Feeding Germany: Food, Science, and the Problem of Scarcity, 1871–1923

By

Carolyn D. Taratko

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Approved:

David G. Blackbourn, Ph.D., Chair

Celia Applegate, Ph.D.

Helmut Walser Smith, Ph.D.

Ari Joskowicz, Ph.D.

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TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

INTRODUCTION

In the summer of 1919, John Maynard Keynes resigned in frustration from his advisory role at the Peace Conference in Paris. After a busy few months of shuttling around the city, he roundly condemned the peace arrangement, which imposed punitive measures and hefty reparation payments on Germany, and retreated to Cambridge. Once at home, Keynes penned The Economic Consequences of the Peace, which would become a bestseller. His famous analysis remains required reading for historians of modern Europe today. However, the concerns about food and population he expressed have long escaped historians' attention. Keynes described the history of Western Europe after 1870 as "unprecedented" in its freedom from the stress of population pressure on food resources. He marveled at how supplies from the United States and the tropics allowed growing European populations easier access to food. The memorable passage concerning the pre-war Londoner who, through the simple act of picking up the phone, had all the world's commodities, conveniences, and markets at his disposal, reveals the increasing distance between urban Europeans and the material, earthly origins of much of their wealth. Keynes wrote,

> That happy age lost sight of a view of the world which filled with deep-seated melancholy the founders of our Political Economy. Before the eighteenth century mankind entertained no false bones. To lay the illusions which grew popular at that age's latter end, Malthus disclosed a Devil. For half a century all serious economical writing held that Devil in clear prospect. For the next half century, he was chained up and out of sight. Now perhaps we have loosed him again.[1]

[1] John Maynard Keynes, *The Economic Consequences of the Peace* (New York: Harcourt Brace, 1919), 10.

To pre-war Europeans, "Malthus' devil" was an unfamiliar one; he personified the misery resulting from population growth outpacing available agricultural resources.[2] For the population of western Europe, living mostly in urban and industrial centers and profiting from advanced communication and transport systems, this devil appeared to have been vanquished long ago.[3] In his assessment, Keynes expressed a certain sympathy for Germans, but his concerns were more global in orientation, as he saw the peace terms sealing the fate of an era of international exchange, availability, and rising standards of living. Keynes' post-Versailles pessimism was largely informed by his knowledge of the German situation, and it was there that it found echo and amplification. Food security was widely held to be one of the greatest barriers to European recovery. The situation in postwar Germany presented an extreme case, as anxiety about starvation and survival through the winter of 1919/20 reached a fever pitch. Malthus' devil, it seemed, had returned.

How many mouths can the earth feed? This question served as a source of anxiety and an impetus for investigation since the eighteenth century. Modern debates about scarcity tend to take Malthus as their starting point. This dismal view of the biological drive to reproduce

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[2] Thomas Robert Malthus, *An Essay on the Principle of Population; or, A View of Its Past and Present Effects on Human Happiness; with an Inquiry into Our Prospects Respecting the Future Removal or Mitigation of the Evils Which It Occasion. A New Edition, Very Much Enlarged* (New Haven: Yale University Press [1803] 2017).

[3] Indeed, Sidney Pollard has shown that while there was an enormous expansion in trade over the course of the period from 1800–1913, it carried significantly more weight in the later years. He estimates that half of the growth occurred in the last two decades of peace and writes, "The years leading up to the First World War were thus years in which economic interrelation deepened at a particularly impressive rate." Pollard, "Free Trade, Protectionism, and the World Economy," in *The Mechanics of Internationalism,* eds. Martin Geyer and Johannes Paulmann (Oxford: Oxford University Press, 2001), 27–55, here 28; and Pollard, *Peaceful Conquest: The Industrialization of Europe, 1760–1970* (Oxford: Oxford University Press, 2002, 1981), 270–279.

beyond natural limits assumes that demand will eventually outpace available supplies. Whether one finds this ominous prediction credible or not, the concept has proved remarkably tenacious through the present day.[4] Food remains the determining factor in the relationship between humankind and the natural world.

It is customary to think of the late nineteenth and twentieth centuries in western Europe as freed from these supposedly natural limits. The history of Germany after its unification in 1871 fits squarely within this rosy trend. Through a happy combination of agricultural improvement and, especially, increased trade, most Germans were living better than ever before. Yet to inhabit a land of plenty did not mean to live carefree. Paradoxically, this relative freedom from acute want did not act to assuage concerns about the food supply: instead the notion of food security developed with a decidedly modern bent, as a site of increased professional specialization and prediction. Experts turned their attention to understanding and managing flows of nutrients in the individual body and the nation writ large. Beginning in the late nineteenth century, nutritional science emerged as an important organizational innovation for rationalizing and managing the food supply and influenced ideas about food, feeding, and land use.

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[4] Malthus' ideas about natural limits to growth have surfaced at various times and contexts. While he has long been held as the enemy of the English poor by arguing against government intervention to attenuate shortages, recently scholars have examined his work in light of European settlement in the New World: see Alison Bashford and Joyce Chaplin, eds., *The New Worlds of Thomas Robert Malthus: Re-reading the Principle of Population* (Princeton: Princeton University Press, 2016). For an account of Malthus' legacy in interwar debates about population, see also Bashford, *Global Population: History, Geopolitics and Life on Earth* (New York: Columbia University Press, 2014). For an account of how a Malthusian worldview informed twentieth-century population planning efforts in India, see Matthew Connelly, *Fatal Misconception: The Struggle to Control World Population* (Cambridge: Belknap Press, 2008).

In the 1880s, nutritional research witnessed a shift away from classical physiological problems of determining quantities of key macronutrients and became reoriented towards the relationship between physiological, social, and economic problems. The scientific pursuit of nutritional minimums and optimums allowed food needs to be calculated for different populations with a degree of supposed accuracy and reliability. In this way, scientists were able to measure the human economy and embed it firmly as a variable in the national economy. If certain nutrients were required for optimizing the human resources of the nation, the question then became how to harmonize this need with the natural ones available. This dissertation explores the centrality of concepts of food security and scarcity in modern Germany between 1871 and 1923, asking how knowledge about food contributed to larger concerns about political economy in a globalized world.

This work starts from the assumption that the topic of food security is inextricable from questions of knowledge production and expertise surrounding food. While Malthus set the terms of the debate about resource scarcity, his was never the final word. Within political economy, generations of thinkers contested the Malthusian view of inevitable shortage by instead highlighting the role of distributional problems or issues of entitlement in moments of scarcity.[5] The balance of these factors varied according to specific historical and geographical contexts; but it also depended on how notions of minimum need were calculated. Thus, assessments of food security required answers to the following questions: What is the

[5] Malthus' contemporary William Godwin vehemently disagreed with his view. For the debate, see *T.R. Malthus: Critical Responses*, ed. Geoffrey Gilbert (London: Routledge, 1997). For the status of the issue in Germany at the beginning of the twentieth century, see Lujo Brentano, *Die Malthussche Lehre und die Bevölkerungsbewegung der letzten Dezennien*, Abhandlungen der Königlich Bayerischen Akademie der Wissenschaften, (Munich: Verlag der K.B. Akademie der Wissenschaften, 1909): 568–625.

minimum quantity of nutrients necessary for human survival? For the maintenance of a productive workforce? And finally, how can decisions be taken at a national level to ensure that these values are met? A more integrated view of individual and aggregate food needs emerged in response to these concerns. While the history of nutrition is often written as part and parcel of medicine and public health, my research shows that in Germany the pursuit of nutritional research was viewed as a structural issue involving agricultural and economic development.[6]

Germany presents a particularly interesting case for scholars interested in food scarcity, as it was devastated by two world wars. Legacies of hunger shaped the fundamental character of four different German states over the course of the twentieth-century.[7] Studies have tended to focus on the Third Reich as the paradigmatic example of a regime explicitly concerned with food security. The preoccupation with Lebensraum among Nazi leadership led them not only to dispossess and exterminate millions in Eastern Europe, but also led to support for ambitious agricultural research projects in the years before the war.[8] The autarkic

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[6] For a sampling of literature dealing with the relationship between nutrition and public health, see Elmer V. McCollum, *A History of Nutrition: A Sequence of Ideas in Nutritional Investigations* (Boston: Houghton Mifflin 1957); David Grigg, *The World Food Problem, 1950–1980* (Oxford: Oxford University Press, 1983); Peter Conrad and Joseph W. Schneider, eds., *Deviance and Medicalisation: From Badness to Sickness* (St. Louis, 1980); Cameron Petty, "Food, Poverty, and Growth: The Application of Nutrition Science, 1918–1939," *Bulletin of the Society for the Social History of Medicine* (1987); Philip D. Curtin, "Nutrition in African History," *Journal of Interdisciplinary History* 14, no.2 (1983): 371–382.

[7] Alice Weinreb's *Modern Hungers* explores the legacy of hunger in the Weimar Republic, the Third Reich, the Federal Republic of Germany and the German Democratic Republic. Weinreb, *Modern Hungers: Food and Power in Twentieth-Century Germany* (Oxford: Oxford University Press, 2017).

[8] Timothy Snyder has recently argued that the Holocaust was an expression of "ecological panic," or a ruthless attempt to diffuse Malthusian pressures on food through annihilation in Eastern Europe. Snyder, *Black Earth: The Holocaust as History and Warning* (New York:

policies of Nazi leadership, and Europe's twentieth-century fascist regimes more generally, showed the outsized role of food provisioning in manufacturing wartime consent.[9] Yet concerns about autarky were not particular to fascist regimes.

There is good reason to look back to the last quarter of the nineteenth century for a deeper contextualization of German fears about food security. This period witnessed the rise of an integrated food system relying on a global division of labor between European industrial centers and extra-European agricultural producers.[10] Germany participated in networks of intercontinental trade in staple goods. Between 1850 and 1913, world trade in agricultural products grew by 3.44% annually.[11] Advances in shipping technology enabled faster transport between the New World and Europe at lower prices, while the development of refrigeration technology expanded the possibilities of what could be shipped.[12] Within the span of a few

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Penguin Random House, 2015); Tiago Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism* (Cambridge: MIT Press, 2016).

[9] Gustavo Corni and Horst Gies, *Brot-Butter-Kanonen: Die Ernährungswirtschaft in Deutschland unter der Diktatur Hitlers* (Berlin: Akademie Verlag, 1997); Willi Oberkrome, *Ordnung und Autarkie: Die Geschichte der deutschen Landbauforschung, Agrarökonomie und ländlichen Sozialwissenschaft im Spiegel von Forschungsdienst und DFG (1920–1970)* (Stuttgart: Steiner, 2009); Susanne Heim, *Kalorien, Kautschuk, Karrieren: Pflanzenzüchtung und landwirtschaftliche Forschung an Kaiser-Wilhelm-Instituten 1933–1945* (Göttingen: Wallstein, 2003); for the Italian case see Alexander Nützenadel, *Landwirtschaft, Staat und Autarkie: Agrarpolitik im faschistischen Italien, 1922–1943* (Tübingen: Niemeyer, 1997).

[10] The idea of a global division of labor emerged from Adam Smith's *The Wealth of Nations* (1776) and received the full-throated support of the Historical School of Economics that rose to prominence in nineteenth- and twentieth-century Germany. For an outline of this scheme in view of historical development, see Gustav Schmoller, *Grundriss der allgemeinen Volkswirtschaftslehre* (Leipzig: Ducker & Humblot, 1900).

[11] Pollard, "Free Trade, Protectionism, and the World Economy," 29–30.

[12] J. Sinclair, *Refrigerated Transportation* (London: Witherby, 1999) 12, 81; Sebastian Conrad, *Globalisierung und Nation im deutschen Kaiserreich* (Munich: C.H. Beck, 2006), 1–30.

decades, a truly global food system supplanted the local and regional networks that had previously provisioned Germans. Consumers welcomed the resulting abundance, and political economists marveled at the dense connections that bound the fate of German housewives to South American farmers.[13] These networks continued to intensify in the years before 1914.

Globalization created this food system, but it also heralded the arrival of its obverse: namely, unease and deep misgiving towards this new dependency on global exchange. The global food system and food security present a neat conceptual pair. The world of plenty that cheap shipping and access to overseas markets inaugurated spelled the end of famine in western Europe.[14] However, this period of affluence was punctuated by pervasive fears of shortage and dependence. Most concretely, globalized trade in agricultural products depressed the German grain market.[15] The growing demands of industry and the magnetism of cities

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[13] Quinn Slobodian's recent article explores how German economists of the Historical School visualized the world economy as in terms of transit/transportation infrastructures (*Verkehr*) in thematic maps. Slobodian, "How to see the world economy: statistics, maps, and Schumpeter's camera in the first age of globalization," *Journal of Global History* 10, no. 2 (2015): 307–332.

[14] The "Hungry Forties" were known as the "last subsistence crises" in Europe. There is a vast literature on the Great Irish Famine and the poor harvests of 1847/48. These catastrophes impacted not only Ireland, but large parts of northern Europe. For a sampling of this literature, see Cormac Ó Gráda, *Black '47 and Beyond. The Great Irish Famine in History, Economy and Memory* (Princeton: Princeton University Press, 1999); J.D. Post, *The Last Great Subsistence Crisis in the Western World* (Baltimore: Johns Hopkins University Press, 1977); Mark Traugott, "The mid-nineteenth-century crisis in France and England," *Theory and Society,* 12 (1983): 455–468; Manfred Gailus, *Strasse und Brot: Sozialer Protest in den deutschen Staaten unter besonderer Berücksichtigung Preußens, 1847–1849* (Göttingen: Vandenhoeck & Ruprecht, 1990) and Ansgar Schanbacher, *Kartoffelkrankheit und Nahrungskrise in Nordwestdeutschland, 1845–1848* (Göttingen: Wallstein, 2016).

[15] Rainer Fremdling, "European Foreign Trade Policies, Freight Rates and the World Markets of Grain and Coal during the Nineteenth Century," *Jahrbuch für Wirtschaftsgeschichte* 44, no. 2 (2003): 83.

accentuated this vulnerability.[16] In this context of the 1890's, the concept of autarky experienced a renaissance among political economists who argued in support of protective tariffs.[17] As political economist and defender of agrarian interests Karl Oldenberg succinctly put it, "the self-sufficiency of the nation is threatened by the elementary lack of independence in the industrial state (Industriestaat)."[18] Economic dependency for staple goods produced a profound uneasiness.

On top of this, more diffuse fears of network breakdown proliferated. These fears tended to cluster around two areas: first, the long distances products traveled presupposed a stable geopolitical situation. Yet this was also an era of imperial rivalries, causing many to fret that the networks were vulnerable to break down.[19] Secondly, suspicions of abstruse or

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[16] As Mack Walker has noted, the hometowns under the Holy Roman Empire were characterized by "local consumption of local production." Walker, *German Hometowns: Community, State and General Estate, 1648-1871* (Ithaca: Cornell University Press, 1998 [1971]), 24.

[17] The conflict between advocates for an agrarian-based state or an industrial one took place in the 1890s. Defenders of the agrarian view such as Karl Oldenberg and Adolph Wagner supported their position with fears of the outbreak of war. The key text here is Kenneth Barkin, *The Controversy over German Industrialization, 1890-1902* (Chicago: Chicago University Press, 1970); see also Barkin, "Conflict and Concord in Wilhelmian Social Thought," *Central European History* 5, no. 1 (March 1972): 55– 71. Not only among political economists like Oldenberg and Wagner, but among sociologists such as Ferdinand Tönnies, whose landmark *Gemeinschaft und Gesellschaft*, published in 1887, set out the ideal of a small community able to satisfy its own needs independent of the market place. *Community and Civil Society,* trans. Jose Harris (Cambridge: Cambridge University Press, 2001), 51.

[18] Hannah Rabe, "Autarkie," in *Geschichtliche Grundbegriffe: historisches Lexikon zur politisch-sozialen Sprache in Deutschland,* eds. Otto Brunner, Werner Conze and Reinhart Koselleck (Stuttgart: Klett Cotta, 1972) 1:379.

[19] As Barkin has noted, beginning around 1890s with the international depression there was a pervasive fear among German academics that the nation was locked in a struggle for raw material and markets with the three empires of France, Britain, and Russia. Barkin "Conflict and Concord," 59.

outright dishonest trading practices– for example skepticism of futures trading or food adulteration – served to drive a wedge between the food on the table and its origins. The transformations of this period from 1871 to 1914 can be fruitfully viewed as a prelude to the "risk society," wherein technological and social change contributes to heightened perception of insecurity.[20] Both the physical distance commodities traveled and their increasingly invisible supply chains stoked an atmosphere of foreboding. As Frank Trentmann has pointed out, "in the less famished regions, as much and perhaps even more than in areas experiencing famine, debates about dependence and deprivation, about food security and human needs were a driving force in the domestic and international politics of consumption."[21] Early notions of food security developed against the backdrop of a globalized food system. Thus, it becomes clear that food security was not in the first order related to a condition of absolute shortage, but rather emerged as a product of anxieties about dependency, unevenness, and concerns about knowledge asymmetries.

In order to explore the concept of food security and its attendant anxieties in modern Germany, this dissertation asks how specific types of knowledge about food developed and were deployed. In doing so, it situates debates about food provisioning at the nexus of science and politics. From the late nineteenth century on, what people ate and how they acquired it became issues of public interest and governmental intervention. New practices of scientific eating promised solutions not only to medical, but also social and moral problems. Nutritional

[20] Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage, 1992), especially 51–91.

[21] Trentmann, "Coping with Shortage: The Problem of Food Security and Global Visions of Coordination, c. 1890s–1950," in *Food and Conflict in Europe in the Age of the Two World Wars,* eds. Frank Trentmann and Flemming Just (New York: Palgrave Macmillan, 2006) 16.

science was an important area in which experts in the human sciences extended their work beyond their laboratories and universities and into the realm of public welfare by making recommendations to ameliorate the "social problem." In this sense, the articulation of nutritional science as a distinct research agenda with practical aims presents an example of what Lutz Raphael has called the "Verwissenschaftlichung des Sozialen," expanding the domain of science to have greater purchase on everyday life and governance.[22] The experts I study saw their work engaging with some of Germany's most pressing problems, including widespread pauperization, malnutrition, and increasing economic dependence on foreign exports. Specialized knowledge about food in the form of nutritional knowledge thus represented an essential component of securing social and economic stability.

