

Democracies, change, sustainability, and transformation: historical perspectives

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ABSTRACT

This article discusses the potential of a historical approach to sustainability transformations. Using environmental issues and governance structures as case studies, it first describes how historical “sustainability transformations” can be conceptualized. It then suggests that 19th-century constitutional reforms can be read as attempts at reaching fiscal sustainability, whereas some social reforms can be interpreted as attempts to render the capitalist economy sustainable. In conclusion, the article highlights that the primary value of historical approaches to sustainability transformations will not lie in models, but in encouraging more creative questions.

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Introduction

A historical approach to any topic involves two assumptions. First, change over time is inevitable. Second, change can only be fully explained in retrospect. The core of these assumptions is, in a sense, simple. Because humans are neither immortal nor identical, even systems of governance, economic exchange, religious worship, or cultural expression which seek to provide stability will be shaped by people whose experiences, perceptions, and preferences vary. And because the fate of any human society is determined by the myriad decisions of its members, who respond to challenge in particular ways, and acquiesce or rebel if their preferences are not acted upon, broad theories of historical development can describe likely trajectories, but cannot predict which ones will be realized and which ones will become “counterfactual history” (Evans 2014). Therefore, it is easy to come up with examples of conclusions from historical trends which seemed plausible at the time but proved to be erroneous (e. g., Kennedy 1989; Fukuyama 1992). For this reason, a historian’s perspective cannot offer a general theory of sustainability transformations in democracies, but it can provide observations on aspects of their empirical relationship, with past performance offering no immediate guide to future outcomes.

Restricting discussion to democratic systems of governance limits the period under study, and thus excludes many well-known cases in which

sustainability transformations succeeded or failed (e.g., Diamond 2011; Acemoglu and Robinson 2012). In a long-term historical perspective, democratic systems of governance have been the exception rather than the rule (Becher, Conermann, and Dohmen 2018; CRC 1167 2016). Prior to the late eighteenth century, political theory, historiography, and constitutional practice assumed that democratic rule was possible only in small entities like Greek poleis, Italian or German civic republics, the Dutch Estates General, or Swiss cantons. In retrospect, one striking feature of these democracies was their exclusion of the majority of the population (women, slaves, members of religious minorities, and individuals lacking citizenship status) from decision-making processes.

Democracies in the modern sense – societies in which the participation of a majority of the population in elections influences the exercise of political power – only emerged when increasing proportions of the population began to participate in electoral processes in large territorial states from the time of the American Revolution. When it turned out that more democratic states could be more successful than their less democratic counterparts, previously autocratic states adopted elements of democratic governance or became democracies. By the twentieth century, a symbolic commitment to democratic rule had become hegemonic. Even states that were, in fact, dictatorships (like the entire Soviet bloc)

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continued to hold elections, though with pre-determined outcomes. Although authoritarian democracy appeared to be on the retreat after the collapse of the Soviet Union, there are increasing concerns that a transition from liberal to authoritarian democracy, in which democratic rituals like elections continue to be practiced but cease to have any real meaning, may occur once again (Nolte 2012; Snyder 2018).

Taken literally, the focus on “sustainability” transformations also has chronological implications. When the word first emerged in the nineteenth century, “sustainability” referred to the validity of legal arguments and came to be used to describe environmental concerns only from the 1980s (*Oxford English Dictionary*, q.v. “sustainability”). The semantic trajectories of analogous concepts like *Nachhaltigkeit* (an eighteenth-century term used primarily in forestry that has long been translated into English as “sustainability”) were similar (e.g., Grober 2010). This semantic shift is linked to the realization that demographic growth, depletion of natural resources, pollution of the natural environment, and risks involved in the use of nuclear power presented grave threats to the future of humanity (Brüggemeier 1998).

