians and state reformers argued over how their organismal state would best work, physiologists, botanists, and zoologists were rethinking the nature of their own objects of study. Kant’s definition of the organism as an entity in which the parts and whole were mutually causal was often adhered to at a philosophical level, but by the 1840s it was meeting plenty of challenges.10 In 1838 the scientifically reformist (but not yet politically active) botanist

organisms, see also F. W. Coker, Organismic Theories of the State: Nineteenth Century Interpretations of the State as Organism or as Person (New York: Columbia University, 1910).

9 Dohrn-Van Rossum and Böckenförde, “Organ” (ref. 6), 597-600; Renato Mazzolini, Politisch-biologische Analogien im Frühwerk Rudolf Virchows (Marburg: Basilisken-Presse, 1988), 83-85.

Matthias Schleiden argued that the properties of life inhered not in the plant as a whole but in its cells: “every plant developed in any higher degree is an aggregate of fully individualized, independent, separate beings, that is, the cells themselves.” These cells acted as individuals while also leading a “double life” as parts of a larger whole. 11 Here Schleiden was adding a new wrinkle to some old ideas among botanists--that plants were not single individuals but composites of individuals, and that these lower level individuals were variants on a small number of themes—the leaves, petals, and sepals, for instance, being fundamentally the same. What sort of a whole was this, then? In extending Schleiden’s ideas to animals a year later, his physiologist colleague Theodor Schwann argued that the cellular individuals "are not ranged side by side as a mere aggregate, but so operate together, in a manner unknown to us, as to produce an harmonious Whole."12 Schwann’s agenda, then, was to explore cell processes, especially the process by which development into tissues ensued and formed that harmonious whole. The cell theory of Schleiden and Schwann (along with a broader surge in microscopical research in the


12 Theodor Schwann, Microscopical Researches (ref. 11), p. 2. Later in this book (p. 188), in presenting a teleological perspective, Schwann referred to the “autocracy of the organism” as possibly superseding the agency of the individual cells, especially evident in the role of suppuration and fever in fighting off foreign or diseased matter.
1830s) lent greater autonomy to the cellular level and redirected scientists’ attention to the actions of the parts.

The rapidly increasing attention to marine invertebrates in the late 1830s and 1840s challenged another assumed attribute of the organic whole: its closed nature. Among the many animals being investigated by zoologists newly disposed to study non-economically valuable marine organisms, quite a few turned out to comprise smaller repeating yet varying parts. By analogy with plants, some lower marine invertebrates could be described not as whole individuals but as colonies of individuals (or “states,” as they sometimes were referred to in German). The justification for not thinking of them as single organic individuals was intensified by closer study of their life-cycles, which revealed a striking autonomy in some of their parts during certain stages, as well as dramatic changes in form across those different stages, associated with different modes of reproduction. In 1842, the Danish biologist Johannes Japetus Steenstrup pulled together research on a number of different such organisms, and called the overall phenomenon “alternation of generations.” Although his version of it was widely disputed, it spurred research on the life cycles of a wide variety of marine creatures and lent weight to the idea that these beings were not single, closed organisms but compounds, multiples, communities—or “states.”

The question of whether the scientist should think of the object before him as an “individual” organism or a “state” or colony was no mere matter of semantics. What made an organism an organism, and not a mere mechanism, for many thinkers in the nineteenth century,

was the mutual causation of the parts and the whole. What coordinated this causation? For more conservative thinkers, it was God. For more radical thinkers, it had to be something physico-chemical. Many scientists thought there must be a special structuring force peculiar to life, a *Bildungstrieb*, that accounted for this coordination. Whether this force was material or immaterial was a significant topic of debate throughout the first half of the nineteenth century. Arguing over this topic was part of what life scientists in this period did as life scientists.¹⁴

What difference did this biological work make to political reformers? And what difference did the political options make to biologists? By the 1840s these two areas of thought and their associated discourses were rather distinct from one another. Students of the life sciences did not regularly refer directly to political writings, nor did the political historians and *Staatswissenschaftler* who wrote about the state-organism refer explicitly to biologists. Nor did they need to. Each group could draw on its own, well-developed body of literature and ways of talking about organismality, and given that the organism of the *Staatswissenschaftler* did not pretend to be a biological organism, and the state of the biologists was not a political one, the partial analogies were communicatively sufficient. If we are to move beyond the observation that both analogical directions were alive at the same time, and to dig beneath the *Zeitgeist* to articulate any specific historical interaction, we must look to Carl Vogt, for he was a key link in bringing these two discourses into direct contact with one another. In doing so, he challenged both.