Nutritional knowledge provided standard units for comparing different foods, essentially providing a universal language of minimum food needs. Armed with this information, decisions could be made about which foods were essential and cost-effective, creating a hierarchy of dietary needs. In this way, nutritional knowledge provided a specific type of knowledge about food that was well-suited to drives to rationalize consumption and production, thus contributing very directly to understandings of food security. By examining the discourse surrounding food security from German unification through the early years of the Weimar Republic, I trace the contours of a nation state which sought to promote

[22] The seminal article is Raphael, "Die Verwissenschaftlichung des Sozialen als methodische und konzeptionelle Herausforderung für eine Sozialgeschichte des 20. Jahrhunderts," in *Geschichte und Gesellschaft,* 22, no. 2 (Jun. 1996): 165-193. The concept, and Raphael's challenge to historians, proved remarkably fecund. Part of this position entailed asking that social historians historicize the categories of knowledge that they employ in their sources. See also *Theorien und Experimente der Moderne: Europas Gesellschaften im 20. Jahrhundert*, ed. Lutz Raphael (Cologne: Böhlau, 2012) and *Die Ordnung der Moderne: Social Engineering im 20. Jahrhundert,* ed., Thomas Etzemüller (Bielefeld: Transcript, 2009).

alimentary self-sufficiency through dietary reform, rational land use, and intervention in the domestic sphere. In doing so, I show how state management of finite resources served as an expression of its legitimacy and sovereignty.

Modern Germany and the social question

Parallel to developments in global trade, Germany experienced a population explosion and migration from the countryside to larger cities and industrial areas. These transformations destabilized relations between rural producers and urban consumers, further inflaming the issue of food security and resulting in widespread poverty and immiseration. The complex of problems resulting from industrialization and urbanization was referred to as the "social question," gesturing towards the difficulty of disentangling the many threads of interrelated problems plaguing German cities.[23] These population concerns became increasingly important to the German state as a matter of labor productivity, military fitness, and also loyalty. At a time of unprecedented change and creation of new wealth, narratives of national progress were undercut by the masses of urban poor. Lacking proper nutrition, they appeared emaciated or sallow, or they filled caloric deficits with cheap alcohol. Surveys of budgets and clinical work led practitioners to conclude that these individuals were undernourished.

Uneven economic development could be read into workers' bodies and nutrition provided a diagnostic. Thus, this dissertation argues that nutritional science provided an important tool for considering the economics of consumption. Reformers and politicians on

[23] A reform milieu coalesced around the range of different problems; for a prosopographical account of this milieu, see Kevin Repp, *Reformers, Critics, and the Paths of German Modernity: Anti-Politics and the Search for Alternatives, 1890–1914* (Cambridge: Harvard University Press, 2000).

the left regarded undernourishment as not only a problem in itself, but also a symbol of how the German worker had been abandoned by self-interested capitalists. Indeed, the refrain that the "social question is a stomach question" was common among the left, highlighting the failure of policies to provide basic subsistence for the German worker.[24]

Questions of nutrition resonated far beyond lecture halls and laboratories. In the last quarter of the nineteenth century, reformers also recognized the social importance of adequate nutrition as central to hygiene. Programs of scientifically grounded "rational nutrition" presented guidelines based on established minimum quantities of key substances of protein, fats, and carbohydrates. For example, the Imperial Health Office (Reichsgesundheitsamt), which was established in 1876, published a guide for the public known as "The Little Book of Health" (Gesundheitsbüchlein) annually. The guides issued recommendations for how a diet should be composed. From the mid-1880s on, the guide recommended that an average working adult consume 118 grams of protein per day.[25] By promoting knowledge about and access to a rational diet, the stock of the population could be improved.[26]

If the laboratory work of physiologists provided normative baselines, surveys of diets and budgets provided a descriptive guide to modern eating patterns. Reformers believed that diet was not just a signifier of social progress; it also served as a motor of upward mobility:

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[24] "Die soziale Frage ist eine Magenfrage!" For example, see *Verhandlungen des Reichstages*, vol. 228 (44. Sitzung, May 2, 1907) or *Verhandlungen des Reichstages*, vol. 284 (31. Sitzung, Mar. 20, 1912) 866.

[25] *Gesundheitsbüchlein: Gemeinfaßliche Anleitung zur Gesundheitspflege* (Berlin: Springer, 1895) 56-57.

[26] Edward Ross Dickinson, "Biopolitics, Fascism, Democracy: Some Reflections on Our Discourse about 'Modernity,'" *Central European History* 37, no.1 (2004):1–48.

where improvements had not yet been made, a program of rational eating promised to turn the lower classes into respectable and productive citizens. Medical doctors and social scientists also collected extensive surveys of worker's diets and budgets, upon which they based more general pronouncements about health, wealth, and consumption.

To reformers, the visibility of the social question highlighted that all was not well with German food provisioning. Indeed, at first glance the history of food policy in Germany before World War I is a story of its absence. Administratively, food policy was set by default through decisions motivated by producers' concerns: no government body existed to coordinate the needs of consumers and distribution with agricultural production. Agricultural policy was set through the actions of individual states in their Ministries of Agriculture, or, lacking that, in their Ministries of the Interior or Trade.[27] One the other hand, tariff policy was decided at the Reich level. In the decades before World War I, tariff policy bore the weight of regulating international trade with agricultural products and thus also determined the extent of domestic products and their prices. Thus, important issues of production and distribution of food were debated at the Reich level, but aside from tariff policy, few instruments existed to regulate or manipulate the food needs of the population.

Aside from a limited administrative structure, the issue of food security posed a knowledge problem on two fronts. On the one side, it required knowing the extent of the harvests and existing grain stores. On the other, it required knowing the needs of the population. This is the problematic that this dissertation takes up: it asks how nutritional

[27] For a history of the present-day Bundesministerium für Ernährung und Landwirtschaft (BMEL) and its predecessors, see Heinz Haushofer and Hans Joachim Recke, *50 Jahre Reichsernährungsministerium-Bundesernährungsministerium* (Regensburg: Mittelbayerische Druck- und Verlagsgesellschaft, 1969).

science developed so that it became an invaluable tool for making political claims and formed an important part of the language of consumption. Over the period under study, nutritional scientists became increasingly occupied with aggregate knowledge, participating in a discourse of reform and in wide-ranging debates about living standards.

These debates reached a fever pitch during the blockade imposed on Germany during the First World War. Cut-off from imports, German authorities turned to programs of rationing and surrogate foods to supply the population. The issue of food security became widely discussed and debated, not only in expert circles but in the popular press. In particular, the war brought discussions about necessary nutritional minimums to a head. As the global food system broke down and excluded Germany, it became increasingly difficult to provide sustenance to the population. In the aftermath of the war and revolution, the new Weimar government continued to wrestle with the responsibility of the government to ensure an "existence minimum" which was fiercely debated among scientists, politicians, and consumers.

Historiography

While the topic of food has proved fertile ground for historical inquiry for decades, the focus on knowledge and expertise is less well-established.[28] This is in part because nutritional knowledge came out of several different disciplinary traditions in the early eighteenth and nineteenth centuries, though it is most often identified with physiology. The history of

[28] For a fascinating example applying the history of knowledge approach to agricultural sciences, see Frank Uekoetter, *Die Wahrheit ist auf dem Feld: Eine Wissensgeschichte der deutschen Landwirtschaft* (Göttingen: Vandenhoeck & Ruprecht, 2012).

physiology, in particular, tends to operate within the rather narrow disciplinary confines of the history of medicine. While this approach has been useful in charting developments and revealing the internal dynamics of the field, it has been marred by two shortcomings: first, it fails to turn outward and examine connections between physiology and other fields, notably social reform, anthropology, and economics.[29] Second, it misses an opportunity to connect the "official" knowledge produced by laboratory science and surveys with the external world. The utility value of knowledge about inputs and outputs, nutrients and metabolism, carried broad applications in the world.[30] These wider contexts were integral settings for knowledge to be deployed, but also made signal contributions to the construction of such knowledge itself. On the whole, histories of nutrition have remained in relative isolation.

Recently, historians have situated the development of nutritional science as part of a broader biopolitical project. They have situated it as one dimension of a larger vision emerging in the late nineteenth century that aimed at enhancing the health and vigor of a region's inhabitants in the name of increased economic and military prowess.[31] Since

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[29] The history of nutrition has largely been written taking for granted the success of later "boundary work," or intellectual work of demarcating the key problems in a field, in divorcing it from other areas of inquiry. For the concept of boundary work, see Thomas Gieryn's seminal article, "Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists," *American Sociological Review* 48, no. 6 (1983): 781–795 and Gieryn, *The Cultural Boundaries of Science: Credibility on the Line* (Chicago: University of Chicago Press, 1999). Emma Spary's work provides a convincing example cutting across this narrow disciplinary divide and revealing the interaction of nutrition with wider state concerns: Spary, *Eating the Enlightenment: Food and the Science in Paris, 1670-1760* (Chicago: University of Chicago Press, 2013) and *Feeding France: New Sciences of Food, 1760–1815* (Cambridge: Cambridge University Press, 2017).

[30] Ulrike Thoms, *Anstaltskost im Rationalisierungsprozeß: Die Ernährung in Krankenhäusern und Gefängnissen im 18. und 19. Jahrhundert* (Stuttgart: Steiner, 2005).

[31] Michael Foucault, "The Right of Death and Power Over Life," in *The History of Sexuality: An Introduction* trans. Robert Hurley (New York: Pantheon, 1978), 1:133–161.

nutritional knowledge posited that human needs were commensurable, it was an important tool for the state administration of welfare. Most recently, Rebecca Earle has argued that, "At the heart of this relationship between the wealth and security of nations and the vigor and productivity of the population was the body of the laborer."[32] There can be no doubt that concerns about adequate food provisioning and the value of a nourishing diet centered on concerns about workers' productivity. "Meat makes meat," as the old housewives' saying went, reflecting the common understanding that eating by animal tissue, humans would build strong muscles.[33] The statement, and the whole enterprise of nutritional science, displayed a productivist stance towards human laborers.

Yet the increasing attention to the body of the worker is not the full story here. The need for food is immediate and existential, yet what is often neglected in historical narratives is that eating is not merely an act of individual consumption, but one hitched to a constellation of agricultural production conditions. Thus, decisions about food are not just a topic of significance to the individual body as a determinant of health and wellbeing, but also central to the economy of the modern state. It is here that my research departs from existing studies on nutrition to encompass the full breadth of disciplinary traditions and experts who contributed to the body of knowledge about food. Nutritional science is used in this dissertation not to describe the pursuit of classical physiological questions of food's components, but to refer to the relation of physiological, social, and economic issues

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[32] Rebecca Earle, "The Political Economy of Nutrition in the Eighteenth Century," *Past and Present* 242, no.1 (Feb. 2019): 79–117, here 85.

[33] Hermann Klencke, "Fleisch," in *Hauslexikon der Gesundheitslehre für Leib und Seele: Ein Familienbuch* (Leipzig: Verlag Eduard Kummer, 1893), 1:434.

connected to food. Discussions of a "rational diet," as we will come to see, were not merely a matter of ensuring adequate nutritional intake to supply the labor force, as historians such as Earle and Corinna Treitel have successfully argued. I contend that a program of "rational nutrition" was only deemed rational by virtue of conforming to a set of highly contentious political economic ideals that sharpened during and after World War I. In sum, nutritional science contributed not only to the biopolitical project of reforming bodies, but a geopolitical one of reinforcing sovereignty through the promotion of domestically produced food.

Examining how scientific inquiry interacted with national economic priorities places the history of nutrition back into histories of consumption. In particular, it moves understandings of malnutrition from an individual problem to one related to widespread scarcity. The topic of food security in modern Europe has received little attention from historians and there remains much to be explored. The literature on this topic is dominated by economists and political scientists.[34] Such studies tend to examine the issue in light of different policy instruments in order to evaluate responses without a larger understanding of historical context and regimes of power. The landmark contribution of Amartya Sen to understanding food scarcity as an issue of entitlements, rather than absolute shortage, remains a touchstone for work in the field. While climate change has given the topic of food shortages and resource scarcity new urgency, these contributions understandably tend to focus on regions outside of Europe.[35] Historical studies have also tended to cluster around major famines outside of

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[34] Amartya Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (Oxford: Clarendon, 1988).

[35] See Dana Simmons, "Starvation Science from Colonies to Metropole," in *Food and Globalization: Consumption, Markets, and Politics in the Modern World,* eds. Alexander Nützenadel and Frank Trentmann (Oxford, New York: Berg, 2008): 178–191; Michael Worboys, "The Discovery of Colonial Malnutrition Between the Wars," in *Imperial Medicine*

Europe. Such work has enriched our understanding of shortage as bound up with issues of class, power, and race, but it also tends to unintentionally reproduce the notion held by contemporaries that hunger was "premodern" and had been banished from Europe.[36]

Within European history, there is a long tradition of historical work on early modern subsistence crises pioneered by social historians. Since Ernest Labrousse's studies of late eighteenth-century France, historians have noted the unhappy conjuncture of disjointed movements in population, prices, rents, and wages.[37] As competition for land and subsistence intensified, social relations deteriorated, particularly straining relations between urban and rural consumers. Similarly, E.P. Thompson's landmark study of the eighteenth-century English working classes contributed to historians' understanding of subsistence crises as key arenas in which political authorities interacted with the wider public.[38] Large-scale mobilization, riots and conspiracy theories proliferated when basic needs could not be met, or when prices for staples created hardship for consumers. The lessons drawn from Labrousse, Thompson, and others suggest that the cycles of subsistence crises trained subjects to perceive

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and Indigenous Societies: Studies in Imperialism, ed. David Arnold (Manchester: Manchester University Press, 1988); David Arnold, "The 'Discovery' of malnutrition and Diet in Colonial India," *Indian Economic and Social History Review* 31, no. 1 (1994):1–26; Rajat Datta, "Subsistence Crises, Markets and Merchants in Late Eighteenth Century Bengal," *Studies in History* 10, no.1 (1994): 81-104.

[36] Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London: Verso, 2000).

[37] Labrousse, *Esquisse du movement des prix et des revenues en France au XVIIIe siècle* (Paris: Éditions des Archives contemporaines, [1933] 1984), 104–120.

[38] E.P. Thompson, "The Moral Economy of the English Crowd in the Eighteenth Century," *Past and Present* 50 (1971): 76-136.

victualling as a measure of the absolutist state's commitment to public interest.[39] The work of these historians demonstrated that food riots of the early modern period were not merely responses to hunger, but instead demands for state intervention to attenuate the effects of dearth. In this way, subsistence crises were also necessarily political crises. These works exposed the frictions between states and subjects by reconstructing the process of political claims-making during times of shortage. Crucially, such work also established food provisioning and pricing as a fundamental litmus test of political authority.

The idea that subsistence crises are fundamentally unmodern has displayed remarkable traction. In large part, this stems from the widely accepted view that the nineteenth century witnessed what E.P. Thompson has characterized as a shift from a "bread nexus," in which certain essential goods were guaranteed as part of a moral economy, to a "cash nexus," in which the free market determined the price for even essential goods. In such analyses, staples became just one commodity among many and protests hinged on issues of income and wages rather than the essential quality and indisputable right to access these goods themselves. This shift in the fundamental character of protest away from claims about indispensable goods and into wages dovetailed with the observation that by the late nineteenth century, Europeans experienced unprecedented affluence and access to consumer goods at accessible prices.

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[39] Labrousse, *Esquisse du mouvement des prix et des revenus en France au 18e siècle* (Paris: Montreux: Éditions des Archives contemporaines, 1984, 1933); Thompson, "Moral Economy"; Cynthia Bouton, *The Flour War: Gender, Class, and Community in Late Ancien Régime French Society* (University Park: Pennsylvania State University Press, 1993); Steven Kaplan, *The Famine Plot Persuasion in Eighteenth-Century France* (Philadelphia: The American Philosophical Society, 1982); Wilhelm Abel, *Massenarmut und Hungerkrisen im vorindustriellen Europa* (Hamburg: Parey, 1974). Recent work led by Dominik Collet has explored hunger crises and the concept of vulnerability in relation to the environment in early modern contexts. *Handeln in Hungerkrisen: Neue Perspektiven auf soziale und klimatische Vulnerabilität,* eds. Dominik Collet, Thore Lassen, Ansgar Schanbacher (Göttingen: Universitätsverlag Göttingen, 2012).

These complementary trends seemed to obviate serious concerns about dearth and food insecurity in modern Europe. However, there were still many mouths agitating against this invisible hand.

A more recent turn to histories of consumption has helped to illuminate some of these trends. In a first stage that was heavily indebted to the work of Pierre Bourdieu and other sociologists, historians tended to focus on consumption as a tool of self-fashioning.[40] In these accounts, consumption remains firmly in the realm of consumer choice, exploring the issue of taste and power.[41] A second, more recent wave of scholarship on consumption has expanded the field of inquiry: whereas once authors thematized luxury and bourgeois tastes in furniture and department store purchases, the newer crop looks low to explore poverty and necessity. Distinguished by the work of Frank Trentmann, these studies depart from concerns about self-

[40] Warren Breckman, "Disciplining Consumption: The Debate about Luxury in Wilhelmine Germany, 1890–1914," *Journal of Social History* 24, no. 3 (Spring 1991): 485–505; Leora Auslander, *Taste and Power: Furnishing Modern France* (Berkeley: University of California Press, 1998); Lisa Tiersten, *Marianne in the Market: Envisioning Consumer Society in fin-de siècle France* (Berkeley: University of California Press, 2001); John Brewer and Roy Porter, eds., *Consumption and the World of Goods* (London: Routledge, 1993); Colin Jones and Rebecca Spang, "Sans-culottes, sans cafe, sans tabac: Shifting Realms of Necessity and Luxury in Eighteenth-Century France," in *Consumers and Luxury: Consumer Culture in Europe, 1650-1850*, eds. Maxine Berg and Helen Clifford (Manchester: Manchester University Press, 1999).