In the 1980s, concerns over “sustainability” could coincide with doubts about whether liberal democratic systems of governance would be able to initiate the changes required to maintain environmental “sustainability,” though for contradictory reasons. One line of argument suggested that democratic governments were unlikely to be able to, say, curtail sulfur dioxide (SO₂) emissions and prevent acid rain from endangering the northern hemisphere’s forests. The reason given was that voters’ primary focus was on increasing their ability to consume goods and services, regardless of the long-term environmental consequences (Schaefer 1987). Another line of argument suggested that the immense hazards involved in the civilian use of nuclear power would transform liberal democracies into authoritarian surveillance states in the medium term (Jungk 1981).

However, this article employs a broader definition of “sustainability” to discuss cases from the nineteenth and early twentieth centuries. I understand “sustainability” as an attribute of any practices of consumption or governance that have (or are perceived to have) the potential to continue indefinitely. Put differently, it is not evident that these practices should need to change. “Sustainability transformations” are historical episodes in which a change in these practices occurs, and in which this change is brought about or justified with reference to the need to proceed from an unsustainable to a sustainable state of affairs.

I will begin by proposing a concept of “sustainability transformations” suitable for

historical analysis and this section will also explain why the search for historical examples of sustainability transformations focused on material resources is fraught with difficulty. The following two sections therefore examine sustainability transformations in the political sphere. I then discuss whether the transition from monarchical to democratic rule can itself be understood as a sustainability transformation designed to replace a vulnerable political system with a more resilient one. This narrative demonstrates that the sustainability achieved by this transition was significant in principle but led to a rapid modification of the role of democratic elements in systems of governance in practice. This treatment is followed by a discussion of the relationship between the transition to more democratic forms of governance on the one hand and attempts to maintain the sustainability of capitalist forms of economic production on the other. This example points to a similar internal dynamic as the previous illustration, but focuses more strongly on the role of perceptions in distinguishing between labor regimes considered sustainable or unsustainable. The conclusion offers suggestions on what historical case studies could contribute to contemporary debates on sustainability.

Conceptualizing “sustainability” in historical perspective

At present, “sustainability” primarily refers to levels of resource consumption which maintain access to these resources for future generations and/or do not produce potentially irreversible consequences like climate change. Thus, fishing is “sustainable” if it allows species to reproduce in sufficient numbers to permit capture to continue; burning fossil fuels may become “sustainable” if the process can be rendered “carbon neutral”; and demographic growth is “sustainable” if a Malthusian trap can be avoided. Instances of “unsustainable” resource consumption have, of course, occurred frequently over time – from the depletion of silver mines in sixteenth-century Tyrol (Bartels and Denzel 2000) to the disappearance of salmon from the Great Lakes in the nineteenth century (Tiro 2016) to concerns about the demographic and environmental effects of smog in London (Mayor of London 2002). However, concerns about the ecological sustainability of human civilization as such have been infrequent, not least because the scale of human impact on the entire planet prior to the Anthropocene was limited. Malthus’s (1798) essay on the dangers of demographic growth, for example, was concerned with the prediction and prevention of periodic

population crises in particular regions, not with the extinction of humanity.

This is not to say that such sources of unease did not exist. As E. A. Wrigley (2010) shows, the rise of the fossil-fuel economy was accompanied by a vibrant debate about what would happen once coal was no longer available, rendering the size of the population and the level of wealth obtained unsustainable. The perception that control over territories with scarce resources (coal, iron ore, precious metals, or oil) was essential for the survival of states gained prominence by the late nineteenth century because of fears of impending shortages and changing strategic preferences, which did much to shape the transition from coal to oil (Ediger and Bowlus 2019). However, while attempts to calculate “peak oil” existed until quite recently, today fears of resource depletion tend to compete against projections of when particular material resources will be replaced (before they are depleted) as a consequence of more efficient recycling or a successful search for more sustainable alternatives.

It is already all but certain that the age of coal will come to an end long before coal reserves are exhausted (Brüggemeier 2018). If a “green transformation” of the planet will indeed occur, the same may well be true of oil and natural gas. At the moment, the debate on rare earths, required in large quantities for the production, storage, and consumption of electricity, displays similar traits though concerns about access to reserves appear to be balanced by trust in the capabilities of technological progress to prevent resource scarcity (e.g., Imholte et al. 2018; Kumari et al. 2018). At the same time, awareness of the link between powerful greenhouse gases like sulfur hexafluoride and “green” electric power is only just emerging (McGrath 2019).