¹⁴ Lenoir, *Strategy of Life* (ref. 10).
Carl Vogt embodied in a unique way the complex relations between science and politics of his time. These were freighted with metaphysics. Controversies over materialism—the idea that physical substances sufficed to account for the activities of living things, making a soul unnecessary—never lay far below the surface of the biological sciences. Materialists generally aligned with an anti-Christian stance, and often connected in turn to the view that, if there is no afterlife, our obligation is to improve the physical lives of people now, in this lifetime. Among materialists, this was often coupled with a broader anti-authoritarian stance, providing multiple reasons for political activism from the left. The “radical materialist” Vogt epitomized a nexus of radical politics, anti-clericalism, and materialist science that frightened some and energized others.

Born in 1817 into a family of radicals in Giessen, he grew up an atmosphere that combined leftist political activism and an interest in science. His politically left-wing father was a professor of medicine at the University of Giessen until 1835, when, under pressure from the repressive duchy of Hesse, he moved to the university in Bern, Switzerland. His home there would become a well-known haven for political refugees, including Carl himself in 1849.

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16 Biographical information is derived from the sources in ref. 3.
Vogt studied medicine at Giessen, but had to flee in the spring of 1835 because of his student political activities. He finished his medical studies in Bern in 1839 under the physiologist and microscopist Gabriel Valentin. From 1839 to 1844 he served as an assistant to the charismatic Louis Agassiz, then professor at the lycée in Neuchâtel. During this period Vogt established his scientific reputation by conducting his own scientific studies on a broad range of anatomical and physiological topics. He also published his first work for a popular audience, an account of mountains and glaciers that included lively stories from his research expeditions with Agassiz.\(^{17}\)

In 1845, having split with the conservative Agassiz, he spent a year in Paris, where he lived by his pen and continued to pursue his scientific research, while hobnobbing with members of Paris’s scientific élite and mingling with other émigré radicals.\(^{18}\) In this stimulating (if divided) company, he produced a two-volume textbook of geology and paleontology that solidified his reputation as a professional geologist, and also published the first two parts of his popular yet authoritative *Physiological Letters for the Educated of All Levels*, which—despite its open materialism---accrued complimentary reviews in periodicals as disparate as the general-literature review *Leipziger Repertorium der Deutschen und Ausländischen Literatur* and the *Archiv für Anatomie, Physiologie und wissenschaftliche Medizin*, Germany’s leading physiology

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journal. Sojourns in coastal Normandy and Provence led to a longer stay in Nice in 1846 to conduct research on marine organisms.

In December 1846, at the instigation of his former teacher Justus Liebig, Vogt was called to a newly founded chair of zoology at the University of Giessen. Vogt’s politics had already aroused skepticism among conservative members of the faculty, and the publication early in the summer of 1847 of the third and final part of his Physiological Letters, which contained his explicit discussions of sex and the physical nature of mind, could only have dismayed them, for it showed him to be not only a wholehearted materialist, but a proselytizing one.


21 According to Vogt’s autobiography, Liebig had had to threaten to leave in order to induce the conservative cultural minister Linde to hire him; Linde purportedly told Liebig he did not know what he was doing in returning this “devil’s spawn” to Giessen. Vogt, Aus meinem Leben, p. 46. For an account based on the documentary record, see Eva-Marie Felschow, et al., “La vie de Carl Vogt” (ref. 20).

22 Karl Vogt, Physiologische Briefe (ref. 19), on sex: 281-2; on materialism and the soul, 457-58.
Giessen’s now notorious materialist and revolutionary settled ever-so-briefly into teaching through the early winter of 1847–8. Then in February 1848, prompted by events in Paris, Vogt became actively involved in the opposition movement in Hessen, as an open member of the “Democratic Union” and commandant of the city “people’s brigade.” He soon gained a seat in the National Assembly in Frankfurt, convened to establish a united Germany and establish its constitutional principles. There Vogt aligned himself with a left-wing faction—not the most radical one, to be sure, but radical enough, advocating universal suffrage and the separation of church and state. When the Assembly was dissolved in May 1849, he was among those to suggest a continuation, known as the “rump parliament,” in Stuttgart. Attended by only a tenth of the National Assembly delegates when it opened in June—among whom Vogt was one of the formal leaders—it was soon attacked by troops of the King of Württemberg, and Vogt fled again, taking a roundabout route to his parents in Switzerland. By that time, the University of Giessen had fired him.

Over the next few years Vogt would again live as a freelance writer, once more paying long visits to the Mediterranean and finding some refuge in his scientific research, but also mixing it with political writing. In 1850 he earned some money by translating the popular English work *Vestiges of the Natural History of Creation* into German, approving of its populist science and potential to support materialism, while disagreeing with its evolutionism. In 1852, he was offered the professorship of geology at the academy in Geneva. He would work there for the rest of his life, helping to transform it into a university in 1873 and serving as its first rector in 1874-5. During these years and many others, even while continuing to publish important

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works in science, he served as a representative to Geneva’s main political body, the Grand Council, and represented Geneva as a Conseiller d’Etat in the Federal Republic of Switzerland.\textsuperscript{24}

As this overview of Vogt’s life suggests, politics and the natural sciences were integral to his entire adult life—a rare combination matched in his time perhaps only by the biography of his younger contemporary Rudolf Virchow.\textsuperscript{25} This combination put him in a unique position to address organism-state analogies in both directions, something he did most fully between 1848 and 1852, especially in his writings on siphonophores.