[41] Konrad Jarausch and Michael Geyer, *Shattered Past: Reconstructing German Histories* (Princeton: Princeton University Press, 2002), 269; Alon Confino and Rudy Koshar, "Regimes of Consumer Culture: New Narratives in Twentieth-Century German History," *German History* 19, no.2 (2001): 135–161; Heinz-Gerhard Haupt, *Konsum und Handel: Europa im 19. und 20. Jahrhundert* (Göttingen: Vandenhoeck & Ruprecht, 2003); Hannes Siegrist, Hartmut Kaelble, and Jürgen Kocka, eds., *Europäische Konsumgeschichte: Zur Gesellschafts- und Kulturgeschichte des Konsums (18. bis 20. Jahrhundert)* (Frankfurt am Main: Campus, 1997); Michael Wildt, *Am Beginn der Konsumgesellschaft: Mangelerfahrung, Lebenshaltung, Wohlstandshoffnung in Westdeutschland in den fünfziger Jahren* (Hamburg: Ergebnisse Verlag, 1994).

fashioning to argue that consumption is not merely a matter of consumer choice and preference, but is also acted out in quotidian and apparently mundane decisions about resource use—such as showering or waste disposal—that are inherently limited by macro-level structures, such as state power.[42] This work has pushed back against notions of consumption as a matter of individual choice and self-expression and asked to what extent these decisions are constrained by structures of power and governance.

Related work has homed in on evolving understandings of necessity, questioning concepts such as the "vital minimum" and the standard of living.[43] These efforts have invited important considerations of the historically contingent nature of such concepts. Making use of source material such as workers' budgets or laboratory studies on respiration, scholars have drawn out the conflict between the dichotomy of luxury and need. Such work has demonstrated how these definitions have served as contested fields of politics and key structuring elements of modern societies, even as overall welfare improved. Histories such as Dana Simmons' work on modern France deliver two important lessons that this study attempts to carry forward: first, they show how debates about "minimums" were fundamentally knowledge problems involving the selection of study subjects that determined the course of setting norms; in other words, the question of how we come to know about need

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[42] Trentmann, "Introduction," in *The Oxford Handbook of the History of Consumption,* ed. Frank Trentmann (Oxford: Oxford University Press, 2012):1–22 and Trentmann, *Empire of Things: How We Became a World of Consumers* (London: Allen Lane, 2016).

[43] Dana Simmons' work explores the history of "necessity" by focusing on concepts of need in modern France. Her approach has influenced my thinking about these issues. Simmons, *Vital Minimum: Need, Science, and Politics in Modern France* (Chicago: University of Chicago Press, 2015). See also Judith Coffin, "A 'Standard' of Living European Perspectives on Class and Consumption in the Early Twentieth Century," *International Labor and Working-Class History* 55 (April 1999): 6–26.

is an exceedingly important determinant of how we respond to and ameliorate it. Second, they have demonstrated how the concept of a "minimum"—whether for nutrients, living space, or wages— was a key instrument of national social and economy policy for the modern welfare state. In essence, it was an indispensable organizational tool for rationalizing and managing populations.

Though food fits neatly into histories of consumption, it carries with it some peculiarities. In treating food as an expression of taste and luxury, or, at the other end of the spectrum, as an essential input characterized by its nutritional components, the circumstances of its production fade from view. This is a pity because in addition to sustaining bodies, food also determines land use in a very direct way.[44] What is needed, then is an account that places knowledge about food between the spheres of production and consumption to show how calculations of human need informed and were informed by land use. Taking food as a subject allows for the observation of one key way in which Germans came to know, use, and consume nature through the act of eating. This dissertation also contributes to our understanding of food history by connecting food consumption to environmental history.[45] It considers food as a product of specific landscapes and scientific-technological interventions into nature.

Chapter overviews

[44] William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton & Co., 1991).

[45] See: Gregg Mitman, "In Search of Health: Landscape and Disease in American Environmental History," *Environmental History* 10 (2005): 184–209.

"Feeding Germany" is structured around a series of debates centered on diet and food provisioning that took place between roughly 1871 and 1923. These debates constitute the core of five thematic chapters. This study does not claim to be a comprehensive account of German food policy during these years, nor is it an institutional history of nutritional science. The focus on debates allow me to look at the shifting and interacting priorities of a range of actors, including scientists, government officials, and scientific publics, and to trace concepts of food security through the scales of individual, national, and global economy. While the chapters proceed roughly chronologically, they are primarily thematic and thus at times reach into and across one another. Since this is not a neat history of German food policy, but rather a history of the interaction of ideas and discourses about food in academic science and politics, this flexibility is necessary.

Chapter One begins by diving into the issue of how specialized knowledge about food became part of larger social and political concerns beginning in roughly 1870. During this period, chemists and physiologists shaped concerns about malnourishment. Meat was at the center of this discourse. The concern for malnourishment represented a turn away from previous preoccupation with subsistence crises, and reflected a widespread acceptance of the essential roles of a variety of substances with nutritive properties. Nutritional science validated consumer demand for meat, eventually providing a language of objective minimums for political protest against high prices in the early twentieth century.

The second chapter examines the role of vegetarians within the Life Reform movement in formulating a critique of modern nutritional science in the decades before World War I. Despite functioning as a subculture in Imperial Germany, vegetarians helped shape the mainstream debate over the ideal diet. The vegetarian critique of academic nutritional science

pitted experiential knowledge about eating against experimental, laboratory-won knowledge. The colonial occupation of tropical environments in the second half of the nineteenth century also prompted a new attention to the role of eating habits in human development. Vegetarians' claims about the value of experiential knowledge was enhanced by expanding contacts with overseas peoples, which they interpreted as validating their position by overturning claims to "universal" dietary recommendations from the academy and medical professionals.

The third chapter addresses World War I and the years under blockade between 1914 and 1919 through the lens of surrogate (Ersatz) foods. Within months, Germany was transformed from a land of plenty to one encountering the problem of scarcity. As other historians have noted, the experience of the blockade and World War I acted as a sort of "initiation experience" to privation for Germans who had spent nearly a half-century accustomed to rising standards of living.[46] I argue that surrogate foods were employed as a technology to overcome shortage and resource depletion during the blockade. The payoff of treating surrogates as a technology is that it allows for a better appreciation of the role these products played as a means of social control to stave off the political problem of hunger. This approach also highlights the underlying assumption that progress in science and industry could overcome scarcity in the early twentieth-century.

Chapter Four explores attempts to engineer a solution to the postwar food shortages and dependency by promoting settlement (Siedlung) on agricultural land. The Settlement Law of 1919 forms the centerpiece of this chapter, as I dissect the debates leading up to its enactment and the various scales at which the projects were executed. These projects of

[46] Willi Oberkrome speaks of the "initiation experience" as formative in *Ordnung und Autarkie,* 28–35.

agricultural settlement served in the first place to promote German food security with an aim towards autarky while supporting population growth in the aftermath of war and destruction.

The fifth and final chapter takes up the topic of how nutritional values factored into the concept of an existence minimum in the early years of the Weimar Republic. Between the end of the war and the stabilization of rampant inflation in 1923, the regime faced a series of political, social, and financial crises. However, the inauguration of a republic under Social Democratic leadership saw the promise of a robust social welfare state. This chapter explores how nutritional knowledge was transmitted into the home, rendering the household the de facto site for postwar recovery efforts and causing the politicization and moralization of consumption decisions.

CHAPTER ONE

Die Fleischfrage: The Changing Place of Meat in the German Diet

When searching for an image emblematic of change over the nineteenth century, it is customary to reach for a depiction of the growing city or the railroad. In the German case, Adolph Menzel's Berlin-Potsdam Railway (1847), with its train belching smoke as it speeds away from the gray cityscape, has proven to be iconic.[47] The railroad served as a momentous technological breakthrough and transformed the land through which it traveled. Another type of scene reflecting change in modern daily life is the subject of Lovis Corinth's In the Slaughterhouse (1893). In it, five men butcher an ox carcass that is suspended in a room while blood washes across the floor (Figure 1). Corinth's expressive style brings both the physically strenuous task of slaughter and its setting to life. In the 1870s, two public slaughterhouses were opened in Munich, where Corinth painted. A decade later, Berlin followed suit.[48] The large public undertaking of erecting a municipal slaughterhouse was justified by consumer demand, hygienic concerns, and scientific and political support for meat consumption.[49] The

[47] In other national contexts, John William Turner's *Rain, Steam and Speed- The Great Western Railway* (1844) and Claude Monet's depiction of the locomotive (*Gare Saint Lazare*, 1877) have rendered the same subject matter and the change in aesthetic sensibility it engendered.

[48] The opening of these facilities spelled the end of the several hundred butchering facilities around the city where inhabitants might have seen, or smelled, the trade. Instead, they were forced to practice their trade at this new site. See GStAPK I. HA Rep. 120: "Die Errichtung öffentlicher Schlachthofe," Nr. 1, Vol. 7.

[49] Dorothee Brantz's research has focused on the institution of the slaughterhouse in nineteenth-century Paris and Berlin, noting the conspicuous disappearance of livestock from cities. Brantz, "Slaughter in the City: The Establishment of Public Abattoirs in Paris and Berlin, 1780–1914" (PhD Dissertation: University of Chicago, 2003), 350–370. Her work

success of nutritional experts in staking their claims about social progress in terms of meat consumption transformed it from a rare treat for working people to a right. The slaughterhouse became a key node in a system of food production, inaugurating a period in which geographies of production and consumption were being remade. The motif surfaces repeatedly in Corinth's work, fusing the painter's vivid style with one of the quintessential sites of transformation of modern life.

While at first glance it may seem that these two paintings—Menzel's railway and Corinth's slaughterhouse— have little in common, a sustained view reveals striking similarities. Changes in modern foodways, like the railroad, also reshaped both perspectives and landscapes. Both heralded new dimensions of mobility, bringing together people, animals, and products. The central place of meat in German diets was the result of scientific and technological intervention into nature. It too tethered the local—in this case the bodily— to larger national and even global networks.

The market for meat in Germany was among the greatest areas of growth over the course of the nineteenth century, with a noticeable uptick in consumption in the decades preceding the turn of the century. Growing demand for meat dictated the opening of modern slaughter facilities and regimes of inspection in order to ensure supply and safety standards. While these facilities were wedded to concerns about technological improvement and public hygiene, they also reflected the centrality of meat to German diets and the economy of the modern state.

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appears alongside several other illuminating contributions in *Meat, Modernity, and the Rise of the Slaughterhouse,* ed. Paula Young Lee (Durham: University of New Hampshire Press, 2008).

Figure 1 Lovis Corinth, "In the Slaughterhouse" (1893)

Corinth's scene, which requires the viewer to mentally link slabs of meat ready for consumption back to the animal and the messy act of slaughter, constituted a radical reminder for a public that had become accustomed to more appetizing presentation in the butcher's shop or store.[50] This detached presentation, paired with increasing meat consumption, can be understood as a hallmark of modernity. In Germany, it was initially heralded as a development and a sign of national prosperity. The diets of wealthy German were distinguished from those of the lower classes by their access to a variety of types of meat

[50] For more on the development of decentralized small grocery stores, see Uwe Spiekermann, *Basis der Konsumgesellschaft: Entstehung und Entwicklung des modernen Kleinhandels in Deutschland, 1850–1914,* (Munich: C.H. Beck, 1999), 165–168.

throughout the week.[51] For centuries, a diet rich in meat had been the province of the well-to-do classes, while the poor tended to do without. By the turn of the century, meat had become widely available across class lines in the form of lower prices, cheaper cuts and sandwiches.[52] In spite of demographic patterns which saw people abandoning the countryside for the city, where living conditions were prohibitive for animal husbandry, by 1900 Germans at all levels of society were eating more meat.

The slaughterhouse scene serves as a reminder of the outsized importance of meat in late nineteenth-century Germany, and how its ubiquity remade the nation nutritionally, economically, and geographically. The issue of meat consumption was not merely a matter of the table, it also served as an important index of health and social welfare. Nineteenth-century nutritional scientists danced around the question of minimum and optimum dietary standards. Their work traversed frontiers between human and social sciences by taking laboratory-based knowledge into cities to assess the impact of occupational transformation, migration, and depressed wages on the human body. During the period from roughly 1870 through 1914, chemists and social reformers in Imperial Germany developed a specific discourse on hunger that was shaped by concerns about malnourishment. Meat was at the center of this discourse.

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[51] Carl Ernst von Malortie's work *Das Menu* was first published in 1878 and set the standard for European high cuisine. In it, the Hanoverian Hofmarschall published a series of menus and recipes taken from European courts and historical occasions, presenting menus from dinners for the Bonaparte family and for the German Chancellor. Not surprisingly, these menus involve several courses of meat dishes.

[52] Hans-Jürgen Teuteberg has argued that there is significant evidence that the middle and lower classes also contributed significantly to increased meat consumption, especially given that consumption and livestock statistics reveal a shift from beef to pork, which was cheaper and more accessible. Teuteberg, "Studien zur Volksernährung unter sozial- und wirtschaftsgeschichtlichen Aspekten," in *Der Wandel der Nahrungsgewohnheiten unter dem Einfluß der Industrialisierung,* Teuteberg, Günter Wiegelmann, eds., (Göttingen: Vandenhoeck & Ruprecht, 1972), 130.

The concern for malnourishment represented a turn away from previous preoccupation with subsistence crises, and reflected a widespread acceptance of the essential roles of a number of substances with nutritive properties. It also demanded a more finely-tuned understanding of nutrition. Whereas the plight of a starving individual was immediately recognizable, malnourishment rested upon a divide between laymen and experts.[53] Only specialists could properly comment on malnourishment and attempt to identify deficiencies.

The dual development of a more nuanced understanding of nutrition with government interest in hygiene further complicated such matters: negotiating these issues was not just a matter of expert opinion versus tradition, or even preference, but also saw key representatives of trade and interest groups jockeying for influence. Specialists asked whether people should consume meat. If so, what was the ideal quantity? The growth of meat consumption led to a flourishing of specialists in its production and distribution who administered to the problems of supply, demand, and quality. This chapter explores the way that these concerns about adequate nutrition shaped debates about Germany's rapid industrialization, posing questions about what it meant to optimize food consumption. By taking a close look at the ways that nutritional values were used to express anxiety about uneven economic development and its social consequences, I argue that the issue of food provisioning became a central critique of the modern German state. Furthermore, I argue that nutritional knowledge—in this case, knowledge specifically about protein—served to connect contemporary notions of the bodily economy to the larger national one.

[53] James Vernon, *Hunger: A Modern History* (Cambridge: Harvard University Press, 2007).

Notions of dietary progress

By 1900, Germans reveled in a diet flush with meat. Especially when compared with other agricultural products, its "take-off" was decisive. Between the period from 1850–54 and 1909–13 the consumption of grain per capita grew by 37%, for milk and milk products by 41%, and for meat a staggering 122%.[54] In Berlin, which experienced a population explosion during the early years of Imperial Germany, average meat consumption per capita jumped by 10 kg in the period between 1875–77 and 1884–85 (Figure 2). Whereas only decades before meat scarcely appeared on the plate of the lower and middling classes, by 1900 it was taken for granted.

Year	Amount in kg, per capita
1845	45-50
1854-61	43.5
1860-69	45
1870-74	52
1875-77	56
1884-85	76
1886-90	78
1891-95	70
1890	69.8
1894	72.9

Figure 2 Average Meat Consumption in Berlin, 1845- 1894.[55]

The shift to a meat heavy diet accompanied Germany's industrial "take-off," or a shift to sustained economic growth on the basis of productive power. Rising meat consumption

[54] Teuteberg, "Verzehr von Nahrungsmitteln in Deutschland pro Kopf," *Archiv für Sozialgeschichte* 19 (1979), 344–347. Also Joseph Bergfried Esslen, *Die Fleischversorgung des Deutschen Reiches* (Stuttgart: Verlag von Ferdinand Enke, 1912), 47.

[55] Teuteberg and Wiegelmann, *Der Wandel der Nahrungsgewohnheiten,* 118.

appeared as an accompanying feature of urbanization, industrialization, and flight from the land.[56] Growth in meat consumption could be traced to rising incomes, increased welfare, and the convenience of obtaining it in urban areas.[57] The preference for meat was not simply a matter of taste. Meat also served a functional role by providing workers outside the home with condensed, nutritional meals well-suited to industrial work.

Popular conceptions of prevailing scientific wisdom held that meat literally embodied productive power. German physiology rested firmly upon the chemical foundations provided by Justus Liebig's work. His laboratory at Gießen was an innovative hub at the heart of many branches of applied chemistry, and in the 1840s he took up the subject of human nutrition.[58] As a young man, Liebig had witnessed the massive subsistence crisis of 1816. The experience of famine resulting from largescale crop failures across Europe appears to have remained with him throughout his life, as he turned towards enhancing the productivity of the soil and determining the nutritive properties present in various foods. In his foundational study Animal Chemistry, he posited that the components of blood and muscle constituted the source of all

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[56] Regions such as Saxony, where industrialization began rather early, also registered heightened meat consumption in this period. From 1875 to 1895, on average 5 kg more meat was consumed per person each year than in the rest of the German Empire. Hans Jürgen Teuteberg, "Der Fleischverzehr in Deutschland und seine strukturellen Veränderungen," in *Unsere tägliche Kost: Geschichte und regionale Prägung,* eds. Teuteberg and Günter Wiegelmann (Münster: Coppenrath, 1986), 63-73, here 69.

[57] Joseph König, *Die menschlichen Nahrungs- und Genussmittel, ihre Herstellung, Zusammensetzung und Beschaffenheit, nebst einem Abriss über die Ernährungslehre* (Berlin: Julius Springer, 1904, 1880), 2:415.

[58] Mark Finlay, "Quackery and Cookery: Justus von Liebig's Extract of Meat and the Theory of Nutrition in the Victorian Age," *Bulletin of the History of Medicine* 66, no. 3 (Fall 1992): 404-418 and William H. Brock, *Justus von Liebig: The Chemical Gatekeeper* (Cambridge: Cambridge University Press, 2002).

nutritional value. Thus, the body found itself in a constant state of replenishment for physical work, assimilating inputs of animal products into human tissue through digestion and rest.[59] Meat was understood as the purest, most assimilable form of the most essential nutrient, protein, and observers celebrated its wide availability. In Liebig's view, additional processes of taking in carbon and oxygen to produce energy were secondary.

Liebig's chemical foundations of nutrition cast a long shadow in Germany. As an emerging field, the methods of late nineteenth-century German nutritional science (Ernährungswissenschaft) had a decidedly physiological bent. Scientists measured input, excretions, and respiration to better understand the bodily economy. However, practitioners positioned their findings in meaningful dialogue with broader questions of both hygiene and political economy. They not only investigated whether a given food was nourishing, but also applied these laboratory findings and made recommendations for dietary reform, schemes of substitution, and the reorientation—or reinforcement—of geographies of trade and commerce. Carl Voit, who was among Liebig's most prominent students, pursued the study of human physiology. An early career discovery that urine was the product of metabolism, not simply an oxidation process in the blood, proved to have exciting methodological applications for the study of nutrition.[60] Voit went on to spend much of his career examining the excretions of

[59] Liebig's *Animal Chemistry* was published in German as *Die organische Chemie in ihrer Anwendung auf Physiologie und Pathologie* (Brauschweig: Vieweg, 1842). An English translation appeared the same year. For a compressed account of the main findings of Liebig's *Organische Chemie* with respect to human nutrition, see Kenneth Carpenter, *Protein and Energy: A Study of Changing Ideas in Nutrition* (Cambridge: Cambridge University Press, 1994), especially 48–53.