Until the late twentieth century, debates on issues analogous to present concerns about ecological sustainability tended to focus not on the consumption of resources, but on the medium- to long-term viability of forms of governance and of specific countries. Issues of change management concerned the sustainability of variants of monarchy or democracy in the face of economic change or social pressure, and of smaller and larger empires or states faced with larger, more efficient, or more stable competitors. In the latter context, the resources considered most important were those on which political power was based: the number of (male, young, and healthy) inhabitants, the size of (taxable) national income, and the capacity to access all things essential to sustaining a military conflict – arms, ammunition, food, transport, and precious metals.

It is worth noting that the relevance of considerations of constitutional stability or change and of

international great-power competition to the population at large varied significantly over time. The threat of war – and the possibility of avoiding or shortening it – was ever present during the early modern period and an especially prominent feature of European life between 1793 and 1815. The prospect receded between 1815 and 1914 (with substantial regional differences), only to reemerge in force during the “age of extremes” (Hobsbawm 1994). The impact of war on economic transactions, local governance, or the civilian population ranged from “absolute” or “total” war at the century’s beginning and end which had direct effects on most of Europe, to briefer periods of military conflict with limited long-term impact between these periods which could pass by entire regions within belligerent states (Hewitson 2017; Chickering and Förster 2000; Langewiesche 2019). Likewise, large-scale constitutional change or alterations of the course of frontiers could matter more or less on the ground, depending on the local impact of central governance, the degree of cultural integration to which central state governments aspired, and the amount of economic integration (for an example where the impact was less, see Merriman 2000 on the relationship between central government reforms and regional practices in early nineteenth-century France).

While debates about political sustainability were inevitably focused on states or empires as a whole, the transformation of practices linked to material resources was likely to be local or regional in scope, though the localities affected at the same time could be far apart. It is thus debatable whether they qualify as sustainability transformations that affect entire societies or even the entire globe, or whether they are more aptly described as sustainability transitions which regard only specific subsystems. One example is the sustainability crisis involving “night soil” or “poudrette.” Both terms are euphemisms for human excrement collected from urban cesspits. In eighteenth-century cities, this was a valuable commodity, as it could be dried, powdered, and sold to ex-urban farmers as fertilizer for foodstuffs consumed in cities, thus establishing an organic nitrogen cycle between urban populations and the surrounding countryside.

Given the demand for fertilizer (including horse dung), urban waste disposal could easily be organized commercially, with entrepreneurs bidding for the privilege of clearing outhouses and streets. As cities grew, this model ceased to be sustainable (Jackson 2014, 27–68): Distances between producers and potential customers of “night soil” became too great, and local supply vastly outstripped local demand. Moreover, locally produced fertilizer began

to compete against guano mined by forced labor in South America on an industrial scale and transported to farming areas at low cost by steam and rail (Melillo 2012). As a result, urban residents began to have to pay for street cleaning, which in turn contributed to making water closets linked to sewers economically viable (as well as comfortable) in spite of the vast expense involved in building a substantial sewer system. However, this solution, too, proved unsustainable. This first transpired in 1850s London. At the time, London was the largest city in Europe. It was also located on the banks of a river with strong tidal flows liable to hold sewage in place rather than drawing it out to sea. The “great stink” that emanated from the Thames, now an open sewer, in the particularly hot summer of 1858 led to the construction of new sewer systems below an artificial Thames embankment that carried waste far away from town (Ashton 2017). This innovation provided a model for dealing with the side-effects of urban sanitation and was adopted elsewhere when similar problems either became acute (as in 1880 Paris) (Barnes 2006), or when they could be anticipated.