[FIRST LEVEL HEADING] VOGT ON SIPHONOPHORES: POLITICS AND BIOLOGY

The organism-as-state first raised its metaphorical head in Vogt’s popular work *Ocean and Mediterranean* (1848). This book drew from his seaside sojourns between 1845 and 1847 in St. Malo on the Norman coast of France and in various villages on the Mediterranean, interspersing vivid descriptions of the local scenery with anecdotes about colorful local characters, political commentary, scientific gossip, and extensive descriptions of his investigations on marine organisms. Prominent among the latter were his examinations of invertebrates from the taxonomic group called siphonophores, fragile and beautiful forms with

\footnote{24} Françoise Dubosson, “Carl Vogt, politician genevois: un parcours ignore,” 31-45, especially p. 31, and Marco Marcacci, “L’Université de Genève descend-elle de Carl Vogt?” 93-109, both in Pont et al, *Carl Vogt* (ref. 3). See also the very useful chronology in ibid., 315-316.

\footnote{25} For a close assessment of how Virchow negotiated the combination of these two spheres, and how that negotiation changed over time, see Constantin Goschler, *Rudolf Virchow* (ref.15).
numerous very distinctive parts—swimming-bells, tentacles, siphons, and little nubs attached to a common stem.  

Vogt observed that some of these parts looked like other creatures that lived autonomously and were identified as different species; moreover, they retained their vitality when separated from the whole. This observation along with comparison of several different kinds of these creatures led Vogt to suggest that it was “simpler” to view the different parts as individuals in a colony than as organs or parts of a single individual. The classificatory consequences were significant. The siphonophores had been classed with other jellyfishes in the class “Medusae.” But this kind of medusa was composite, whereas another kind of medusa was newly discovered to be just a developmental stage of an organism with different features. The two were not “the same” at all. Vogt was inclined to think that the entire class of medusae would have to be dissolved. The organism-as-state thus did important work for Vogt, and had real consequences for his biology.

By contrast, he disapproved of the state-as-organism analogy, at least as used by German nationalist politicians. He said as much on the floor of the National Assembly, in February 1849, in the debate over a proposed franchise law that weighted votes according to income—a proposition that Vogt, as a staunch one man-one vote democrat, fiercely opposed. Drawing explicitly on his authority as an expert (“als Sachverständiger”) on organisms, he argued that the

26 One possible reason for the great extent of the descriptions is that the book was not illustrated, probably to save costs. This contrasts with the many illustrations in his later Zoologische Briefe (Frankfurt am Main: Literarische Anstalt, 1851) and Bilder aus dem Thierleben (Frankfurt am Main: Literarische Anstalt, 1852).

27 Carl Vogt, Ocean und Mittelmeer (ref.18), 304-323.
statesmen who endlessly spoke of the “state-organism” had in mind only “an organism with head, chest, belly, arms and legs,” and were ignorant of other forms of organization that served life just as well. Moreover, he continued, they ignored the “deep gulf” between animal and human societies. Among humans,

social community [Zusammenleben] and its regulation are the highest goal and the highest development of the human— and therefore of the state-organism; whereas in the animal world the social individual that lives in a society of necessity always stands lower than the individual that lives independently. Gentlemen! But in the animal world, too, the worst social forms are those in which privileged classes of individuals exist, just as in the human world. To create such is truly the goal of this election law.28

Vogt developed this argument at much greater length in his Investigations into Animal States (1851), originally published serially in 1850 in the short-lived left-wing periodical Deutsche Monatsschrift für Politik, Wissenschaft, Kunst, und Leben. Although its title suggests a work of natural history (and indeed, remarkably, it seems to have been treated as such by most previous commentators29), this work is actually three essays of biting political allegory, on bees,


locusts, and siphonophores. Consistent with his focus on the siphonophore as a collection of animals that merely appeared to be an organism, here he sidestepped both the state-as-organism and the organism-as-state analogy to draw comparisons between animal groups and human political states, to throw into satirical relief the broader habit of looking to nature for models of the ideal state.

Reflecting the philosophically materialist, anti-idealist position for which he was already well-known, he argued in the book’s introduction that the principal task of the animal state was to supply the basic material wants of the individuals in it—especially food. “The professors,” he said, tended forget that social stability depended on satisfying these basic needs—something he said that animal states already “knew.” He argued that no matter what form the animal state took—whether “absolute or constitutional monarchy, republic with or without caste differences, democratic or aristocratic socialism”—these different state forms were all solutions to the problem of satisfying material need. But as his book would show, each solution had its limits—especially on personal freedom. In this respect, he elaborated on a point he had made in the Frankfurt Assembly, with regard to degrees of perfection.