[60] Theodor Bischoff and Carl Voit, *Gesetze über die Ernährung des Fleischfressers* (Leipzig & Heidelberg: Winter'sche Verlag, 1860).

different animals (especially dogs) to determine nutritional values and metabolic processes. In particular, Voit's work with Max von Pettenkofer using a respiration apparatus allowed the men to measure human metabolism by measuring the body's carbon dioxide production over several days while varying food intake and activity.[61] These investigations tended to reinforce the importance of protein.

In the 1870s and 80s, physiologists extended their reach from clinical questions to the wider population. This endeavor was helped along by an altogether different methodological approach: instead of monitoring subjects within closely controlled laboratory settings, physiologists employed statistics. Turning to workers' budgets, physiologists attempted to make sense of their calculations and their real-world applications. Such work coincided with a growing state interest in statistics as the basis of policy, most noticeably spearheaded by Ernst Engel, director of the Prussian Office of Statistics. In addition to reforming Prussian statistical surveys to better account for social and economic statistics, he trained his eye on a formidable compilation of workers' budgets collected by others. By analyzing decades of household budgets from across Europe he came to the conclusion dubbed "Engel's law": since the need for food was fixed, it followed that the poorer the family, the larger proportion of its budget went to food. As household income rose, a smaller percentage of the budget went to food.[62] Engel's insight proved fundamental in constructing the concept of a standard of living, and his methods for budget analysis were eagerly taken up by physiologists who hoped to reconcile

[61] Max Pettenkofer and Carl Voit, "Untersuchungen über den Stoffverbrauch des normalen Menschen," *Zeitschrift für Biologie* 2 (1866): 459–573.

[62] Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning,* trans. Camille Naish (Cambridge: Harvard University Press, 2002) 222–225.

human need with economic realities. Combining laboratory knowledge of human metabolism with statistical studies, physiologists moved unencumbered across the boundaries between human and social sciences in their investigations of food consumption.

The "meat question" (Fleischfrage) that was hotly debated from 1870 onwards centered on the role of meat as a nourishing substance. It resulted from the crude equivalence between protein, meat, and work. Most physiologists, under the influence of Liebig's teachings, held that protein discharged in urine was the result of "burning off" of excess protein beyond that needed to cover the deficit resulting from physical work.[63] In fact, Voit disproved the baseline of this theory, which held that increased physical work led to increased protein use. The physiological concept of "luxus consumption" emerged in reference to the discharged protein in urine that supposedly was not needed to replace bodily work. However, more sophisticated minds, such as Voit, insisted on accounting for the invisible, or internal work performed by the body. Thus, he posed the question, "is there a hard boundary where the necessary is provided and luxury begins?"[64] Voit presciently argued that it was impossible to determine a fixed point between the quantity necessary for restoration of protein consumed in physical work and the so-called "unnecessary" surfeit that the body discharged. Instead, he considered the excess protein beyond that consumed in work (the so-called "luxus") to be a contribution towards overall stores that was used by organs for other internal processes. "Hunger is in no way the measure of the necessary and a large surplus of protein is not

[63] Voit, "Bemerkung über die sogenannte Luxusconsumption," *Zeitschrift für Biologie* 4 (1868) 517–530, here 524, 526.

[64] Voit, "Luxusconsumption," 524-525.

unnecessary, rather it creates a condition of certainty in the body."[65] This supposed excess could not be considered as a luxury, as it ensured the smooth functioning of organ systems and a hedge against periods of irregular intake.

The body, argued Voit, functioned less like a perfect thermodynamic machine and more like a room heated with a poorly constructed oven, "whose construction we cannot change but we must accept as a given […] so we must use a lot of wood to warm our room pleasantly; but this isn't a 'luxury' for the bad oven because we don't want to freeze, so we have no choice but to use so much fuel."[66] In the oven metaphor, abundant protein intake functioned as the wood. Though it was not being used efficiently as a direct replacement for heat, it was nonetheless necessary.

Voit's intervention turned away from notions of a bare minimum for replacement and towards necessary protein reserves. Correspondingly, his later work set recommendations for protein sky-high. Having established impeccable experimental credentials, Voit began undertaking investigations of wider social application in the 1870s. In 1872, the Munich Magistrate commissioned a study of the city's public kitchens, where the poor received a warm mid-day meal. Diligently examining the standards here, as well as in orphanages and prisons, Voit published his studies along with a set of guidelines in 1877.[67] Recommendations

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[65] Voit, "Luxusconsumption," 525. Max Rubner later characterized this realization in physiology as a "major step forward." MPG Archiv: Rubner Nachlass III. Rep 8 Akt. Nr 133-4, Rubner, "Wandlungen," 69, 71. See also Rubner, "Über Kompensation und Summation der funktionellen Leistungen des Körpers," *Sitzungsbericht der Kgl. Preuß. Akad. der Wissenschaften* (Mar 17. 1910).

[66] Voit, "Luxusconsumption," 530.

[67] Voit, *Die Untersuchung der Kost in einigen öffentlichen Anstalten. Für Aerzte und Verwaltungsbeamtezusammengestellt* (Munich: R. Oldenbourg, 1877).

for minimum values followed: for an average person weighing 70 kg, Voit recommended a daily minimum intake of 118 grams of protein.[68] Voit showed ambivalence towards the immediate equation between protein and meat: "It shouldn't be denied that one can also live off vegetables alone and still perform hard work […] but no one would want to be responsible for taking a soldier's meat away."[69] Yet despite this personal hesitation, the fixing of the protein standard lent credence to the taste for meat. "Meat makes meat," as the popular saying held, reflecting the common understanding that by eating animal tissue, humans ensured their ability to replenish themselves and reproduce.

Studies conducted in public institutes such as communal kitchens, jails, and barracks demonstrated that the issue of proper feeding and provisioning spoke to concerns not just about the health and strength of individuals, but of entire populations. The introduction of a program of rational nutrition based on Voit's objective, scientific criteria supported programs for disease prevention and gains in national productivity. In this way, discussions of food became linked to larger discussions of national standing and strength. As one economist noted,

> One can justifiably trace the influence of better nutrition through the history of different peoples and note that it influences not only the temperament of individuals, but also the vigor they display for producing and maintaining themselves […] in this sense it is so that a certain relationship between the eating habits of populations and their overall political and social character cannot be denied, and so for these purposes the development of animal husbandry should be followed with great interest."[70]

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[68] Voit, *Die Untersuchung,* 25.

[69] Voit, *Die Untersuchung*, 21.

[70] Emanuel Hauser, *Die Entwicklung der Viehzucht in Preußen von 1816 bis 1883: Mit besonderer Rücksicht auf die beiden einheitlichen Zählungen 1873 und 1883 für das ganze deutsche Reich* (Jena: Fischer, 1887), 4.

Since proper feeding exerted such a great influence on the development of nations, it also generated state interest. Through scrupulous comparative statistics and qualitative descriptions, nutritionists, economists, and anthropologists made just such comparisons (Figure 3). In particular, data on the comparative meat consumption of different industrialized nations frequently appeared, reflecting preconceived civilizational hierarchies and narratives of German progress.

	Germany	Australia	USA	Great Britain	France	Belgium & Holland	Austria-Hungary	Russia	Spain	Italy
Per year	52.3 kg	111.6 kg	64.4 kg	47.6 kg	33.6 kg	31.3 kg	29 kg	21.8 kg	22.2 kg	10.4 kg
Per day	144 g	306 g	149 g	130 g	92 g	86 g	79 g	59 g	61 g	29 g

Figure 3 Meat Consumption per capita (1899)[71]

[71] König, *Chemie der menschlichen Nahrungs- und Genußmittel*, 416.

Programs of scientifically grounded "rational nutrition" resonated within newly formed state-sponsored public health infrastructure of the 1870s and 1880s.[72] The Imperial Health Office (Kaiserliches Gesundheitsamt), which was established in 1876 to oversee medical and veterinary affairs, published a guide for the public known as "The Little Book of Health" (Gesundheitsbüchlein) each year.[73] Strongly influenced by the social hygiene movement, the publication emphasized the importance of maintaining health and not just rooting out sickness.[74] These guides emphasized the superiority of protein from animal sources over other types of food. From the mid-1880s on, the Imperial Health Office adopted Voit's protein minimum and recommended that an average working adult consume 118 grams of protein per day for a normal subject—a working adult male. Only a diet rich in meat could

[72] The role of improved diet as a prophylactic for the worst outbreaks of disease was recognized early in the century. In Berlin, after a cholera outbreak in 1831, the city administration decided to add meat to meals in soup kitchens to better nourish the poor and defend against illness. See Rita Aldenhoff-Hübinger, "Bevölkerungsexplosion einer Großstadt und Hunger in Berlin," in *Ortstermine: Stationen Brandenburg-Preußens auf dem Weg in die moderne Welt* (Berlin: Henschel, 2001) 76. In Hamburg, after another cholera outbreak in 1848, citizens were advised to consume more meat to improve resilience to disease. See Richard Evans, *Death in Hamburg: Society and Politics in the Cholera Age, 1830–1910* (Oxford: Oxford University Press, 1987), 250. In the decades that followed, specialists could focus on the optimization of nutrition in the absence of subsistence crises and epidemics. Prussian efforts for provisioning the poor with adequate food between 1848 and 1878, including from horse meats, can be found in GStAPK: I. Rep. 120 A, Tit VIII, 1 Nr 5.

[73] For a history of the Imperial Health Office's development, organization, and first decade of activity, see *Das kaiserliche Gesundheitsamt: Rückblick auf den Ursprung sowie auf die Entwickelung und Thätigkeit des Amtes in den ersten zehn Jahren seines Bestehens* (Berlin: Springer, 1886).

[74] Max von Gruber, "Einleitung," in *Handbuch der Hygiene,* eds. Max Rubner, Max von Gruber, Martin Ficker (Leipzig: S. Hirzel, 1911) 1:3–5. See also Wolfgang Eckart, "Sozialhygiene, Sozialmedizin*,"* in *Enzyklopädie Medizingeschichte,* eds. Werner E. Gerabek, Bernhard D. Haage, Gundolf Keil, Wolfgang Wegner (Berlin, New York: de Gruyter, 2005), 1344–1346.

deliver such a large quantity.[75] By promoting knowledge about and access to a rational diet, the guide's authors hoped that the stock of the population could be improved.

The Gesundheitsbüchlein contained guidelines, not guarantees. While the newly formed Health Office aligned its recommendations with those of leading physiologists, it played a limited role in controlling distribution. Though in official publications the state buttressed the view that abundant meat intake was medically and socially desirable, it took little action to ensure standards of nutrition were met. Nutritional knowledge provided a useful diagnostic for the national body, but tended to contribute to a growing gulf between expert knowledge and the actual practice of state intervention in distribution.

"Detached from the natural economy": Urban and rural consumers at the turn of the century

As the effects of industrialization and urbanization became more pronounced, nutritional science became an indispensable tool for assessing social change. Assessments of health based on contemporary nutritional knowledge often undercut narratives of economic progress and development. By providing a measure of the effects of scarcity and misdistribution, nutritional values helped to flush out the full dimensions of the social question. Far from being confined to laboratory studies, nutrition provided a language for addressing the structural issues and lags inherent in agricultural and economic development.

When speaking of the social question, scholars have often focused on the urban poor.[76] However, the economic transformations of the late nineteenth century proved equally

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[75] *Gesundheitsbüchlein: Gemeinfassliche Anleitung zur Gesundheitspflege* (Berlin: Springer, 1895), 56-57.

[76] The work George Steinmetz has remained a landmark study in German history: Steinmetz, *Regulating the Social: The Welfare State and Local Politics in Imperial Germany* (Princeton:

dramatic for rural populations. When Max Weber evaluated the situation of the agricultural workers east of the Elbe in 1892, he kept his eye trained on two areas: their importance to Germany's national interest as well as the material conditions under which they lived. In doing so, the sweeping changes that their diet and health had undergone over the course of a few decades caught his attention:

> The introduction of greater meat consumption in the food budget is in itself a welcome development in people's nutrition (Volksernährung); but for the agricultural worker under the current circumstances the certainty of an appropriately nourishing diet is more unlikely than before.[77]

What accounted for this apparently contradictory situation, wherein agricultural workers were malnourished in spite of the auspicious appearance of more meat in their diets? Traditional patterns of cultivation lent themselves to a diet based on cereals and dairy, with the occasional addition of meat on Sundays and holidays. The combination of cereals, milk, and cheese guaranteed, per Weber, that the working body received protein, fat, and starch in proportional quantities.[78] Recent shifts towards intensive agriculture, involving wheat in place of rye and increased cultivation of root vegetables and cash crops, meant that these staples had been largely replaced by other foods. The deficiencies Weber cited were an expression of the same

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Princeton University Press, 1993). For recent examples outside of Germany, see Robert Castel, *From Manual Workers to Wage Laborers: Transformation of the Social Question* (New Brunswick: Taylor and Francis, 2003); Pamela M. Pilbeam, *French Socialists before Marx: Workers, Women and the Social Question in France* (Montreal: McGill, 2000)

[77] In the original German: "Die Einführung eines vermehrten Fleischkonsums in das Nahrungsbudget ist an sich ein unzweifelhafter Fortschritt der Volksernährung, allein unter den jetzigen Verhältnissen ist gerade für die Landarbeiter die Sicherheit, dass ihre Nahrung zweckmässig zusammengesetzt sei, eine geringere als früher." Martin Riesbrodt, ed., *Die Lage der Landarbeiter im ostelbischen Deutschland 1892,* Max Weber Gesamtausgabe 1, vol. 3 (Tübingen: J.C.B. Mohr Paul Siebeck, 1984) 898. Emphasis added.

[78] Weber, *Lage der Landarbeiter*, 898.

circumstances that led him to study the region as part of the Association for Social Policy's (Verein für Sozialpolitik) 1890s survey of flight from large landed estates. The erosion of the patriarchal system released masses into the cities, but it also forestalled the possibility of securing one's own livelihood for workers who remained behind.

For agricultural workers the primary question after meeting their basic needs revolved around the possibility of ascending the rural social ladder to a state of self-sufficiency. The theme of self-sufficiency recurs throughout Weber's work–while the German farmer became the darling of nationalists and conservatives alike as a result of his supposed virtuousness and self-sufficiency, the actual social constitution behind this idealized image was crumbling away. East of the Elbe, where the patriarchal manorial system (Gutswirtschaft) was the rule, the independent farmer had never existed. Under the traditional arrangement, the agricultural worker reached the height of his ascent when he reached the status of Instmann, or worker cum smaller farmer, a position that carried a secure working contract with residence on the manor and payment in both cash and kind. In this way, a worker could derive his own existence from the manorial system. While once this was a coveted position among agricultural workers, by the 1880s it had been cast aside in favor of more market-oriented capitalism.[79] Instead of aspiring to the status of Instmann with a secure plot of land, workers drifted into either urban and industrial centers, eager to cash in their wages for sources of leisure, or into the manor house in favor of lighter work.[80] The temptation of this lifestyle was obvious to observers: in most respects, the transition from farm worker to proletarian

[79] Weber, *Lage der Landarbeiter*, 921.

[80] Weber, *Lage der Landarbeiter*, 899.

represented a reprieve from dawn to dusk hard physical work and a livelihood at the mercy of the vicissitudes of weather and the world market. Weber elaborated,

> The farmer no longer needs to wonder whether frost or hail will damage the harvest, or whether disease will decimate the livestock, or whether foreign bread and meat obtained from ruthless exploitation overseas will rob him of his yield. […] But that doesn't change the fact that the former farmer becomes a proletarian, that his interests are now those of the consumer and that he loses his stake in the single plot that stood right before his eyes and becomes another member of the enormous, undifferentiated mass of the dispossessed.[81]

Given their vulnerability to all sorts of natural and market forces, many farmers calculated that it was in their best interest to give up the trade and relocate. In doing so, they lost access to land and reliable, albeit seasonal, recourse to staples that had nourished their stock for generations. In turning away from their hereditary right to a plot on the estate, they declined participation in the rural social ladder and submitted themselves to the life of a proletariat, and by extension, a consumer.[82] Nature was a fickle master and more exciting prospects beckoned in nearby cities and industrial centers.

It was not as if remaining on the estates presented an appealing alternative. The vacuum left behind by the passing of the patriarchal manorial system spelled the beginning of major changes in the structure of landholding. Those who stayed to work the land faced severe challenges as employer relationships evolved to meet the exigencies of the market. For example, the practice of stall raising livestock became increasingly widespread, allowing for quicker times to maturity and speedy fattening while also reducing pasture land. The

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[81] Weber, *Lage der Landarbeiter*, 901.

[82] For examination of the concept of the rural "social ladder" which appears in much of the social policy writing of the 1880s and 90s, see Elizabeth Jones, "The Rural 'Social Ladder': Internal Colonization, Germanization, and Civilizing Missions in the German Empire," *Geschichte und Gesellschaft* 40, no. 4 (Dec. 2014): 457–492.

diminished need for land allowed for pigs and cattle to be fully assimilated as part of an intensive system of inputs and outputs, engendering important changes in the geography of shortage and surplus. Yet it had long been customary for agricultural workers to keep their own animals which were permitted to roam freely on the estate with those of the manor. The transition to stall raising removed this privilege from agricultural workers. The practice of maintaining a cow, which had been allowed to graze in the estate pastures, had given families a degree of food independence and reliable source of milk and cheese, proved essential to workers' wellbeing. In place of these traditional privileges, workers received a wage for their labor. However, this wage was not generally sufficient to purchase a similarly nourishing diet. While expressing disapproval for out-migration and the temptations of an easier life in the city, even Weber could acknowledge the impossible circumstances these workers faced in the new system. The lack of access to their own livestock, which had been a feature of the manorial economy for centuries, sat squarely within this trend away from self-sufficiency.