Without doubt, the absence of sustainable waste management would have impeded, and possibly ended, urban growth; hence, tackling the problem constituted a sustainability transition. Whether this transition was democratic is more difficult to say. In the 1850s, parts of London, like the City, had a complex constitution with significant democratic elements; yet, the “Metropolis” as a whole lacked democratic governance until late in the nineteenth century (Davis 1988), thus putting Parliament (an institution with democratic and oligarchical elements, which also happened to be at the epicenter of the 1858 olfactory crisis) in the key position. The city of Paris lacked any form of democratic local government until 1977. Previously, the head of local government (*prévôt de marchands* or “provost of merchants” until 1789 and *préfet de la Seine* or “prefect of the Seine” from 1800 to 1977) was installed directly by monarchs or presidents, as were the mayors of the city’s administrative subdivisions. Elected local governments (or *communes de Paris*) existed only between 1789 and 1795, in 1848, and 1871. However, France as a whole was obviously a republican democracy by the 1880s (Marchand 1993). Richard Evans’s classic book on the 1892 Hamburg cholera epidemic argued that liberal Hamburg, where there was greater concern about levels of taxation and thus reluctance to pay for septic drain fields, was less successful in handling the transition than more authoritarian Prussia, and therefore much more affected by the contagion (Evans 1987; see also Kühl 2002). However, on

closer inspection the specific form of government in Prussia in the 1890s could itself be seen as the outcome of a political sustainability transformation.

Democracy and sustainability: fiscal capabilities, reform, and revolution

As debates on the rise of “the fiscal-military state” have highlighted, governments tend to spend more than they receive in taxes in times of crisis, particularly in wartime. During the eighteenth century, the question of how long-running military conflicts could be financed became particularly acute. There were several attempts to use novel financial instruments to resolve the problem, mainly issuing shares in colonial ventures (the South Sea Company or the Mississippi Company of 1720) and/or the introduction of paper currency backed by state property (like the *assignats* issued during the French Revolution). These attempts to convert government debt into convertible securities failed, however, as the instruments rapidly declined in value relative to currency, that is to say, precious metals. As contemporaries were thus aware, the outcome of the Napoleonic Wars was determined, in large part, by governments’ ability to obtain credit without devaluing public debt. This applied to individuals – Napoleon’s rise as a revolutionary general was due to a combination of propaganda and paying his soldiers in precious metals – as well as to states. Accordingly, the victory of the anti-French coalitions was largely due to Britain’s ability to sustain much higher levels of taxation and government debt than France (Branda 2007; Dwyer 2007).

While the British constitution was interpreted in various ways, one feature that appeared crucial to the country’s financial success was the existence of a parliamentary assembly charged with approving (and thus implicitly guaranteeing) government debt. The guarantee was reliable because Parliament represented the country’s propertied elites (even though the representation was shaped by an irrational franchise subject to increasing criticism from the late eighteenth century). One outcome of the Napoleonic Wars was therefore a greater willingness to introduce parliamentary assemblies in continental states. Elected by a franchise restricted to top taxpayers and limited to representatives who were both (relatively) aged and (absolutely) rich, they were supposed to allow for a similar level of resource extraction without challenging monarchical rule in general and monarchs’ control over their military and foreign policy in particular.

Prussia made the link between constitution, credit, and bureaucratic autonomy explicit. A 1824 law on public credit required new government debt

to be approved by a national representative assembly, though such an assembly did not yet exist. Its creation was first postponed and ultimately abandoned because the experience of representative assemblies introduced in France and southern German states indicated unexpected side-effects. Restricting membership to top taxpayers rendered parliamentary assemblies parsimonious, particularly with regard to military expenditure, and conservative with regard to social and economic policies. Rendering high levels of government debt more sustainable thus threatened to block attempts to accelerate economic growth through the introduction of economic reforms such as freedom of movement or freedom of occupation (Koselleck 1981).