There are animal states of varied levels of perfection--the lower they stand, the more they suppress the individual and recast its rights into duties toward the whole . . . through the curtailment and abasement of the individual. . . . The individual becomes the more perfect, the more it emancipates itself from the state. . . . Every living atom thirsts for

\[\textit{Jahrhundert}, \text{vol. 1: Der Materialismus-Streit}, \text{ed. Kurt Bayertz, Myriam Gerhard and Walter Jaeschke} \text{ (Hamburg: Felix Meiner Verlag, 2007), 223-59, esp. 233, n. 15.}\]

\[\textsuperscript{30} \text{Carl Vogt, } \textit{Untersuchungen über Thierstaaten}, \text{ (Frankfurt: Literarische Anstalt, 1851), 13-14.}\]
anarchy, strives toward freedom.... The progress of mankind for the better lies only in anarchy, and the goal of our striving can only be anarchy.\textsuperscript{31}

Here Vogt was both making a political statement and playing with a common topic of discussion among both biologists: how to judge degrees of perfection in organisms. “Complexity” was usually the answer. Vogt personally knew the Parisian comparative anatomist Henri Milne-Edwards, and would have known that the latter sought increasing perfection in the degree of division of labor and functional integration to be found in an organism’s tissues and organs. Compound organisms like salps were typically considered “lower” invertebrates because their parts were not highly differentiated and they had no brain to provide a centralized directing mechanism; siphonophores displayed a more differentiated division of labor, but still lacked morphological integration. Vertebrates had a highly differentiated set of tissues and organs that were complexly integrated into a whole. By the 1840s the justification of vertebrates as “higher” organisms was regularly couched in these terms (which were themselves drawn originally from Adam Smith’s idea that the division of labor was fundamental to increases in productivity and wealth).\textsuperscript{32} What lent Vogt’s argument here its jarring humor was his upending of the usual hierarchy of perfection by seeing “differentiation and integration” not as the creation of a higher, more integrated whole but as a loss of freedom for the parts. This might be fine if one is talking about cells, organ systems, and physiological functions in “lower” organisms, but not if one is talking about humans and personal freedom.

Vogt wrote the essay on siphonophores in Nice, where his political allegory could draw on the rich realm of the Mediterranean. He derived much satirical fodder from the ocean’s

\textsuperscript{31} Vogt, \textit{Untersuchungen über Thierstaaten} (ref. 30), 28-30.

\textsuperscript{32} See Nyhart and Lidgard, “Individuals” (ref. 13); Camille Limoges, "Milne-Edwards," (ref. 1).
inhabitants, even before arriving at the siphonophores. Consider his discussion of the salp—
another compound marine invertebrate that received much attention in this period, from the
taxonomic class of the tunicates. He compared this form to “the true type of Louis Blanc’s
fraternal worker’s association, founded on equality and brotherhood without freedom. . . .
Indissolubly chained to one another, equal in size and shape, the individuals of these chains have
only so much free will as is necessary never to exercise it,” just as certain politicians had
suggested it possible to give German workers a vote so restricted that they could never use it
(180).

The siphonophores appeared at first glance to be the closest to an ideal state—their parts
were so autonomous that they could still live independently if the colony was shaken apart, and
they might be imagined to have come together “voluntarily” to form this whole. As Vogt put it,
the parts are only “tacked onto the idea of the whole, but not subordinated to it, so that each
organ, if not quite completely free and independent, nevertheless lives and acts as an isolated
individual.” Yet the siphonophores still did not achieve his ideal of “culture-anarchy” for, as he
acknowledged (in a typical moment of self-directed irony), they displayed no culture and
therefore no anarchy, either—indeed, it would appear that, once united, they were “forced” into
remaining parts of the larger whole (184).

Vogt was particularly interested in the siphonophore sub-group Physophora, commonly
called Blasenträger (balloon-carriers) for the air-bladder the organism uses to regulate its depth
in the water. Vogt had fun riffing on the idea that “a Nothing can play the most important role in
an organism,” and seeking the most appropriate functional analogy for a “constitutional air-
bubble.” He decided that the air bladder was best likened to “the state treasury, with its wealth
made out of debts, which with its positive emptiness supports the entire body of the state, and the
circulation of which feeds it internally” (191).

Over the next fifty-plus pages, Vogt worked his way through the entire anatomy of the siphonophore, drawing analogies and disanalogies with different aspects of human society and government, and finding occasion to skewer political figures through their resemblance to various polyp-parts. But the air-bladder remained the central feature, and he returned to it at the end. While acknowledging that he had been unable to observe the actual development of the siphonophore-state, he suggested that the air-bladder was primary to all else, the first part to be constructed. It was also the last part left intact when the organism died. The parts fell off one by one, until in the end, "there is nothing but the drawn-together stem with the air bladder. . . . Thus has the empty state treasury, which had marked the beginning of the whole organization, become in the same way its end-point."33 Driving home at once both his view of the corrupt nature of state-making and his commitment to materialism, he finished the work by carrying the air-bladder metaphor two steps further. It is the debts of the empty treasury that outlast the siphonophore-state—and these debts are also its immortal soul, which survives "when the body of the state-organism has sunk into dust and slime. Can one offer any better comfort to the owners of government bonds, than that nature has already discovered the eternity of state debts?" (248).