It was a horrible irony that those closest to the land on which food was grown were often among those most poorly nourished. While estates had long been outward-looking, oriented towards transregional and national markets, competition from abroad beginning in the 1870s drove down prices and led to sector-wide transformations in agriculture. Shifting agricultural practices, including the increased cultivation of root vegetables and cash crops, carried consequences for workers' diets and weakened their constitutions. This situation also carried a price for national well-being: politicians and economists had long credited the manorial system with preserving the standard of sustenance (Nahrungsstand) for future conscripts. A life in the fields prepared able-bodied young men for military service. The supply of young men who willingly worked in the elements dwindled towards the close of the

century; so it could be said that the recent development of large, capitalist farms came at the price of the standard of sustenance. National military strength had long been drawn from the open land of the German East.[83] Weber's remarks about increased meat consumption and worsening nutritional standards gestures towards an important debate about the centrality of meat in the German diet. The stakes of this debate were not only narrowly confined to the field of nutritional science, but also involved Germany's political economy and national interest.

Weber's observations on the social constitution East of the Elbe introduce the knotty problem facing German reformers. In an industrialized, rapidly urbanizing society, the availability of meat at lower prices transformed the traditional diet. While on the one hand, these changes made meat and meat products available to a greater number of people, they also eroded the diets comprised mainly of cereals and dairy which met nutritional needs. With a growing number of people buying their food and not cultivating it themselves, the years between 1870 and 1914 witnessed the creation of more stable and recognizable categories of consumers and producers. The state, and reform-oriented associations like the Association for Social Policy (Verein für Sozialpolitik), sought to reorganize the relationship between producers and consumers, which had become increasingly separated through the growth of regional industrial centers and migration.

The plight of agricultural workers East of the Elbe highlighted the way that local

[83] Weber, *Lage der Landarbeiter*, 917. Teuteberg notes that in 1828 a military report noted that in some industrial regions of the Rhineland, recruits were unfit for service as a result of child labor and they would no longer meet recruitment quotas. This report resulted in a regulation on March 9, 1839 regarding the employment of children in factories, which represented the first law of social policy in Germany. Teuteberg, "Studien zur Volksernährung," 204.

consumption concerns were subsumed in the logic of a growing transregional, at times global, market. However, what was true in the countryside rang just as true in the cities. Wage earning among the working class created nutritional deficiencies and reflected overall social precarity. In his 1902 study of German nutrition submitted to Gustav Schmoller's political science seminar of the University of Berlin, Alfred Grotjahn explored the transformation of dietary habits.[84] Grotjahn was something of a peculiarity in Schmoller's seminar: as a trained medical doctor, he brought his earlier training to bear on issues of economic and social reform by translating concerns from individual bodies to the social body. His career as a doctor in Berlin's working-class district of Kreuzberg was spent treating diseases like tuberculosis and alcoholism that disproportionately afflicted the poor. These experiences, and a curiosity about the structural origins of the deep inequalities on display in German cities, convinced him of the importance of understanding social milieu and environment to treat disease. To better understand the pressing origins of the "social question," he resolved to visit Schmoller's seminar to expand his approach to study the systematic problems that manifested themselves in the bodies of individual patients.

Grotjahn's study fused medical concerns with economic methods and represents an early example of his theory of social hygiene, which held that the social milieu of patients

[84] The study itself is structured by membership in a particular class. First, Grotjahn treats the diet of the well-to-do, which is more or less freely chosen; then that of the urban artisan, *Unterbeamten* and well-employed worker; third that of the rural worker, farmer, fisher, or farm hand; and finally that of the of worker who secures his living purely through wage labor in a large city. Alfred Grotjahn, *Über Wandlungen in der Volksernährung* (Leipzig: Duncker & Humblot, 1902).

influenced their illnesses as well as their prospects for recovery.[85] Surprisingly, he diagnosed the problem facing both urban workers and well-to-do classes as resulting from their complete disconnection from the act of food production. While on the one hand the interconnectedness of the modern economy was a testament to an increasingly sophisticated civilization (wachsende Kultur), it represented a reversal of not just tradition but also nature's laws. "Man extracts his food with which he satisfies himself most naturally from his immediate surroundings," wrote Grotjahn.[86] Modern industrial society dissolved the local pattern of consumption rooted in the surrounding environment– Grotjahn repeatedly refers to modern man's condition as "detached from the natural economy."[87] The state of "detachment" disrupted traditional ways of eating which was then manifested in poor nutrition. More concretely, in speaking of detachment he referred to the absence of opportunities for supplementing income and diet in traditional ways, such as through a small garden or foraging in woods, which were denied to those who lived in urban areas.

It was not only inhabitants of cities and towns who displayed troubling dietary shifts. In agricultural communities, traditional cultivation methods, such as the three-field method or

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[85] Grotjahn's views on social hygiene were attacked by eugenicists and by 1926 he had come around to their point of view, embracing racial hygiene as a way of improving the German nation.

[86] Grotjahn, *Wandlungen,* 11.

[87] In the original German: "losgelöst von der Naturalwirtschaft" Grotjahn, *Wandlungen*, 11. This expression, and the concept of man attached to his place through his consumption of its food, foreshadows the use of the term "bodenständig," which became a priority for breeding plants and animals that could be grown or nourished on German soil in the 1920s and 30s. For a fascinating treatment of *bodenständig* pigs, see Tiago Saraiva, *Fascist Pigs: Technoscientific Organisms and the History of Fascism* (Cambridge: MIT Press, 2016), 101–136.

Schlagwirtschaft, which featured alternation between cereal cultivation and pasture, ensured that the backbone of the diet, cereals, remained unchanged. In recent times, the importance of cereals in the diet had waned in favor of root and cash crops for animal feed. Thus, a diet primarily composed of different grains and milk products had been replaced by preference for meats and the predominance of potato, which lacked the nutrients of traditional cereals such as rye, spelt or oats.[88]

Grotjahn's main findings largely concurred with Weber's: although the century had witnessed improvements in nutrition overall, the shift towards market-oriented agriculture caused lower-class diets–even among the rural population– to deviate from their traditional foundations. In the absence of rights to their own plots of land to supplement wages, they sought to imitate that of the well-to-do by purchasing more meat and refined foods. The problem therein was that average wages could not purchase a sufficient quantity of such food. The expense of meat prevented the purchase of other important supplemental foods, namely grains or dairy, to round out the diet. Thus, members of these lower classes found themselves in a state of chronic undernourishment (Unterernährung). Both Grotjahn and Weber's observations highlighted the complexity of fixing dietary recommendations. On the whole, Germans enjoyed greater prosperity and declining mortality around the turn of the century. Yet nutritional deficiencies suggested all was not well.[89] While physiologists had confirmed the importance of meat in the diet, a one-sided pursuit of more meat at the expense of other food groups also proved undesirable.

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[88] Grotjahn, *Wandlungen*, 59.

[89] MPG Archiv: Rubner III. Abt. Rep. 8 Akt. Nr. 133-4, Rubner, *Wandlungen in der Volksernährung* (Leipzig: Akademische Verlagsgesellschaft, 1913), 2–3.

Isolating the nutritive properties of meat

The problem of how to ensure the delivery of adequate animal protein to an increasingly urban nation was of great importance to political economists and hygienists. In a lecture delivered in 1873, Max von Pettenkofer, a leading figure in the hygienic movement and frequent collaborator of Carl Voit in Munich, pronounced,

> It is a remarkable fact that today almost every educated farmer knows exactly how much protein and other substances he must feed to a hog, a sheep, a cow or an ox in order to produce a certain result. He knows what composition of fodder is required for maintenance, for fattening, for the production of milk or for muscular development. Man, however, has hardly been touched by the rays of the rising sun of the science of nutrition. Many, of course, will say: "We do not need these rays in order to live well; we have done it before without them." It is quite true that plants and animals and man existed, developed and thrived long before scientific principles could be established for their nutrition. […] Science does not precede existence and life; on the contrary, science in itself is only a slowly and late ripening fruit of civilized life—but we must not forget that life is being fertilized by this fruit over and over again. Since problems of nutrition, following powerful trends of science, are being investigated along such lines, we already obtain more grain from the same fields, more meat from the same animals than heretofore, with less material."[90]

His dismal appraisal of the progress of human nutrition served as a call to arms to better understand the complexities of human nourishment. For centuries, meat had been prized for its strength-giving properties. The developments in nutritional science over the course of the nineteenth century had established the superior properties of meat through modern laboratory science, setting up a rough equivalence between meat and protein. Training in nutritional chemistry privileged the role of protein in human nutrition, building upon the foundational teachings of Liebig, whose mid-century work established protein as the most important

[90] Max von Pettenkofer, "The Value of Health to a City, Two Lectures, delivered in 1873," trans. Henry E. Sigerist, *Bulletin of the History of Medicine* 10 (1941) 603.

macronutrient.[91] Similarly, Voit's work at the Munich Physiological Institute in the 1870s further contributed to establishing a popular equivalence between protein and meat.[92] While the pace of human nutritional science remained slow, as Pettenkofer acknowledged, its findings quickly permeated the world of commercial food products. In valorizing protein as the key to robust health, nutritional scientists opened up a door for collaboration with entrepreneurs to revolutionize the world of industrial foods.

The interplay between nutritional expertise and the commercial sphere can be examined through the trajectory of a single product: meat extract. The role of meat in a proper diet had long been the object of study; in fact, it is fair to say that meat, and specifically the question as to which of its components provided nourishment, was a cornerstone problem of modern nutritional sciences. In the first half of the nineteenth century, chemists attempted to isolate and identify the nutritive properties of meat and to bring its benefits to the population. As Emma Spary has noted, a sea change took place in scientific and medical accounts of food around 1800. In place of the search for a single nourishing substance, which had occupied chemists for centuries, scientists began to assert that nourishing substances came in fundamentally distinct categories.[93] Chemists had studied the composition of foods for

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[91] Liebig, *Animal Chemistry or Organic Chemistry in its Application to Physiology and Pathology, ed. William Gregory (London: Taylor and Walton, 1842). For a survey of developments in nutritional science, see* Kenneth Carpenter, *Protein and Energy: A Study of Changing Ideas in Nutrition* (Cambridge: Cambridge University Press, 1994).

[92] Voit's research popularized the common expression "meat makes meat" to encapsulate its essential role in the body. Voit, "Physiologie des allgemeines Stoffwechsels und der Ernährung," *Handbuch der Physiologie*, vol. 6, ed. Ludimar Hermann (Leipzig: Vogel, 1881).

[93] Emma Spary, *Feeding France: New Sciences of Food, 1760–1815* (Cambridge: Cambridge University Press, 2014) 233.

centuries, but the late nineteenth century constituted a watershed moment in their credibility, as their expertise was called upon to evaluate new industrial food products and police food safety and regulation.

The most successful product on the market for meat extracts was Justus Liebig's Meat Extract. Liebig was active in both soil and nutritional sciences. After apprenticing in an apothecary, Liebig moved to study chemistry in Bonn, Erlangen, and Paris, where he encountered the likes of Lavoisier and Guy-Lussac. As Spary has noted, Liebig's inquiries ran parallel to those of early nineteenth-century French scientists within the Academy of Science in Paris with whom he visited. In the 1830s, the Parisian establishment remained divided over which component of meat held most of its nutritive properties.While most agreed that it was the broth that contained nutritional value, others, particularly in the navy, were convinced that it was gelatin.[94] Liebig concurred with his Parisian hosts, who represented the broth, or "osmazôme" school, which held that that the nutritive properties of meat were found in its aromatic juices.

In his 1847 publication Investigation of Meat and its Preparation as a Food, he

[94] Spary, *Feeding France*, 230. Spary discusses Papin's digestor, which was improved upon over the years. In an 1853 encyclopedia entry on "Digestor," Liebig's recent experiments are recounted and the inferior nutritive qualities of gelatin are exposed. By this time, the view of the broth as carrying the nutritive properties of meat was dominant in Germany. The author goes on to recommend against the use of the digestor in preparing meat dishes, because the center of the meat reaches a high temperature, essentially overcooking it and therefore leeching its nutrients. The entry also notes that Papin's digestor saw little use within Germany, where other methods of extracting gelatin were preferred (namely d'Arce's method of first treating bones with potash lye and then either putting them in a solution of muriatic acid or placing them in a pressure cooker). For a discussion of gelatin produced through a digestor, and the improvements the apparatus underwent over the years, see Richard Pohl, "Digestor," in *Oswald Marbach's Physikalisches Lexikon*, (Leipzig: Verlag von Otto Wigand, 1853): 523-531.

described the process by which a piece of meat in water lost its nutritive properties, as well as its taste, to the surrounding water. While these nutritive properties were present in raw meat, the process of cooking resulted in a significant change in its composition which resulted in the separation of soluble and insoluble components. It was the soluble components (which were also held to be responsible for the smell and taste) that were released into the water. Liebig considered these soluble components to be the nutritive components of meat; the cooked mass of meat contained only some leftover nutrients of limited value. If the piece of meat was then enjoyed without the accompanying broth, it came not only at the expense of its nutritive ability but also its quality of digestibility, which was greatly enhanced by the similarity in composition between the meat's broth and stomach acids.[95] Therefore, Liebig recommended that cooked meat should be enjoyed with a Fleischbrühe, or meat stock, to help reconstitute its nutritional value and assimilability. This "discovery" was to later become the foundation of his most remunerative entrepreneurial venture, Liebig's Meat Extract.

These debates on isolating this substance gave rise to a series of products for commercial consumption that promised to deliver the nutritive substance in a condensed form at an affordable price. In this way, the chemist-as-nutritionist could capitalize on his expertise by entering the commercial market. While Liebig's meat extract was certainly not the first of its kind, it did enjoy commercial success that was unparalleled by competitors. The outsized role of this product in Imperial German diets provides a convenient entry point into contemporary ideas about nutrition.

Liebig's meat extract was a dark, viscous liquid with the consistency of honey that

[95] Liebig, *Chemische Untersuchung über das Fleisch und seine Zubereitung zum Nahrungsmittel* (Heidelberg: Akademische Verlagshandlung von C.F. Winter, 1847), 101.

smelled strongly of beef. It was produced by hacking meat into small pieces and then soaking it in vats of boiling water until it was reduced to a paste. At the outset, the extract was produced only in small batches at the Royal Apothecary (Hofapotheke) in Munich by Dr. Franz Xaver Pettenkofer beginning in 1850. In this arrangement, the consumer of meat extract was also a patient. He or she only had access to the meat extract with the help of a physician or apothecary, and then only until health was restored. Reports of the popularity of the preparation circulated in Germany, especially in Munich, where Pettenkofer's laboratory could hardly keep pace with demand. In this respect, meat extract is one of the earliest examples of a product that successfully commodified health. Drawing on the scientific foundations of nutrition put forward by Liebig and others, meat extract promised the best of meat in a concentrated, convenient, and easily digestible form. Yet production remained largely artisanal and thus circulation was limited to those privileged enough to visit a physician or apothecary. The demand for meat extract far exceeded its supply; the difficulty of procuring cheap meat remained a limiting factor on its commercial success.

A market for meat extract had been cultivated for decades prior to the commercial launch of Liebig's product. A strong reliance on the restorative properties of meat was common to both folk and medical wisdom; but with the marketing of meat extract, chemists had supposedly succeeded in isolating the substance through which this curative mechanism operated. The product promised to deliver the benefits of whole cuts of meat at a fraction of the cost. The international medical press also took the extract seriously; in 1865 the editors of The Lancet wrote that "the whole medical profession owe[s] a deep debt of gratitude [to

Liebig]."[96] As mentioned, Liebig's extract was not the first of its kind. Meat extracts were employed by the French Navy under the Old Regime to ward off scurvy; chemists were responding to the need for a substance to replace the inconvenience of having live animals aboard ships. Gradually they saw demand for a meat substitute for poorer customers. The success of Liebig's extract speaks to the increasing penetration of the market by scientific expertise. His marketing stroke of genius included trading cards with scenes from his lab, making the chemist's laboratory a familiar and cherished sight for consumers. In this way, scenes of scientific rigor came to be a stand in for nutritional quality. Nutrition had undergone a transformation from a tradition-bound practice often based on self-observation to a medicalized sphere of self-improvement. The development and marketing of meat extracts were the first phase of mass-produced, medically-supported dietary products that subscribed to the succulence theory of nutrition first articulated earlier in the century.

Liebig's product soon become merely one in a crowded field. By the 1870s, the process of extraction had been improved. Years of experience in distilling meat extract led some engineers and nutritional experts to address its major shortcoming, namely that the protein was lost during the process due to the high temperatures involved. As a result, an improved version of the extract appeared on the European market under the name of "Fluid Meat." Fluid Meat purported to be a preparation that contained all of the nourishing properties of meat except for fats and required no digestion for its nourishing properties to be transmitted to the blood. It represented a new, "economical foodstuff" that in two tablespoons delivered the nutritional worth of a quantity of 1 ¼ pounds of cooked meat. Thus, it advertised itself as

[96] "Extractum carnis Liebig," *British Medical Journal*, May 13, 1865, 489 quoted in Finlay, "Quackery and Cookery," 409.

a significant improvement, billing itself as "Dr. Liebig's meat extract, plus the remaining nutritive components of meat that Liebig's popular preparation did not contain."[97] In fact, the ingenious strategy of Fluid Meat's proponents involved leveraging Liebig's own scientific testimony against his product. In an 1865 article in The Lancet, Liebig wrote that, "If it were possible to create a preparation in which the protein content as well as the extracted nutrients of meat were united for an acceptable price, it would be preferable to my product, for it would contain all of the nourishing parts of meat," responding to concerns that it was not just meat, but specifically its protein content, that was most healthful.[98] Fluid Meat attempted to capitalize on the statement, claiming to occupy precisely this space in the market. Using scientific credentials, advertisers presented a vision of an improved product to compete with Liebig's, which had been the leading producer of meat extract for nearly two decades and become a staple in European pantries.

Liebig's advertising strategy began to downplay meat extract's nutritional properties, and highlight its practicality as a simple and cheap flavoring agent. Competitors' marketing tactics also took on a more popular tone, steering away from explicit claims about nutritional value and appealing to more generalized notions of health and strength. For example, the manufacturers of Bovril, another rival, took to using more sensationalist images of a bull breaking through a wall, claiming in boldface "Bovril is meat itself" (see Figures 4 & 5).[99] Others also featured animals more prominently in their advertisements.