Both responses – introducing or not introducing parliamentary assemblies in order to sustain the aims and structures of monarchical government – led to further transformation. In states with parliamentary assemblies, citizens without voting rights argued for an expansion of the franchise; members of parliament argued for greater say in political personnel decisions (such as ministerial appointments) and in legislative matters (such as the right to propose legislation). In Prussia, economic growth did not pick up fast enough to render parliamentary assemblies superfluous and by 1847 the government needed funds to construct a new railway, and was thus forced to invite members of provincial assemblies to form a united Prussian diet. As this diet rejected a call to approve the new debt (and as he faced increasing popular pressure in the “year of revolution,” Rapport 2009), the monarch finally granted permission for the election of a constitutional assembly and enacted a modified version of its constitutional proposals in late 1848. Even though it was imposed by the monarch unilaterally, the new constitution retained many liberal elements, not least a broad franchise for most adult men. This was replaced in 1849 by the so-called “three-class franchise” which divided eligible electors (adult men who did not receive poor relief and had no criminal record) into three classes who collectively paid the same amount in taxes, with the poorest group casting their (public) votes first (i.e., in the presence of members of the wealthier classes likely to be their landlords or employers).

The medium-term result was a rerun of the confrontations other states had experienced in the pre-revolutionary period. These came to a head in the Prussian constitutional conflict from 1862, when a liberal parliamentary majority refused to approve the state’s budget and the government under Otto von Bismarck decided to carry on regardless. In the longer term, economic developments exacerbated the inequality inherent in the three-class franchise,

as very successful self-made men could turn out to be the single voter in Class I, relegating even representatives of the state (e.g., members of the higher ranks of the bureaucracy or ministers) to Class II and thus subverting political hierarchies. In the medium term, the Prussian standoff ended in a 1866 compromise: government success in the first two wars of unification convinced a sufficient proportion of representatives that military expenses were, on the whole, justified. The offer of a broader franchise not weighted by wealth for the new federal German parliament – the franchise proposed by the revolutionary national assembly in 1848 – mollified some liberals, and the government agreed to abandon its position that it could legally collect taxes without a budget in return for “indemnity” for its breach of the law (e.g., Clark 2006: 510–555).

The sustainability at stake here was the provision of funding and the maintenance of structures of governance. Having concluded from a comparison between the fate of the French monarchy (where a financial crisis ended in revolution) and of Britain (where higher expenditures did not endanger the stability of government), that elite political participation aided the sustainability of monarchical rule, many European monarchies introduced parliamentary bodies with limited powers. Partial democratization of governance thus created its own dynamics, leading to institutional conflict and modifications of the political system. Such modifications could be the outcome of revolutions, as was the case in parts of continental Europe in 1848, 1917, and 1918. It could also occur by way of electoral reform, with parliaments and governments granting the franchise to groups who had previously been excluded from it. This occurred in Britain in 1832, 1867, 1884, and 1918 (Beales 1999). In this case, the aim was to adapt the processes and institutions of political decision making to economic and social change. By contrast, Bismarck’s expansion of the franchise to less wealthy adult men sought to make monarchical rule sustainable by increasing the political influence of the more conservative rural voters who still made up the majority of Germany’s adult male population. Transitions could thus be designed to include new groups in the exercise of power or to cement the power of traditional elites (Fahrmeir 2007).

While “revolution” and “reform” appear to indicate opposite modes of political change today – violent rupture in the former, gradual transitions in the latter case – this was less true in the nineteenth century. This was partly because the meaning of the terms overlapped. Both “reform” and “revolution” originally described a return to a past state conceived as ideal, either by way of “reformation” or in

the course of cyclical developments in history (an analogy to planetary “revolution”). This understanding changed in the course of the eighteenth century, and particularly after the French Revolution of 1789, when both terms began to conform more closely, but not entirely, to present usage so that observers frequently discussed whether revolution could be disguised as reform and vice versa (Wende 1999, 150).

Moreover, the results of “revolutions” and “reforms” were similar in many respects: republican “revolutions” often resulted in a return to monarchical rule (as in 1789, 1830, and 1848 France), while “reform” (or “revolution from above”) often brought about increased political participation. Even though “reforms” had a greater tendency to strive for a “sustainable” monarchy, the expansion of the franchise was never without effect. As the franchise expanded beyond economic elites, the impact of economic transformations on the political system grew, leading to a recalibration of social policies.