Clearly, this essay was not intended as science, but as political commentary. It is nevertheless worth noting that Vogt could have treated the siphonophore as a single individual and satirized the state-as-organism that way, or could have chosen a different sort of organism for his most integrated model, but he did not. Whether treating the beehive, the locust colony, or

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33 The German suggests a tiny pun on arguments about teleological causation.
the siphonophore, he always presented the “animal state” as a collection of individuals—a coordinated social, political, and economic system, but not a single organism. The autonomy and rights of the individual within the state were his biggest political concerns, and they would not have been served by treating them as mere organs, or parts, of a single individual.

In 1853, Vogt finally drew together all the research he had conducted since 1846–47 on the siphonophores of the Mediterranean into a large scholarly monograph. Since his early investigations, the balance between politics and science in his own life had shifted from science to politics and now back toward science again. Now he was once more employed in an academic position, this time in the more politically compatible surroundings of Geneva. Coming out of his scholarly isolation in Nice, where he had hung out with fishermen and political friends, he discovered that many other biologists were working on siphonophores and their close relatives as well—his monograph cites a score of authors on the genus *Velella* alone. The taxonomic reclassification of the medusae that he had suggested in 1848 had in fact been pursued by others (who did not wholly agree with one another). These included the young T. H. Huxley, who had become intrigued with these groups on the voyage of *H. M. S. Rattlesnake* in 1846–50 and had begun publishing on them in 1849; and, perhaps irritatively closer to home, Rudolf Leuckart, Vogt’s successor in the professorship of zoology at Giessen.34

Leuckart had blown onto the academic scene in 1847 and rapidly made a name for himself. In 1851 he published a pamphlet that ambitiously sought to resolve the convoluted connections between the alternation of generations, polymorphism in compound organisms, and

34 Leuckart was a former student of the conservative Göttingen physiologist Rudolf Wagner, which must have helped his candidacy in Vogt’s wake. Wagner would attack Vogt in print for his materialism, starting in 1851.
the problem of organic individuality, using the division of labor as a key fulcrum. Here he unequivocally favored viewing siphonophores and similar lower organisms as composites or “states” of multiple individuals performing different functions for the colony, rather than as simple individuals with organs. Indeed, in perhaps the only explicitly political comment in Leuckart’s entire scientific corpus, he wrote, “As in a communist state there are here no poor next to the rich, no hungry next to the sated – but also no lazy next to the industrious. Each contributes its own to the sustenance and health of the whole, each according to its powers.” 35

One might have expected Vogt to have praised this seemingly radical analogy, but instead, in his 1853 monograph he expressed some impatience with the whole discussion over what constituted a “real” individual. Writing on the hydrozoan Velella (then grouped with the siphonophores), he stated that while it was important to recognize a Velella specimen as a colony of individuals, “I don’t attach much importance to the discussion that could be raised on this subject. . . . Observations on other species of siphonophores show that it is almost impossible in such curious colonies to place a limit between the signification of the words ‘individual’ and ‘organ.’” 36

One might note that Vogt had become more circumspect in his criticisms, at least of scientists, though specialist readers of the monograph would have known perfectly well that he was criticizing Leuckart here. More significantly, this statement suggests that Vogt’s attitude


toward the organism-as-state was at best lukewarm, if not as cold as his attitude toward the state-as-organism. How do we reconcile this attitude with his exuberantly metaphorical language in *Animal States*? How does his pragmatic stance toward organs versus individuals square with his flamboyant political writing?

I would suggest that the two are actually of a piece. Both reflect a well-developed consciousness of the constructed nature of the language humans use to describe nature and society, and an associated inclination not invest too much in such language. His sensibility seems to be that one cannot build too much science upon metaphorical language, as appealing as it is rhetorically.

This pragmatic, even belittling stance about words, I suggest, reflects deeper philosophical commitments. Our knowledge of these marine creatures, Vogt had written in *Ocean and Mediterranean*, is extremely limited. We extrapolate from what we know, as best we can, via analogy—conscious of the limits of our knowledge and knowing it is only provisional. Our terms will have to change as our knowledge changes. While still striving to find general laws, Vogt adopted a stance of epistemological modesty that was characteristic of many life scientists of his generation. In Vogt, this provisional stance was aligned with his materialism. Both were ways of undercutting overly “philosophical” ambitions and claims for science, especially associated with idealistic stances (including explicitly religious ones, but not limited to them).

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37 Vogt, *Ocean und Mittelmeer* (ref. 18), 323.