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[97] BArch R 86 3342: Advertisement, Mr. S. Darby for Savory & Moore, Königliche Englischer Hofapotheke, "Fluid Meat."

[98] Liebig, *The Lancet* 2, no. 2202 (Nov. 11 1865), 547.

[99] "Bovril ist das Fleisch selbst." See BArch R 86 3442.

Figure 4 Bovril advertisement, "Bovril is meat itself" (1893). BArch R 86 3442.

Figure 5 Bovril advertisement (1894), BArch R 86 3442.

By the turn of the century, consensus within the nutritional community had begun to shift away from its emphasis on protein and embraced the wisdom that different types of food served different nutritive purposes. The embrace of protein as the limiting factor in human growth and metabolism remained unquestioned, but the content of meat extract attracted increasing scrutiny. Liebig's marketing of the extract also pivoted to reflect this view: instead of promoting the extract as some sort of nutritional panacea, it was billed as a mix of proteins and nourishing minerals (Nährsalze) along with creatine, glycogen and lactic acid, which gave the extract its special taste. In 1879, Max Rubner, another prominent physiologist who assisted Voit, published a critique of Fluid Meat in the pages of the Zeitschrift für Biologie, a publication edited by Voit along with Liebig's collaborator, Max von Pettenkofer.[100] Rubner concluded that Fluid Meat could not be compared with Liebig's Extract: while the latter claimed only to be a Genussmittel (a difficult to translate category that has been the subject of much debate) and fulfilled this goal to a remarkable degree, the former made empty claims to being nourishing.[101] Furthermore, Fluid Meat could not be considered an economical replacement for meat, since in order to approximate the protein in a piece of meat, one would have to consume a considerable quantity of Fluid Meat at a high price.[102]

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[100] Max Rubner, "Über den Nährwerth des Fluid Meat," *Zeitschrift für Biologie* 15 (1879): 485-492.

[101] *Genussmittel* is often translated in English as stimulant, but this is not quite right, though it includes substances such as tobacco, coffee, and spices. I have elected to preserve the original German to be faithful to the way the category implies more than a physiological stimulant, but also substances that aid appetite and digestion. See discussion below.

[102] Rubner calculated that a man would eat 191 grams of meat containing 42 g of protein (or pepton) per day in order to receive the same protein content from Fluid Meat, the same man

In addition to promising healthful benefits, Liebig's Meat Extract addressed the problem of transportation and global resource distribution. Demand quickly outpaced the production capacity in Pettenkofer's small Munich operation in the 1850s. Aside from the high price of European beef, the process for obtaining meat extract was too arduous to sustain large-scale production and commercial sale to the German people. However, with the assistance of Georg Christian Giebert, an entrepreneurial German immigrant to Fray Bentos (Uruguay), the small-batch preparation that had previously only seen medicinal use became a mass-produced international phenomenon. Giebert had little difficulty convincing Liebig that the plentiful and low-cost ranching of Fray Bentos was an auspicious location for a meat extract factory. And, whereas the export of fresh meat continued to pose difficulty to enterprising ranchers, with the extract there was no risk of spoilage. By 1865, production in Fray Bentos had begun under the careful eye of Liebig and his associate Max von Pettenkofer (nephew of Xaver of the Royal Apothecary). In this way, Liebig's Extract promised to solve a locational problem, namely that meat was both expensive and often geographically inaccessible to urban consumers. Liebig's extract capitalized on the global market, making cheap cattle raised in the New World accessible to European customers.

Another brand, the Cibils Brothers, staked out its territory by gesturing to the mounting population pressure which taxed the earth's food supply. In their advertisements, they defined nutrition as a problem of global balance. In South America, cattle could be raised cheaply and graze upon large stretches of land that were sparsely populated. In Europe, animal husbandry was expensive, yet the population, and thus demand, was more densely

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would have to consume 154 grams of Fluid Meat (at 5 M). "Über den Nährwerth des Fluid Meats," 492.

concentrated. Here it was not only a question of the household economy, but of the global one. They advertised citing the enlightened idea of Liebig, who first considered "utilizing (verwerthen) valuable food products, which were almost worthless in other regions of the world because their massive availability (Verbreitung) is in no relation to the population density, for the nourishment of our own."[103] Since Europe's comparatively dense population and small area restricted animal husbandry, the product promised to extract the "useful" ingredient from overseas production and make it conveniently available at home. The Cibils Brothers marketed themselves as contributing to a global equilibrium of resource distribution. In this way, they foregrounded not the individual metabolism, but what other historians have referred to as the "social metabolism," or exchanges between human society and the natural world.[104]

The various labels under which meat extract was sold promised to condense the world's territory and deliver it at an affordable price to Europeans. At the Liebig factory in Fray Bentos, the wealth of South America was extracted and concentrated into the thick syrup destined for Europe. In an informational brochure for women, the Liebig company showed pictures of the factory on the shore. Elsewhere, the brochure is adorned with images of gauchos and cattle, with Liebig's Extract doing the physical work of concentrating the

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[103] BArch R 86 3442: Dr. Carl Rüger, vereidigter, gerichtlicher Chemiker und verantwortlicher Chemiker des Berliner Hausfrauen-Vereins, August 30, 1883.

[104] Fascinating work on this topic appears in Rolf Peter Sieferle, Fridolin Krausman, Heinz Schandt, and Verena Winiwarter's *Das Ende der Fläche*. The authors describe the transition from a "biological ancien regime," whose energetic foundations are found in preindustrial agriculture, to the modern exchange of resources, beginning with timber in the New World. They lay out an especially suggestive framework for considering ecological exchanges between Europe and spaces of colonial expansion. *Das Ende der Fläche: Zum gesellschaftlichen Stoffwechsel der Industrialisierung* (Cologne: Böhlau, 2006).

advantages of South America into a preparation for the convenience of the housewife.[105] In the brochure, a doctor patiently explains the climate of Uruguay and the process of extraction to an imagined woman, transforming a description of a process that might elicit disgust into a marvel of modern science and industry. The Cibils Brothers advertisements promote a similar view of the process of extraction. By offering up the wealth of South America and its extensive pasture in a small glass bottle, advertisers played to Germany's concern about the agricultural exhaustion of its land. After successfully engineering a transition to an advanced industrial society in the 1880s, a pervasive fear about losing its agricultural basis haunted the nation. The case of meat extract demonstrates how scientific expertise applied to food might work to overcome fears of natural agricultural limits.

Meat extract represented the triumph of modern science and technology. It distilled the necessary and good properties of meat, as well as the benefits of foreign lands, into a compact, neatly packaged product. Liebig's extract not only drew on chemical understandings of nutrition for advertising purposes, it also, in doing so, legitimated them. The chemist's seal and the accompanying trading cards depicting laboratory scenes underwrote the idea that the energetic foundations of the human body could be reduced—extracted-- into their smallest components and consumed for health. Fortifying the population, in turn, served as an engine for Germany's global ascendance. Without strong bodies, the nation would falter. Meat extract, then, presented a vision of scientific progress that could end hunger and malnutrition and strengthen the collective national body.

Despite attempts to undermine its credibility, the coalition of experts Liebig had

[105] BArch R 86 3442: "Ein interressante Unterhaltung von Dr. med. Jesser," Liebig Extract brochure, (undated).

enrolled succeeded in bolstering the product's credentials and ensuring its commercial success. After Liebig's death in 1873, Carl Voit came to the product's defense. He insisted that Liebig's meat extract was a Genussmittel. Voit went on to say that the role of Genussmittel had long been underappreciated.[106] Its function was analogous to the lubricating oil of a machine, he claimed; while it was neither a component of the machine nor a driving force itself, it enabled the proper functioning of the organism.[107] In Voit's view, the often-heard complaint that Liebig's extract could be improved by conserving the protein, gelatinous substance (Leim), and fats of meats was a misguided one. The defense of meat extract as a Genussmittel gradually won popularity.

Since the debate was not only about scientific properties, but also about public opinion, it played out in publications geared towards the general interest. In a 1901 article in Die Gartenlaube, a popular family weekly, Dr. Max von Pettenkofer published an essay on Liebig's extract, defending the importance of Genussmittel as opposed to nutrients (Nährstoff). By this point, it was clear that meat extract was hardly a suitable replacement for meat. In spite of this, Pettenkofer employed an ingenious strategy: he discusses the substance known as meat (Fleisch) to butchers and cooks, and known as muscle (Muskel) to anatomists and physiologists. He writes, "instead of meat extract, we might just as accurately call it

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[106] *Genussmittel: Ein kulturgeschichtliches Handbuch,* eds. Thomas Hengartner and Christoph Maria Merki (Frankfurt: Campus Verlag, 1999). Also see Wolfgang Schivelbusch, *Taste of Paradise: A Social History of Spices, Stimulants, and Intoxicants* (New York: Vintage Books, 1993).

[107] BArch R 86 3442: Voit, "Fleischextrakt," *Münchener Medicinische Wochenschrift* (Mar. 2 1897).

muscle extract."[108] A defense of the energy potential of the meat extract was thereby preserved, even in the face of mounting evidence that the extract was a poor substitute for the real thing. In doing so, Pettenkofer also gestured to nutritive properties beyond macronutrients.[109] By the turn of the century, meat extract was a component of the German diet that most were unwilling to do without; paradoxically, it had also been accepted as a Genussmittel, or flavoring agent whose health benefits were secondary.

Pettenkofer also insisted that as a Genussmittel, meat extract functioned to stimulate the appetite. In fact, he argued that meat extract did not detract from meat consumption and instead created more demand by making less desirable or commonly enjoyed cuts more delectable.[110] He made use of the platform in the popular press to drum up support for an exception to a recent piece of legislation, the Meat Inspection Law introduced in June of 1900. The law banned the importation of meat and meat conserves from overseas which had enabled producers to keep their prices low. The law threatened to put manufacturers of meat extract out of business by barring them from access to the German market.

The fact that meat extract manufacturers found themselves arguing that they were not disposed to compete with European producers takes us back a few decades earlier. At the heart of Imperial Germany's self-conception was a preoccupation with food security. Unlike Great Britain, where naval power and colonial holdings assigned trade the responsibility of

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[108] Dr. Max von Pettenkofer, "Zur Geschichte und Bedeutung des Fleischextraktes," *Die Gartenlaube* (Jan. 22 1901): 46-47.

[109] Vitamins were not discovered until 1912.

[110] Pettenkofer, "Zur Geschichte und Bedeutung des Fleischextraktes," *Die Gartenlaube* (Jan. 22 1901): 47.

procuring food, Germany was concerned with meeting its population's own agricultural demand. Steered by the grim determination of conservative politicians to promote their own interests, the issue of meat provisioning and prices became a hotly contested political issue.

Economic nationalism and sanitary protectionism

Economic nationalism has long been a phenomenon ascribed to late-nineteenth century nations.[111] From mid-century onward, a global expansion in arable land took place. In Europe, Russia, and "neo-European" overseas societies, total arable land rose by a factor of 1.7—from 255 million hectares in 1860 to 439 million hectares in 1910; a rate of growth that was unprecedented in the preceding half century.[112] However, this growth was experienced primarily in the United States and Russia. These developments put those Western European states that retained their agrarian character in a difficult position. Thus, a new breed of economic nationalism was born. The most visible manifestation of protectionism in Imperial Germany was the introduction of tariffs on grain. The famed "coalition of iron and rye," marrying large grain-producing estate owners and heavy industrialists led up to the protectionist 1879 Tariff Law. This alliance sought to protect its own interests in the face of growing international competition and declining grain prices following the depression that set in in 1873. However, as Cornelius Torp has noted, the agricultural lobby did not present (at least at the outset) a unified front, since many producers were already oriented towards

[111] Friedrich List is considered the first German to espouse economic nationalism in the early nineteenth century and advocated for tariffs on imported goods. See List, *The National System of Political Economy,* trans. W.O. Henderson (London: Frank Cass, [1838] 1983).

[112] Osterhammel, *Transformation of the World,* 262.

export.[113] In the years following the introduction of the 1879 tariff, support grew among the agrarian community for protectionist measures. Yet the coalition that Chancellor Otto von Bismarck had worked to engineer was not immune from attack– in fact, a tariff protecting heavy industry and agricultural products was not necessarily mutually beneficial. The relationship remained fraught. High prices for agricultural products meant industrialists would have to countenance higher wages, while agriculturalists would face higher prices for equipment and machines as a result.

Adjustments to protective tariffs on agricultural products were successful in keeping grain prices relatively stable over the period from 1879 to 1900. This stability made the increase in livestock and meat prices towards the end of the century especially noticeable, since other agricultural goods had not changed much in price during this time.[114] In the half century between 1854 and 1913, the consumption of meat per capita grew more than twofold.[115] Increasing prices met growing demand.

Advances in agricultural improvement covered some of this new demand. Animal husbandry was on the rise. Given that only large estates could be competitive on the cereals market, global market conditions favored animal husbandry for small- and middle-sized landholders and improved techniques for breeding and feeding led to an increase in the average slaughter weights of animals.[116] As one agricultural expert, Emanuel Hauser, estimated

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[113] Torp, "The 'Coalition of Rye and Iron' under the Pressure of Globalization: A Reinterpretation," *Central European History* 43, no. 3 (Sept. 2010): 407.

[114] Ulrich Teichmann, *Die Politik der Agrarpreisstützung: Marktbeeinflussung als Teil des Agrarinterventionismus in Deutschland* (Cologne: Deutz, 1955), 568.

[115] Esslen, *Fleischverbrauch*, 751.

[116] Teuteberg, "Studien zur Volksernährung," 118–130, especially 120.

based on Prussian livestock censuses, between 1816 and 1883 Germany's pig population doubled.[117] Even as German farmers raised greater numbers of livestock for slaughter, demand outpaced their herd sizes. The market dictated adaptation: "Among all civilized peoples," he wrote, "meat is ascribed a higher value than plants, which lag behind the former in price. Thus, trade and commerce show themselves to be leading guides of agricultural production, even where the scientific knowledge evades the instinctive old farmer."[118] For the average German farmer in the years since 1858, animal husbandry was a much more profitable enterprise than extensive farming. In a 1974 article, James C. Hunt argued that German protectionism was biased in favor of animal producers, which was in the interests of the politically well-represented peasantry.[119] Hunt's account resonates with the observations of Hauser and other contemporary agriculturalists and statisticians, who noted a shift among farmers to animal husbandry in the years following the 1873 depression.[120] The manipulation of veterinary law and sanitation codes in favor of protectionism seems to have been a cornerstone of German trade policy. While large, export-oriented grain estates were concentrated in the East, small- and medium- sized farms which raised grain for local consumption but also livestock remained the rule in other regions. Binding together

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[117] Emmanuel Hauser, *Die Entwickelung der Viehzucht in Preussen von 1816 bis 1883 mit besonderer Rücksicht auf die beiden Einheitlichen Zählungen 1873 und 1884 für das ganze Deutsche Reich* (Jena: Verlag Gustav Fischer, 1887) 11 and 33.

[118] Hauser, *Entwickelung der Viehzucht,* 1.

[119] Hunt, "Peasants, Grain Tariffs, and Meat Quotas: Imperial German Protectionism Reexamined," *Central European History* 7, no. 4 (Dec. 1974): 311–331.

[120] Similar account in Peter Wagner, *Die Steigerung der Roherträge in der Landwirtschaft im Laufe des 19. Jahrhunderts* (Jena: Universitätsdrückerei, 1896), 5-77.

protectionist interests of Germany's agrarians required uniting the interests of these large grain producers and smaller farmers engaged in animal husbandry. As Hunt astutely observed, it was difficult to pass a quota system on grain in the Reichstag. Eliminating the perceived threat of pestilent animals from overseas proved far more palatable.

To ease the impact of this globalization of agriculture on domestic producers, Germany instituted bans on meat products from several countries. Between 1870 and 1914, meat quality emerged as one of the most contentious issues in the trade relations between the US and Germany. In a report to the Imperial Health Office (Kaiserliches Gesundheitsamt) from 1911, a German trade representative chronicled the prevalence of the "meat trust," a "big six" of slaughterhouse firms in Chicago with an outsized influence on the practices and legislation in the preparation of animal products in the US. The author noted,

> While in Europe, all branches of food production are decentralized and this is held to be desirable, the situation is reversed in America […] In Europe, especially in large cities, though a certain degree of centralization has set in, this is of a purely technical nature (in central stockyard and slaughterhouses); but these technical establishments are diminished in importance by the plurality of individual firms that use them […] We should actually greet the limited penetration of centralization in meat production and provisioning as a healthy development. It is normal to have meat production take place in decentralized businesses that are better attuned to local consumption […] The credibility of products shipped from America and other export lands is damaged by their permissive certification, which create competition for our superior domestic products.[121]

His observations on national differences towards food safety and preparation shed light on the deep misgivings that accompanied international trade. In addition to accusations of crowding out the domestic market, meat from America was also suspicious in substance. The author wrote that long periods of time in cool storage contributed to nutritional degradation of the

[121] BArch R 86 3142: N. Kaumanns, Report to Kaiserliches Gesundheitsamt (Nov. 20 1911), 1–25. Emphasis in original.

meat. He described how, after only five or six weeks, poultry began to lose nutritional value and after six months in cool storage, eggs were totally without nutritional value (Nährwert). These statements were the subject of ongoing debate and evidence was far from conclusive, as the marginalia on the receiving end, a small handwritten "richtig?" (correct) scrawled next to the statement indicates.[122] In this climate of uncertainty, concerns about low quality, loss of nutrients, and disease were used to justify protectionist policies.

The incidence of trichinosis, a tiny worm that primarily infected pork and pork products, also illustrates this point.[123] From 1880–1891, German health officials harbored serious concerns about the health of American pork. The appearance of cheap, imported American meat concerned authorities, as these imports were not subject to the same regulations as domestically produced meat. Germans adopted a two-prong approach for combating trichinosis. Hygienists such as Rudolf Virchow and Friedrich Küchenmeister advocated improved methods of pig keeping, which prevented the transmission of the worms to the pigs themselves.[124] Implementation was complicated by pigs' indiscriminate eating habits; they were routinely fed on household scraps and often scavenged for smaller animals and even excrement. The practice of stall-raising animals signaled the intensification of agriculture; admittedly it was on the uptick in the last quarter of the century, but was not yet

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[122] BArch R 86 3142: N. Kaumanns, Report to Kaiserliches Gesundheitsamt (Nov. 20, 1911), 22.

[123] Uwe Spiekermann, "Dangerous Meat? German and American Quarrels Over Pork and Beef, 1870-1900," *Bulletin of the German Historical Institute* 46 (Spring 2010): 93-110.