An unsustainable economy? Responses to the rise of factories

Prior to the nineteenth century, European economies had been dominated by small- to medium-scale producers. The majority of the population lived in villages, was engaged in agriculture, and experienced only limited economic change from generation to generation. Economic crises typically followed from political cataclysms like war, epidemics (frequently tied to war), and environmental events (drought, rain, cold, volcanic eruptions) that resulted in below-average harvests. In years of poor cultivation, increased food prices depressed the consumption of manufactured goods, leading to urban underemployment and poverty. By the late nineteenth century, this condition was no longer true in the industrialized regions of western and central Europe or North America. The population of larger cities was increasing, the presence of large employers in manufacturing and mining became more visible and captured the imagination of experts (mainly writers on economic issues and philosophically inclined entrepreneurs) and general observers (such as journalists or the authors of novels) alike. In some political systems, like the German Empire and France with their near-universal adult male suffrage, the social concerns of poorer workers also acquired greater (potential) political resonance (Plumpe 2019).

This modern economy was subject to a new type of economic crisis, triggered not by events external to economic relations, but by imbalances within the financial system. A number of observers, Karl Marx

and Friedrich Engels among them, saw this as proof that the modern capitalist economy would not prove to be sustainable, but would culminate in a revolution that would lead to a new, sustainable form of economic organization (Stedman Jones 2016).

While Marx and Engels desired a radical break, others sought to identify ways that could render the current trajectory of economic development sustainable. Even the analyses of Marx and Engels suggested that what would be crucial in this regard was how propertied elites would deal with the social consequences of economic change. For most of the early modern period, the poverty of able-bodied individuals had been interpreted as proof of individual character flaws which rendered them unwilling to work. The main response was thus to threaten such people with internment in “poor houses,” or with harsh punishment for begging or vagrancy in order to force them to overcome their presumed laziness (Althammer, Gestrich, and Gründler 2014). This characterization changed only gradually with the rise of “pauperism” as a mass phenomenon in the 1830s and 1840s. The main focus was now on family size, with an inclination to blame paupers themselves for siring excessive numbers of children. Britain’s 1834 “new poor law” responded by segregating individuals in workhouses by gender, thus preventing further reproduction; German states introduced “political marriage consent” (governmental permission to marry), a privilege granted only to couples with an assured income (Matz 1980).

By the end of the nineteenth century, perceptions changed again. In factory towns dependent on a single employer, it was evident that loss of employment and income was the consequence of economic crises, not of individual character traits. Moreover, in industrialized economies, the aim of economic independence (i.e., self-employment) was gradually displaced by permanent dependent employment. As a result, terms like “unemployed” acquired their modern meaning of lacking employment (rather than being idle) (Topalov 1994). Coming to terms with “unemployment” was clearly a question of sustainability for the industrial economy. It required more knowledge of labor markets, particularly of the number of individuals seeking work and the number of vacant positions; and it appeared to demand greater engagement of the state in planning labor supply, not least by regulating international migration. As enfranchised citizens could exert political influence in democratic states, whereas aliens could not, cross-border migrants were increasingly treated as a flexible labor reserve for times of high employment, who could be required to depart again in times of economic crisis (Herbert 2001). Finally, considering some types of unemployment as an

insurable risk was an option of mitigating its effects on individuals.

Given the limits on administrative capabilities, local experiments initially led the way (Topalov 1994). The situation began to change with the Great War of 1914–1918, when every belligerent state took stock of national labor resources. This provided the incentive, and freed up the financial means, for the creation of centralized registers of available jobs and available workers. The registers, and the concepts which emerged, were carried over into the postwar period and became a central feature of planning and regulating national labor markets ever since – with greater or lesser success (e.g., Lindert 2004; Noiriell 2006; Fahrmeir 2007).