Indeed, by 1859, Vogt recognized that materialism itself could be handled too “philosophically,” as everyone declared their first principles and stuck fast to them. A leading player in the “materialism debate” of the early 1850s, he now declared himself tired not only of the wheelbarrowfuls of writings that it had engendered but also of the dogmatic tone it had taken on. Dogma on both sides was what he opposed, he now said, for dogma was the enemy of freedom. Where, then, lay truth? Truth lay in scientific investigation, which produced facts.39

But Vogt was not exactly retreating quietly into fact-collecting. Facts could provide the sort of bludgeon against his enemies that satire had previously offered. Theologians and jurists—the perpetuators of old dogmas—were “completely unable to grasp and value the worth of a naked fact.” At the end of his 1859 reflections, Vogt argued for a “break with scholasticism” in the schools, and for putting education “on the foundation of the material facts.”40 Thus we have a direct linkage of science, facts, materialism, and freedom, on the one hand, contrasted to the authority of theology and the law, dogmatism, denial of the facts in favor of previous (idealist) belief, and repression, on the other. Science would speak truth to power, and to do so, its language would have to be the language of facts. Interpretations would come and go, and one must not invest too much in interpretive language, lest it become dogma. As we will see, this stance puts Vogt with other “realists” of the 1850s—political ones, as well as scientific ones.

39 Vogt, *Altes und Neues aus Thier- und Menschenleben*, 2 vols. (Frankfurt/M: Literarische Anstalt, 1859), xv-xvi. Note that this stance did not preclude Vogt from holding fast to his most notorious analogy, that thoughts stand in the same relation to the brain “as the bile to the liver or urine to the kidneys.” But this, he claimed, was an induction from the evidence! See his *Physiologische Briefe* (ref. 19), 206.

[FIRST LEVEL HEADING] STATES, ORGANISMS, AND SCIENTIFIC POLITICS IN THE 1850S

Carl Vogt was perhaps the only German zoologist in the late 1840s and early 1850s in a position to bring the discourses of natural history and politics actively and authoritatively together. Uniting biology and politics in his own biography, he sought to create a mode of being, and of writing, in which the distinction between scientist and political activist diminished to nothing. His seaside investigations with his radical friends, his interpolation of political commentary into his descriptions of those investigations, his relative neglect of writing for specialists in favor of presenting the results of his research in a form accessible to a broad audience (who would become better citizens by their simultaneous political and natural-historical education)—all these show him seeking a style of being wholly committed to science and to politics, at once. However, he did not use his dual authority to reinforce the circulation of analogies between states and organisms but rather to disrupt it. What happened to those analogies, then, in the 1850s?

In the life sciences, Vogt’s biological politics served in certain cases as a positive model. Most directly, his emphasis on the autonomy of the parts relative to the whole, expressed in both the Frankfurt Assembly and in *Investigations into Animal States*, would be taken up in the 1850s by the liberal pathological anatomist Rudolf Virchow. Too young to have been eligible for the Frankfurt National Assembly, and too sober of temperament to aspire to Vogt’s satirical style, in 1855 and again in 1859 Virchow earnestly proposed to represent the body as a “cell state”—a state made up of cells that acted as republican, equal citizens. This position would shape his
development of the new discipline of cellular pathology (though it is noteworthy that he did not view the political state in the same way).  

In the zoological community, the organism-as-state analogy persisted, where it remained just one expression of the broad problematic surrounding biological parts, wholes, and individuality. Explicit discussions of organic individuality reached a peak in the early 1850s, continuing into the 1860s and beyond. Most famously, Ernst Haeckel incorporated earlier models of the organism-as-state into a much broader hierarchy of individuality in which lower levels aggregated to form higher levels. In the 1870s he modified his version of Virchow’s cell state into a more monarchical view of organismal structure and rule, but he retained the term “cell state” in his many textbooks and popular publications throughout his lifetime.

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41 Rudolf Virchow, “Cellular-Pathologie,” in Archiv für pathologische Anatomie und Physiologie und für klinische Medizin, 8 (1855): 3-39; Virchow, “Atoms and Individuals,” (1859), tr. Leland Rather; see the discussion of these and other aspects of Virchow’s cell state metaphor in Goschler, Rudolf Virchow (ref. 15), 279-283; Mazzolini, Politisch-biologische Analogien (ref. 28); Eva Johach, Krebszelle und Zellenstaat: Zur medizinischen und politischen Metaphorik in Rudolf Virchows Zellularchologie (Freiburg/Berlin/Vienna: Rombach, 2008).

42 Rudolf Leuckart, a deeply interested party, highlighted such discussions in his reviews of the literature on the lower organisms between 1854 (covering 1848–53) and 1879, which appeared about every other year in the Archiv für Naturgeschichte, Part 2.