[124] Virchow's wide-ranging and accomplished career as a medical doctor, anthropologist, and politician has made him the subject of several biographical works. Constantin Goschler's stands out among them: Goschler, *Rudolf Virchow: Mediziner- Anthropologe- Politiker* (Cologne: Böhlau, 2002).

practiced everywhere.[125] On more traditional farms, pigs were allowed to roam free, making it impossible to control their food intake. To make matters worse, pigs carrying trichinosis rarely presented symptoms themselves: various experiments at agricultural institutes in Eldena and Halle showed that pigs infected with trichinosis retained their appetites, reached normal weights, and behaved generally like healthy pigs.[126]

Rather than supervising the living conditions of each animal, the examination of meat at sites of slaughter provided a more practical solution. Thus, a preventative regime of microscopic inspection of meat was introduced.[127] The long-held custom, especially among the poor, of consuming raw or undercooked pork products was the primary means of transmission. This practice became more common as pork consumption increased.[128] According to Virchow's report from 1866, in Saxony alone in the past decade the meal of

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[125] And even this was not guaranteed, as Virchow conceded. The largest epidemics were in Saxony, where stall-raising was the rule. Virchow, *Die Lehre von den Trichinen: mit Rücksicht auf die dadurch gebotenen Vorsichtsmaaßregeln für Laien und Aerzte dargestellt* (Berlin: Reimer, 1866), 64-55. Also see Falkenberg and Hammer, "Zur Geschichte und Kultur der Schweinezucht," *Züchtungskunde* 79, no. 2 (2007): 92–110. For a critique of stall-raising based on its elimination of the possibility of animal husbandry for farm workers, see Max Weber's description: "Mit Übergang zur Stallfütterung verschwindet endlich auch die Viehweide, die eigene Kuhhaltung wird teils beschnitten, teils beseitigt, und damit die wirtschaftliche Selbsständigkeit des Insthaushalts vernichtet." Weber, *Lage der Landarbeiter*, 900.

[126] Virchow, *Lehre von den Trichinen,* 38.

[127] Virchow, *Lehre von den Trichinen*, 35. See also Rudolf Leuckart, *Die menschlichen Parasiten und die von ihnen herrührenden Krankheiten* (Leipzig und Heidelberg: C.F. Winter'sche Verlag, 1876), 597.

[128] Hans Jürgen Teuteberg has noted that in older, more established cities and towns there was a marked preference for beef, while in newer industrial centers pork was preferred. Late nineteenth- and early twentieth-century Saxony was a hotbed of industrial centers. Teuteberg, "Der Fleischverzehr in Deutschland und seine strukturellen Veränderungen," in *Unsere Tägliche Kost,* ed. Teuteberg and Günter Wiegelmann (Münster, 1988) 70.

freshly hacked pork on bread had become entrenched in the regional culture. Instead of attempting to reform this practice, the German state assumed the responsibility for protecting citizens from possibly infected meats. In the US, the situation looked quite different: although trichinosis was also known in the US, it was viewed as a German problem. It was not that the quality of meat in the US was inherently better; instead, cooking practices dictated that pork was fully cooked or salted, killing the trichinae in the process. Since common practice in the US militated against the spread of the disease, the introduction of an inspection regime was seen as an unnecessary expense.

While this may have been the extent of the issue if all pork products were consumed domestically, in the existing scheme of international trade in agricultural products it assumed great importance. Virchow dismissed the claims of many that trichinosis was a "new" disease whose origins could be traced back to the import of guano for fertilizer or from pigs from Hungary or China.[129] Sagely, he warned against falling victim to the easy assumption that because the disease had not previously been identified, it had not existed. He wagered that the danger of trichinosis in pork resulting from pigs' omnivorous nature might have been the basis of their designation as "unclean" and unfit for human consumption in the Old Testament. Virchow's clear-eyed view of the problem and its solution, which could only come about through the introduction of microscopic inspection led him (and his Progressive Party comrades) to advocate against a ban on foreign meat. Nonetheless, German officials continued to cite the high infection rates among American pork products and their lax hygienic standards, ultimately leading to a ban on American pork (except bacon and ham) in

[129] Virchow, *Die Lehre von den Trichinen,* 46.

1880 that remained in place until 1891, when Germany withdrew the pork ban after the US established its own meat inspection system.[130]

The ongoing feud with US meat exporters and representatives of trade on the pork issue was just one manifestation of the conflict: elsewhere, isolated outbreaks of disease also caused German authorities to restrict trade with other countries. The ban on American pork from 1880 supplemented another ban on pork from Italy and Austria-Hungary. While officially the goal of these measures was to ensure the health of the German consumer and, rather pedantically, to teach other nations that their inspection processes must be improved, it can also be interpreted as a protective measure meant to support Germany's pig farmers.[131] Among the local governments in affected areas, it was also a populist measure met with the support of the people that favored producers at the expense of consumers.[132]

Increasingly stringent standards for import culminated in the Meat Inspection Law (Fleischbeschaugesetz) of June 1900. The law was introduced to create a uniform standard of inspection for domestic as well as foreign meat products. In practice, it all but banned foreign imports. The guidelines explained that, "besides their sanitary goals, [the measures] also took

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[130] "Verordnung, betreffend das Verbot der Einfuhr von Schweinefleisch und Würsten aus Amerika," *Deutsches Reichsgesetzblatt,* no. 15 (Jun. 28, 1880), 151.

[131] Incidentally, the American public interpreted the German ban along exactly these lines. The *New York Daily Tribune*, *Washington Post*, and *New York Times* all saw the ban as a baseless slight against American producers intended to cripple trade, calling it as "sanitary pretext for protection." (No Title), *New York Times*, Jan, 4 1884, 4 cited in Spiekermann, "Dangerous Meat," 100.

[132] For an instructive transcript from Lower Saxony, see R. Blasius, *Referat der Dr. med. R. Blasius über den vierten Gegenstand der Tagesordnung der achten Hauptversammlung des Niedersächsischen Aeztevereinsbundes zu Hannover am 14. Juli 1883: Die Trichinose und die gegen dieselbe erforderlichen sanitätspolizeilichen Schutzmassregeln* (Hannover: August Grimpe, 1884).

on a general national economic character in the Reichstag."[133] The law resulted from a report by the Imperial Health Office on the state of slaughter and sanitation which was then passed on to a commission of twenty-one members in the Reichstag. Already in the first meeting of the commission, which met in April 1899, participants voiced concerns about the economic favorability of a ban on imported meats and the subsequent protection of German animal husbandry.[134]

Perhaps nowhere were these protectionist interests more clearly articulated than in the debates surrounding home slaughtering (Hausschlachtungen), or slaughter for consumption within one's own household. On this issue, the parties of the right argued that there should be an exemption from the obligatory double inspection (before and after slaughter), as it would levy a great inconvenience and penalty upon the rural population. The parties of the left and the representatives of the Imperial Health Office argued that this exemption would effectively undermine the hygienic concerns of the law, citing the fact that such inspections had already been introduced in many regions without having placed a great burden upon the population. However, the right held the parliamentary majority and thus the law included a provision exempting home slaughter from inspection. Notably, it was these same parties of the right who had stridently argued in favor of strict standards for all imported foreign meat, favoring an outright ban. The political right made these claims over the objections of others, who protested that German livestock farming was in no position to meet domestic demand and would thus result in a massive price increase for necessary meat products. These objections

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[133] *Das Fleischbeschaugesetz vom 3. Juni 1900*, ed. Georg Lebbin and Georg Braun (Berlin: J. Guttentag, 1903), 9.

[134] *Das Fleischbeschaugesetz vom 3. Juni 1900*, 13.

were made to no avail as the Reichstag adopted the new legislation.[135]

Toughening import standards aggravated the demand-driven spike in meat prices. By the end of the nineteenth century, this situation of high demand combined with high prices was referred to alternately as a "meat shortage" or "crisis" (Fleischnot or Notzustand). For the working-class population, the ban on imported meats created hardship by elevating prices. This shortage was the subject of fierce parliamentary debate. Members of the opposition cited reports by the Imperial Health Office, which confirmed that affordable meat was necessary for the population. The 1911 guide recommended 113 grams of protein per day—slightly reduced from the turn of the century recommendation.[136] Without this, "workers' vigor (Lebenskraft) and productivity (Leistungsfähigkeit) would fade."[137] But, as one parliamentarian argued, rather than speak of national averages and aggregates, a trip into the cities proved worthwhile. There, a haunting picture emerged. Stunted children and women with sunken features who were unable to rise and work complained that they could not afford even the cheapest cuts of meat. One Hamburg doctor described how deprived mothers visited him, asking for help for their listless children. He could only recommend incorporating more meat, to which one mother responded curtly that now meat was a luxury. "On a daily basis," reported the doctor, "I hear from my ill patients who require a diet rich in meat that they are

[135] Amendments made on December 31, 1903 made this ban more complete by prohibiting the import of all meat products except Schmalz, Speck, pure oleo-margarine and some exceptions for small quantities of pickled meats (*Pökelfleisch*).

[136] *Verhandlungen des Reichstages,* vol. 284 (31. Sitzung, Mar. 20, 1912), 849.

[137] *Verhandlungen des Reichstages,* vol. 284 (30. Sitzung Mar. 19, 1912), 827.

not in a position to follow our dietary guidelines because meat is too expensive. Is there a more drastic example of the meat shortage?"[138]

His testimony fits well within the narrative set out by Social Democrats and reformers. In order to protest self-interested trade measures, they leveraged arguments about malnourishment to highlight the irresponsibility of the governing coalition. These claims were not rooted in experiential accounts from hungry people so much as the objective failure of working people to obtain sufficient quantities of protein. It became more difficult to brush off grievances rooted in external measurements. As one social democrat argued in 1912, "the social question is a question of the stomach!"[139] Protein, and nutrition standards more generally, served as an important means of accounting not only for the bodily economy, but for the national one. Nutritional values served as an effective means of communicating about food and need. Deficiencies of macronutrients, such as protein, served as persuasive forms of rhetoric and representation. Arguing about meat in terms of the protein minimum highlighted the work meat accomplished in constituting people. It provided scientific and compelling language to opposition parties in the debates about meat shortage in the years preceding 1914. These claims provided a convenient and concrete example of the governing coalition's irresponsibility and the need to overturn them. As one Frankfurt delegate recounted, in talking with his constituents, they made two requests of him: "Go to Berlin," they said, "first to overturn ruling interests and then to decrease the price of food!"

The issue pitted urban consumers and butchers against livestock farmers. A popular

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[138] Dr. med. Fritz Bruch cited in *Verhandlungen des Reichstages,* vol. 284 (30. Sitzung Mar. 19, 1912), 831.

[139] *Verhandlungen des Reichstages,* vol. 284 (31. Sitzung, Mar. 20, 1912), 866.

explanation that conveniently absolved both butchers and farmers traced the price increase to the proliferation of intermediary traders (Zwischenhändler), who took the livestock from farm to slaughterhouse, taking a cut along the way. Naturally, this cut was passed on to the consumer in the form of a markup.[140] While the livestock traders were the target of much of the ire, it is not clear that their role had a decisive impact on prices. Nonetheless, traders were treated with derision by many butchers and agriculturalists who viewed them as inferior on account of their lack of both skill and productive power. Such views represented well-worn stereotypes, but in fact skilled traders were generally raised as farmhands themselves; only through close contact with livestock could they develop the necessary appraisal skills.[141] A more likely explanation for the ease with which blame was cast is that both the butchers' associations and the livestock producers were highly organized interest groups with associations and publications through which they could stir up action.

In October of 1913, the Ministry of the Interior published a report on livestock and

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[140] In most cities, the butcher purchased his animals himself from farmers in the surrounding area. Middlemen, while not unheard of, were few and far between. In Mainz, as late as 1870 the city butcher traveled regularly to surrounding areas in Kreuznach or the Hunsrück to purchase animals; he would then drive those he had selected into the city when they had reached their weight for slaughter. In other areas, such as in Munich or cities in the Ruhr, a similar trend towards direct contact between butcher and producer lingered on past mid-century as well. In some cases, the roles were reversed: farmers would make the journey with their slaughter-ready animals to the urban market. Berlin presented somewhat of an exception; here intermediary trade developed earlier. For Mainz, see Bernhard Gottron, *Erlebtes und Erlauschtes aus dem Mainzer Metzgergewerbe im 19. Jahrhundert* (Mainz, 1926), 19–23. For other cities and a general overview in changes to meat market, see Christoph Nonn, "Fleischvermarktung im Deutschland im 19. und frühen 20. Jahrhundert," *Jahrbuch für Wirtschaftsgeschichte* 1 (1996): 57.

[141] Teichmann, *Politik der Agrarpreisstützung*, 638. For an interesting exploration of the way Jewish cattle traders were scapegoated by individuals and cooperatives in Kurhessen, see David Peal, "Anti-Semitism and Rural Transformation in Kurhessen: The Rise and Fall of the Böckel Movement," (PhD Diss., Columbia University, 1985).

meat sales to tackle the deteriorating situation. The study was overseen by an advisory committee whose members were drawn from representatives of the butchering industry, as well as the agricultural community.[142] Their task was to determine the origins of the increased price of meat. According to the chairman of the committee, State Secretary Dr. Delbrück, the main goal for an improved meat provisioning should be the removal of irregularity and fluctuation in the prices. In several cities, experiments with negotiating long term delivery contracts between producers in cooperative organizations and municipalities were carried out.[143] In Ulm, host to one of these trial programs, the mayor deemed the experiment a success judged not only by its price-stabilizing effect, but also in social terms, as a way of "contributing to a greater sense of understanding among the urban population for agricultural problems and fighting off the inner alienation between industrial and agricultural populations."[144] The mayor's optimism notwithstanding, the idea of long term contracts was not permanently implemented. Nonetheless, his comments are revealing, as the 1913 study suggests the hardening categories of producers and consumers and growing antagonism during the decades preceding the war. This "inner alienation" between Germans took place through the geographical separation of agricultural producers and urban consumers; it also marked their bodies through malnourishment observed by Grotjahn and others.

The Ministry of the Interior published its findings on the sources of meat price

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[142] BArch R 86 3297: Reichsamt des Innern, "Fleischenquete 1913-- Zusammenstellung der gutachten der Sachverständigen vor der Kommision zur Untersuchung der Zustände im Vieh- und Fleischhandel," (Oct. 1913).

[143] BArch R 86 3297: Reichsamt des Innern, "Fleischenquete 1913," 124-134.

[144] BArch 86 3297: Oberbürgermeister Wagner, "Die Fleischmarkt-Enquête" *Deutsche Tageszeitung*, (Nov. 27 1913).

fluctuation. The committee included detailed expositions of breeding and feeding practices, as well as distributional practices in the report. They concluded that it was difficult to place the blame on farmers since they could hardly avoid fluctuations in their own costs, which they were then forced to cover. On the other hand, they wrote, livestock traders had been unfairly demonized. In the first place, more than half of the purchases of livestock were concluded directly between butcher and farmer, and in the second, traders provided an indispensable service to butchers in large cities.[145] To stabilize prices and secure meat provisioning, the commission recommended a moratorium on the practice of re-exporting imported meat in the isolated locales where foreign meat was permitted (some North German cities received meat from Denmark) while acknowledging that changes to the Meat Inspection Law itself were unlikely and slow-coming. It also suggested that a permanent commission be formed to monitor and consult the government on these matters.[146] However, the report remained silent on the role agricultural protectionism in the form of the restriction of foreign livestock and grain tariffs played in meat prices.[147] The rigorous controls that the Reichstag introduced on the import of foreign meat under the Meat Inspection Law of 1900 belie an ideological blind spot in the form of dedication to protectionism that prevented authorities from understanding, or at least acting upon, the deepest origins of the meat shortage.

Conclusion

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[145] BArch 86 3297: Reichsamt des Innern, "Fleischenquete," 4.

[146] BArch 86 3297: Reichsamt des Innern, "Fleischenquete," 19-20. The report cited Max Rubner's suggestion for the creation of a National Food Office (*Reichsnahrungsamt)*. For more on this, see chapter 3.

[147] Teichmann, *Politik der Agrarpreisstützung*, 575.

Like many critiques, the one voiced by Social Democrats of trade measures grew out of the gap between promise and reality. In this case, the idea of a protein minimum, and the consequent need for meat, had been validated by decades of work in nutritional science. The early work of Liebig and others laid the foundation for protein as a foundation of health. Popularization of scientific knowledge, as well as popular taste, performed the work of translating protein into meat, transforming what had once been seen as a luxury into a necessity.

As the bureaucratic infrastructure for public health expanded in the years before the turn of the century, the government issued dietary recommendations and thus offered their explicit recognition of these needs. Yet trade and agricultural decisions kept meat at prohibitive prices and sentenced many of the neediest Germans to do without. The gap between recognized scientific recommendations and reality opened a space for a trenchant critique of ruling interests. Arguments not only about inadequate supply, but also about the inefficacy and illegitimacy of ruling interests, coalesced around the absence of meat. In contrast to early modern episodes of food shortages, these demands were staked in explicitly scientific terms.

The pride of place accorded to meat in the German diet was both symptom and driver of the nation's modernizing success. Increasingly specialized work freed the population from subsistence farming and turned millions loose in cities and factories. In order to power the burgeoning economy, human capital had to be preserved. This entailed both replenishing individual workers through ensuring adequate nutrition and ensuring that the workers reproduced to replace themselves. This required a rational diet that maximized energy and minimized cost. And, most essential to this was ample protein intake. Paradoxically, as

scientists validated the dietary importance of meat, its distribution became hamstrung by political and economic decisions to preserve German self-sufficiency at the expense of consumer interests.

CHAPTER TWO

In Search of a Natural Diet: Vegetarian Critique and Indigenous Diets, ca. 1870–1914

"The physiologists," pronounced Hans Paasche, a former naval officer and vegetarian, "are unfortunately as useless as their name sounds foreign."[148] Thus began his 1912 tract on the simple pleasure of eating plants as opposed to the violence and artifice of eating meat. Paasche satirized conventional medical wisdom, personified as "Uncle Sanitätsrat" who warns of the dangers of too much sport while swirling a glass of red wine in one hand with a cigar in the other. Physiologists bore the brunt of his criticism for validating the decadent habits of Germans: "They prevent the recognition of the truth […] Just try to grab a rabbit and enjoy it as you would a mandarin orange!" The intuitive character of vegetarian fare contrasted sharply with the decadence and moral decay in Germany.