This sustainability crisis concerned the implications of economic cycles on labor markets and on the acceptance of capitalist systems of exchange as sustainable in spite of their inevitable crises. It produced attempts to mitigate the effects of capitalism through measures designed to support steady employment or to insure against the risk of losing gainful work. These circumstances also created an alternative approach to labor markets that sought to avoid such risks entirely through economic planning – an approach that proved to be less sustainable because empirical developments often defied planners' projections (Nützenadel 2005).

Conclusion

These three examples of medium-term fundamental change were obviously not chosen entirely at random. The first one considered the mechanisms behind a specific sustainability transition: the collapse of demand for what had been a valuable commodity in the face of urban growth, which in turn led to new systems of disposing of urban waste, and that proved to be sustainable for at least a century and a half. The second discussed how the attempt to render monarchies in competition with rivals more sustainable did not result in a stable alternative, but set in train a continuous process of change. The third traced the route to a “sustainable” system of capitalist production, based on a novel understanding of the existence of periodic crises and the (largely successful) attempt to ensure adequate provision for individuals most vulnerable to them.

These cases illustrate three features of a historical approach to sustainability relevant to current debates. In two of the three cases, the origin of the process of transformation lay in a semantic shift or a different framing of a perennial challenge: a shift from “poverty” to “unemployment” and from royal profligacy to public debt (Sonnenscher 2007; Ullmann 2005). Both outcomes occurred in the

context of a novel understanding of society based on perpetual change to which political and social structures needed to adapt (Steinmetz 1993). They also implied an understanding of state and society as complex systems amenable to an analysis that reduced overwhelming complexity to a finite number of observable categories and variables (Scott 1998). In the third case, one commodity (“night soil”) changed from a valuable resource to waste due to oversupply and competition from other sources of nitrogen.

A first way of exploring contemporary challenges is therefore to study such “discourses of weakness” (Amelung, Leppin, and Müller 2018); another is to think about ways in which apparently stable orders are reconceptualized as being under threat (Frie and Meier 2014). Once the weakness or threat become recognized more broadly, a search for ways to overcome it begins. This can either lead to reform (if the analysis is shared by those in power) or revolution (if it is not). In either case, there are consequences for the use and disposal of resources and for systems of government. Change leads to new discourses of weakness and new cycles of reform or revolution, some of which may be significant enough to qualify as sustainability transformations.

Second, while a historical approach to the problem of sustainability transformations cannot offer models, recipes, or prescriptions for courses to take and courses to avoid, it can encourage questions, not least about the scope and implied timescales of attempts to attain sustainability: What is to be rendered sustainable, and for how long can this be achieved? Modern sewerage systems in cities have proved sustainable for over a century but assume that water is both plentiful and available at low cost, assumptions that may be challenged by climate change. They are already being tested by calls to decrease individual water consumption. This reduces flow through sewers at a time when new sanitary products contribute to novel problems like “fatbergs” (congealed masses of discharged materials). It is probable that such issues can be handled without transforming the system as a whole (i.e., through yet another sustainability transition), but this is by no means assured. However, the issue of whether the aim of “sustainability” is to resolve a problem for years, decades, or centuries; how this time-scale compares to the speed at which measures to tackle a given problem are likely to take effect; and what degree of parallel change they can deal with, is likely to be relevant more generally.

Finally, historical approaches to sustainability transformations come with an invitation to broaden horizons. What is the likely impact of transformation on issues that, at first sight, have no

connection to them at all? Modern democracy has proved to be a very resilient system of political decision making, but its introduction contributed to fundamental alterations in the relationship between rulers and ruled, state, society, the economy, and the environment in ways that the individuals mainly interested in solving postwar fiscal crises or dealing with the particular abuses of a specific monarchy did not – and could not have – imagined. It is therefore helpful to be alert not just to the complexity of the subsystems at the focus of attention, but also to the complexity of social, economic, ecological, and political systems of which they are a part. Attempts to induce sustainability transformations require models, but these models always run the risk of being too simple and thus of creating desired as well as entirely unexpected effects.

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