43 Robert J. Richards, The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought (Chicago: University of Chicago Press, 2008) discusses his debts to Virchow (esp. 46-7); Schleiden and Johannes Müller were other plausible influences on his hierarchical thinking: Richards, esp. 128-135. Ernst Haeckel, Generelle Morphologie der
Haeckel nevertheless shared Vogt’s view about “organs” and “individuals” (along with his aim to reach a broad public): as he wrote, “the two concepts of the individual and the organ are in nature not nearly so distinct” as one might think. They were relative concepts, dependent on the scientist’s questions and mode of analysis. And indeed, within the broader ongoing discussion of organic individuality and part-whole relations, the organism-as-state analogy seems not to have hardened into a dominant concept. Biologists had other intellectual fish to fry. As the problem of individuality ramified into many different problems concerning generation, parasitism, symbiosis, the nature of species, and functional part-whole relations within individual organisms, explicit analogizing of the organism to the state seems to have been chosen only relatively rarely to do the work scientists sought to do.

What about the state-as-organism analogy, and the work done on the political side? Here Vogt’s anti-idealist stance was more in tune with other political theorists and activists. Indeed, here he may have led them or spoken for them, in the broad move in the 1850s toward what was known as “Realismus” -- realism, in the meaning of the time that meant one focused on the real


44 Haeckel, Generelle Morphologie (ref. 42), 250-51. See Nyhart, Biology Takes Form (ref.38), pp. 135-136. On Vogt as a model more broadly for Haeckel, see Nick Hopwood, Haeckel’s Embryos (ref. 3), 45, 50, 57.

45 This claim is based on a wide but impressionistic reading of the literature of the 1850s and requires further investigation, which would come through more systematic searching the literature in the various problem areas associated with individuality for discussions of states.
world rather than the ideal one. Politics and history, the natural sciences, and languages (versus philosophy and theology)—these were called the “Realwissenschaften,” understood to be the sciences that dealt with the real world and helped to run it. Just as physiology, interpreted as a “Realwissenschaft,” would deal with the actualities of the real, physical world, rather than seeking laws in the ideal one, so too, according to reformers, would history and politics—drawing on the “realistic” natural sciences as their models.46

Many liberal German political scientists and historians continued to use the organism as a model for the state in the 1850s47—only now, in contrast to the 1830s and 40s, they emphasized the “real”—that is, non-ideal—nature of this organism. Consider the liberal political theorist August von Rochau, who invented the term Realpolitik in 1853. Rochau is famous for asserting the existence of an ultimate “law of power” over the life of the state, a “realistic” perspective in more than one sense. Less often attended to is that he opened his treatise by calling the state “the political organism of human society,” an organism that followed natural laws like all other organisms. Here we might see recourse to the older Kantian concept of organism as a formal part-whole causal circle rather than a specifically biological organism, especially in the locution “organism of,” but Rochau’s stance was a little different. Drawing on recent work by August Comte, he elaborated on the characteristics of this organism in the distinctly physicalist, natural-scientific terms of the laws of force, as applied to physiology. The state-organism was characterized by the “interaction of various forces,” and the study of these forces in forming the state was the proper foundation for understanding it. Indeed, Rochau framed an entire physiology

46 On this point, see Christian Jansen, ““Revolution”” (ref. 29).
of active and passive forces of the state from these principles. Further, in suitably scientistic
tones, he argued that the question should not be, Is this a good or the best constitution? but
rather, what is the constitution that “allows all the social forces to be expressed to their full
extent through the state”? It was the job of the government to tinker with these real forces to
achieve an appropriate balance. As he worked through seeking that balance, Rochau extended his
metaphor to encompass the political organism’s organs, its life activities, the problem of forces
that are not incorporated into the body of the state, and so on.48

In this way, Rochau (among others) revived the analogy between organism and state, but
on something more akin to the materialist basis pushed by Vogt. And here, biology—and more
broadly, the natural world and its sciences—did indeed provide a source of legitimation for
politics, especially liberal politics. If Vogt thus helped prepare the way for his fellow liberals and

48 Ludwig August von Rochau, Grundsätze der Realpolitik, angewendet auf die staatlichen
Zustände Deutschlands, edited by Hans-Ulrich Wehler (Frankfurt/M: Ullstein, 1972; Part 1
originally published in 1853), esp. 25-37. Although often associated in America with late Cold
War politics, Realpolitik had an important earlier history internationally: John Bew, Realpolitik:
A History (Oxford: Oxford University Press, 2016). On Rochau’s debt to August Comte’s
Systeme de la politique positive (1851), see: Natascha Doll, Recht, Politik und 'Realpolitik' bei
August Ludwig von Rochau (1810–1873): Ein wissenschaftsgeschichtlicher Beitrag zum
Verhältnis von Politik und Recht im 19. Jahrhundert (Frankfurt am Main: Vittorio Klostermann,
2005); and Christian Jansen, Einheit, Macht, und Freiheit: Die Paulskirchenlinke und die
deutsche Politik in der nachrevolutionären Epoche 1849–1867 (Düsseldorf: Droste Verlag,
2000), 260-265, esp. p. 260;.
radicals to move toward a more positivist, “realist” view of the state, he failed to head off analogizing the state to the organism.49

[FIRST LEVEL HEADING] CONCLUSION

Both the state-as-organism and the organism-as-state analogies were too useful to be tossed aside in the 1850s. Two final points remain to be made about the nature of that utility. First, the fates of the two analogies were asymmetrical. The organism-as-state analogy was especially useful in thinking about certain major questions concerning organismal part-whole relations—about the autonomy of parts in colonial invertebrates and of cells in metazoans, and about the locus of “governance” in the animal body.50 But scientists rarely alluded explicitly to

49 Jansen, “‘Revolution,’” (ref. 29) argues for a “paradigm shift” toward Realpolitik among left-wing political activists who remained in Germany in the 1850s, including Rochau. He argues that Vogt’s materialism was coupled with an émigré political stance that remained more sharply oppositional than the Realpolitiker who stayed behind in Germany, and cautions against lumping natural-scientific “realism” together with Realpolitik (p. 253). Nevertheless, even though Vogt himself would not be characterized as a Realpolitiker, the thrust of Jansen’s argument is that the Realpolitiker did indeed base their new politics at least in part on a “realist” model of nature, of the kind supported by Vogt. My argument about the state-as-organism here thus offers further support for this aspect of Jansen’s argument (though he does not discuss Rochau’s use of the analogy).

50 Reynolds, “Haeckel and the Cell State” (ref.43) and sources cited therein; for similar issues in Britain, see James Elwick, Styles of Reasoning in the British Life Sciences: Shared Assumptions, 1820–1858 (London: Pickering and Chatto, 2007).
political writings, and scientists do not appear to have drawn on particular state-theories to justify their positions. The state-as-organism analogy, by contrast, explicitly structured discourse about the state, whether in its old idealist form or its new “realist” guise. (The key difference between the latter two forms, with respect to legitimation, is that the older one drew on the authority of philosophy, whereas the newer leaned on the authority of natural science.)

An obvious reason for this asymmetry in the two analogies lies in the authority of nature as an ultimate recourse. Nature continued to provide legitimacy for politics, but the opposite direction spelled illegitimacy for science: if politics too obviously shaped the scientist’s views on nature, then he was no longer doing science. This is a complex topic, with many more ramifications than can be pursued here. But in Germany in the 1850s, holding politics at arm’s length became the price the scientist had to pay to do science. This was true in a pragmatic sense: many academics, including Vogt, lost their jobs for their revolutionary activities, and others barely kept theirs: the activist Rudolf Virchow, after severe restrictions had been put on him to retain his position in Berlin, was expected not to undertake political activities as part of his appointment by the University of Würzburg in 1849, and only returned to the political realm later on in his career.

But the need for separation was not only pragmatic; it also spoke to the need of scientists to secure their legitimacy as truth tellers. Value-neutrality was most clearly articulated as a virtue

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51 On the widespread and novel “paradigm-shift” to natural-scientific vocabulary by Staatswissenschaftler in the 1850s, see Jansen, “Revolution” (ref. 29) esp. 234, 237.

52 Goschler, *Virchow* (ref.15), esp. pp. 81-92, 152-61, 252-3.
of science later in the nineteenth century, often bearing a retrospective hue. One might speculate that this stance, connected with seeing the scientist as standing apart from politics, began to take shape as early as the 1850s. Making a virtue out of a necessity, it coincided with both the repression of that era and the emergence of a distinctive role for the natural scientist, separate from the other Wissenschaften. While limiting the legitimacy of the scientist’s personal political activity, this stance buttressed the claims of natural science over the territory of nature. It thus both strengthened the “realistic” state-as-organism metaphor, which defended a “natural-scientific” basis for understanding the state, and gained strength from it.

Second, and finally, that same distance between science and politics also helped the two analogies stay alive. In both directions, the analogies worked as long as they were not pressed too hard. The benefit of the analogies was that they required only fairly general knowledge about what a biological “organism” or a political “state” was. That lack of specialist knowledge allowed statesmen and biologists, respectively, to think directedly but creatively about the conceptual problems they faced. When Vogt invoked his authority as an expert in the Frankfurt

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53 Robert Proctor, *Value-Free Science? Purity and Power in Modern Knowledge* (Cambridge, MA: Harvard University Press, 1991), pp. 85-98, attributes its clear articulation to Max Weber and Ferdinand Tönnies in the early twentieth century. As these names suggest, the issue of value-neutrality in science has mainly been explored with reference to the social sciences, which have always felt an immediate tension between theory and practice. See also Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007).

National Assembly to puncture the statesmen’s concept of the state-as-organism, he showed what could happen when the analogy faced too-close scrutiny. What he probably didn’t anticipate was its robust ability to reinflate once sufficient distance was re-established.

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