Paasche's impassioned tract centers on his conversion to vegetarianism while stationed near Lake Victoria, where he realized the folly of conventional eating habits in Wilhelmine Germany. Paasche may have been somewhat of an aberration: while serving in the Imperial Navy in German East Africa, he fought to suppress the Maji Maji rebellion and developed an abiding interest in life there.[149] After returning to Germany, he threw himself into the turn of the century social reform milieu, advocating for pacifism and the overturning of

[148] Hans Paasche, "Die Kentnisse der natürlichen Lebensweise (1914)," in *"Ändert Euren Sinn!" Schriften eines Revolutionärs*, eds. Helmut Donat, Helga Paasche (Bremen: Donat, 1992). First published in *Vortruppe* in 1912

[149] For an account of the destructive practices of the German troops in East Africa and the famine resulting from their scorched earth policies in putting down the Maji rebellion, see Isabel Hull, *Absolute Destruction: Military Culture and the Practices of War in Imperial Germany* (Ithaca: Cornell University Press, 2005), 131–159.

stale traditions and received wisdom. He became a committed vegetarian, teetotaler, and active publicist for these causes. For Paasche, his time in Africa proved formative, affording him a new perspective on the culture he was raised in.

Paasche was not alone in questioning German indulgences and violence. His barb against physiologists echoed widely in German society, as many educated Germans perceived academic scientists and medical doctors to be validating self-destructive habits of modern industrial society. The prominence of meat in modern diets drew their ire, as it revealed the everyday brutality that featured in modern society. Instead, these critics called for cultivating the senses. By doing so, individuals could recognize that a meat-based diet was in fact a form of self-delusion and of deference to authority privileged over intuitive knowledge.[150]

Paasche's contempt for the physiologists, and modern diets more generally, poses interesting questions about how knowledge claims about food could be made. Experience overseas and contact with different ways of life decentered European norms. Paasche also represented a generation of Germans raised in the aftermath of Germany's post-1884 leap into imperial activity. These global encounters threw supposedly "German" habits, authorized by official medical and academic bodies, into question.[151] Increasing contact with peoples in Asia

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[150] The theme of self-delusion appears repeatedly in vegetarian writings. In the first editions of Eduard Baltzer's *Vereins-Blatt,* he described the plight of modern man as "self-deception […] in that we are experiencing widespread degeneration, we are creating physical and mental illnesses, we are undermining morality, we forge our own chains of slavery, we shorten our lives and drive millions to an early death—all without having the slightest idea of it." Baltzer, "Vorwort," *Vereins-Blatt für Freunde der natürlichen Lebensweise (Vegetarianer)* 1 (Jun. 1 1868): 2-3.

[151] David Ciarlo's important study of visual culture in Wilhelmine Germany demonstrates how these representations in advertisements were wildly successful in selling goods. Ciarlo, *Advertising Empire: Race and Visual Culture in Imperial Germany* (Cambridge: Harvard University Press, 2011).

and Africa with significantly different dietary habits contributed to reappraisals of European narratives of dietary progress. This chapter charts the role of vegetarians in redefining the nature of nourishment. It explores how encounters with peoples, practices, and plants outside of Europe contributed to reorienting debates about nourishing foods. The chapter proceeds in three steps. In a first section, it sketches a brief history of the vegetarian movement to demonstrate members' continued engagement and criticism with academic science. In doing so, it shows that vegetarians did not reject mainstream nutritional science, but rather integrated and popularized it through their own teachings, while at the same time sharpening critiques of its priorities and practices. It then turns to deal specifically with vegetarian criticisms of academic physiology, which tended to dominate in late nineteenth and early twentieth-century discussions of nutrition. In a third and final section, it explores how encounters with peoples, cultures, and plants abroad during the height of new imperialism proved useful for a vegetarian critique of modern eating practices. Vegetarians identified with so-called primitive peoples and used them to buttress their case for a diet guided by experience, not experimental learning. While German physiologists attempted to quantify nutrition on a chemical basis and make it more precise, encounters and reports from abroad about indigenous diets helped vegetarians refute the universalist claims of academic science.

Eating and being

What exactly was a vegetarian lifestyle? German vegetarians promoted their diet as the key to restoring a balanced relationship with nature and renewing social ties. While an aversion to the suffering of animals was frequently cited as a reason to renounce meat and adopt a vegetarian lifestyle, this proved to be a secondary concern. In the late 1860s, the

Association for a Natural Lifestyle (Verein für naturgemäße Lebensweise) formed to popularize the natural lifestyle under the leadership of Eduard Baltzer.[152] Members advocated abstention from alcohol and tobacco as well as meat; in fact, a "natural lifestyle" entailed a good deal more than a plant-based diet. However, the practice of vegetarianism fell under the larger category of the Life Reform (Lebensreform) movement, which was driven by a commitment to individual and social reform. Vegetarianism represented one of several practices that aimed to correct the excesses and ills of modern industrial society through the cultivation of the self. Advocates for a plant-based diet were united by their skepticism of the increasingly visible manifestations of large industry and capitalism. These troubling developments catalyzed a turn inwards among members, who aimed to reform themselves without waiting for social norms or laws to change.[153] The crass materialism these Life Reformers saw as characteristic of the late nineteenth century prompted them to seek out a simpler way of life.

Vegetarianism in Germany had long been perceived as a fringe movement. Contemporaries were quick to dismiss vegetarians and disparage them by pointing to some of the more extreme practitioners, such as the artist, nudist, and critic of monogamy, Karl Wilhelm Diefenbach or the extreme anti-Semitism of völkisch ideologue Theodor Fritsch.

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[152] Members of the Association for a Natural Lifestyle tended to come from middle-class backgrounds and inhabit urban areas. For more on the professional and regional compositions of the associations, see Eva Barlösius, *Naturgemässe Lebensführung: Zur Geschichte der Lebensreform um die Jahrhundertwende* (Frankfurt and New York: Campus, 1996); Wolfgang Krabbe, *Gesellschaftsveränderung durch Lebensreform: Strukturmerkmale einer sozialreformerischen Bewegung im Deutschland der Industrialisierungsperiode* (Göttingen: Vandenhoeck & Ruprecht, 1974).

[153] See, for example, Alfred Lill von Lilienbach, "Das sociale Elend und die Nahrungsreform," *Vereins-Blatt für Freunde der natürlichen Lebensweise*, 17, no. 176 (Dec. 1884): 2804–2808.

The various branches of the Life Reform movement, including vegetarianism, nudism, and youth culture, have been the subject of extensivehistorical study.[154] Yet the difficulties of drawing sharp contours around the milieu in its various forms, as well as its eclecticism, has rendered these groups peripheral to histories of nineteenth-century social reform. The retreat into individual reform lent the appearance of a group of eccentrics rather than a social reform movement; Life Reformers were distanced from traditional politics in Imperial Germany and stood "at the periphery of the anti-political milieu."[155] Implicit in this characterization is the assumption that whatever claims vegetarians may have made, their status as outsiders, or "kohlrabi apostles" as Hermann Hesse once wrote, prevented them from seriously contributing to the discourse of social reform.[156] Similarly, the prominence of certain communes, such as the Eden Fruit Colony, founded in 1893 outside of Berlin, as well as Monte Verità in Italy, have contributed to their marginal status.[157] Additionally, the ties

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[154] Corinna Treitel's recent work provides one of the few accounts in English: Treitel, *Eating Nature in Modern Germany: Food, Agriculture and Environment, c.1870 to 2000* (Cambridge: Cambridge University Press, 2017); as does that of Matthew Jefferies, "Lebensreform: A Middle-Class Antidote to Wilhelminism?" in *Wilhelminism and Its Legacies: German Modernities, Imperialism, and the Meanings of Reform, 1890–1930,* eds. Geoff Eley and Jim Retallack (New York: Berghahn, 2003), 91–107. Other studies of the movement include Krabbe, *Gesellschaftsveränderung durch Lebensreform*; Diethart Kerbs and Jürgen Reulecke, eds., *Handbuch der deutschen Reformbewegungen 1880–1933* (Wuppertal: Peter Hammer Verlag, 1998); Kai Buchholz et al., eds., *Die Lebensreform: Entwürfe zur Neugestaltung von Leben und Kunst um 1900,* 2 vols. (Darmstadt: Hausser, 2001); and Judith Baumgartner, *Ernährungsreform: Antwort auf Industrialisierung und Ernährungswandel: Ernährungsreform als Teil der Lebensreformbewegung am Beispiel der Siedlung und des Unternehmens Eden seit 1893* (Frankfurt: Peter Lang, 1992).

[155] Repp, *Reformers,* 267.

[156] Hesse, "Doktor Knölges Ende (1910)," *Der Weltverbesserer und Dr. Knölges Ende: Zwei Erzählungen* (Frankfurt: Suhrkamp, 1985).

[157] For more on Eden, see Baumgartner, *Ernährungsreform*.

between the practice of vegetarianism and the natural healing movement—one full of promise, but also of quacks—rendered the group at best irrelevant, and at times dangerous. Leaving these colorful personalities and practices aside for a moment, one can appreciate how the movement seized upon the glaring manifestations of the social question and demanded that nutritional knowledge account for individual experience and variation. In fact, vegetarian critiques proved a useful corrective to mainstream nutritional science and played an instrumental role in popularizing academic science. To understand these areas of overlap, contestation, and resolution, we must first turn to how diet came to be seen as a path to social reform.

A brief exploration of the origins of the vegetarian movement in nineteenth-century Germany lays to rest any lingering suspicions that they were cut off from serious discussions of social and political reform. The biographies of its earliest representatives confirm their worldly engagement. Gustav Struve, widely considered to be the founding father of German vegetarianism, served as a leader of the 1848 revolution in Baden and as a Frankfurt parliamentarian. Like many revolutionaries at the Frankfurt Vorparlament and the National Assembly, he pointed to the suffering of the German people as evidence of misrule. In a motion he introduced at the Vorparlament, he cited the famine and misery of the people in Upper Silesia.[158] Under tyranny, he held, the phenomena of hunger, ignorance, and subjugation

[158] "Der Antrag Gustav von Struves im Frankfurter Vorparlament," (March 31, 1848) GHDI. Struve's use of Hungerspest reveals that there was conflation between a typhus plague in the region and the disease itself; many were convinced that the typhus resulted from the hunger. Others (such as Rudolf Virchow) saw it a precondition that made the disease more lethal. Virchow had also traveled through Upper Silesia in the spring of 1848 to study a typhus epidemic there. He also noted the unbearable conditions of the population there and was deeply critical of Prussian policies there.

fed off of one another to produce a physically and spiritually weak nation.[159] Following the suppression of the revolution in Baden in 1849, Struve fled to the United States via Switzerland. He returned to Germany in 1863 and made the acquaintance of vegetarians Eduard Baltzer and Theodor Hahn, joining the Association for a Natural Lifestyle and contributing to their publications, which included Baltzer's Vereins-Blatt für Freunde der natürlichen Lebensweise founded in 1860. Both Struve and Baltzer were liberal agitators during the 1848 revolutions. The third man, Hahn, was an apothecary who took part in the communist movement in Mecklenburg during the 1840s before fleeing to Switzerland. These men had at turns confronted poverty and despotism through political means. In particular, they produced a lively print culture to publicize their views and attract adherents. Attention to early vegetarians' political commitments helps reframe their motivations, moving them from a role as critics at the margins of society to individuals engaged in the central political and social debates of the era.[160]

Privileging the role of eating in processes of social reform was not unique to Life Reformers. In fact, it was a remarkably salient idea for nineteenth-century Germans. First, and most directly, to vegetarian forefathers such as Struve, widespread hunger provided critical

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[159] Virchow's report cited Struve's motion and editorial printed in the German weekly paper *Deutscher Zuschauer* which he later published from exile in New York: Virchow, *Mittheilungen über die in Oberschlesien herrschende Typhus-Epidemie* (Berlin: G. Reimer, 1848) 21.

[160] Barlösius presents vegetarian associations as a particularly bourgeois phenomenon, tied more to ideas of self-improvement than social engagement. She cites the high rate of turnover in memberships as evidence of vegetarianism as a "fad"; another possible explanation is the proliferation of associations and societies associated with the Life Reform movement, particularly in the Wilhelmine period. Her work came out of the heyday of studies of the German bourgeoisie in West German universities in the 1970s. See Barlösius, *Naturgemässe Lebensführung*.

evidence of misrule and oppression. Securing adequate food provisioning had always been within the purview of governing authorities. Particularly through the 1840s, German lands were plagued by failed harvests and political unrest. In an economic system where food was always in short supply, even small localized events threatened to upset market stability and trigger increases in the price of foodstuffs, putting them out of reach for many people. Thus, the state also carried regulatory responsibility to act as a buffer against such disturbances. The famine in Upper Silesia during 1848 under Prussian rule provided damning proof of a callous government. Similarly, the potato blight that famously devastated Ireland in the 1840s also afflicted northwestern Germany.[161] The biological damage of the blight was compounded by laissez-faire policies, resulting in catastrophic death and emigration.

Europe's "Hungry Forties" brought the relationship between political misrule and famine into sharp relief: both the acute suffering at home and the legacy of the thousands of emigrants who sought work and food elsewhere remained a part of the fabric of German society. The consequences of previous subsistence crises were not only preserved in demographic legacies, but also within expectations for the government of the new confederation in 1871. The generation of founders of the German Life Reform movement thus had lived experience of the twin scourges of hunger and injustice. The extreme cases of

[161] In particular, the work of Manfred Gailus on food protest in the Hungry Forties stands out here: Manfred Gailus, *Strasse und Brot: Sozialer Protest in den deutschen Staaten unter besonderer Berücksichtigung Preußens, 1847–1849* (Göttingen: Vandenhoeck & Ruprecht, 1990). For more recent work, see Ansgar Schanbacher, *Kartoffelkrankheit und Nahrungskrise in Nordwestdeutschland 1845-1848* (Göttingen 2016) and "Die Nahrungskrise von 1846/47 in der Provinz Preußen - Wahrnehmung und Bewältigung," in *Wirtschaftskrisen als Wendepunkte*, eds. Stefan Lehnstaedt, Dariusz Admaczyk (Osnabrück: Fibre, 2015): 233-259.

Europe's Hungry Forties imparted the lesson to many Germans that misgovernance could be read into the body.

The scale of suffering resulting from famine, disease, and migration at mid-century generated a debate about the role of food and political authority. The conviction that access to good food was the prerequisite for a just and stable society emerged as an item of liberal consensus. More radical proponents held that access to food was not merely the material substrate for a healthy state, but revealed the existence of a healthy state in itself. Intervening in this debate, the physiologist Jacob Moleschott supported the view that there existed "strong causal links between specific foods and all aspects of human nature," which became characteristic of a school of scientific materialists.[162] This conception presented an integrated view of Moleschott's scientific training and political radicalism.[163] The famous dictum "You are what you eat," emerged from Ludwig Feuerbach's review of one of Moleschott's popular publications.[164] Not only did this adage hold true for specific substances and their effects, such as Moleschott's example of coffee consumption stimulating a tendency toward liberation, but

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[162] Kamminga, "Nutrition for the People," 28.

[163] Harmke Kamminga, "Nutrition for the People, or the Fate of Jacob Moleschott's Contest for A Humanist Science," in *The Science and Culture of Nutrition, 1840s–1940s,* eds. Harmke Kamminga and Andrew Cunningham (Amsterdam: Rodopi, 1995), 15–47; Jacob Moleschott, *Lehre der Nahrungsmittel, für das Volk* (Erlangen: Ferdinand Enke, 1850). As Laura Meneghello has explained, Moleschott's *Lehre der Nahrungsmittel* was a simplified and shortened version of his eight-hundred-page *Physiologie der Nahrungsmittel* for a popular audience. See Meneghello, *Jacob Moleschott– A Transnational Biography: Science, Politics, and Popularization in Nineteenth-Century Europe* (Bielefeld: Transcript, 2017), 114–139.

[164] The pithy sentence appears in Ludwig Feuerbach's review of Moleschott's *Lehre der Nahrungsmittel* (1850). Feuerbach, "Naturwissenschaft und die Revolution (1850)," in *Ludwig Feuerbach, Gesammelte Werke,* Werner Schuffenhauer, ed., vol. 10 (Berlin: Akademie-Verlags, 1971): 347–368.

it also suggested that the progress of a nation could be read into the bodies of its people.[165] Moleschott argued that a diet rich in meat formed a social imperative for "advanced" peoples across the globe.[166] He published widely and maintained a wide network of correspondence with other scientific materialists while occupying the chair in physiology at Heidelberg until political circumstances forced him into exile in 1854.

Though Moleschott was expelled from German lands, his ideas about diet and metabolism remained well-represented by scientific materialists. They enjoyed particularly wide circulation among Life Reformers who found support for their worldview in his more popular scientific publications. In the wake of the widespread shortages of 1848 and the conservative backlash in the following years, the linkage between poor management of the food supply and poor governance of the people seemed apparent. Both Hermann Klencke, trained as a military doctor, and Theodor Hahn, an apothecary, advanced the position that diet was the basis for social transformation from within the ranks of the Life Reform movement.[167] While Hahn vehemently disagreed with Moleschott's assertion that a diet rich in meat was the

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[165] Moleschott held that coffee sharpened judgement and contributed towards liberation, citing the example of Mourad II, who closed the coffee houses in Constantinople. See Kamminga, "Nutrition for the People," 28.

[166] Moleschott, *Lehre der Nahrungsmittel, für das Volk* (Erlangen: Ferdinand Enke, [1850] 1858), 81–98.

[167] See Hermann Klencke, *Die Nahrungsmittelfrage in Deutschland, oder Welches sind die Naturanforderungen menschlicher Ernährung, wie müssen sie durch die deutsche Küche erfüllt und wie kann dem Unbemittelten eine billige und kräftige Nahrung geboten werden? Vom Standpunkt der praktischen Naturwissenschaft beantwortet* (Leipzig: Eduard Kummer, 1855) 142-149. Corinna Treitel has examined Klencke and Hahn's response to Rudolf Virchow in Treitel, "How Vegetarians, Naturopaths, Scientists, and Physicians Unmade the Protein Standard in Modern Germany," in *Setting Nutritional Standards: Theory, Policies and Practices,* Elizabeth Neswald, David F. Smith and Ulrike Thoms, eds. (Rochester; University of Rochester Press, 2017), 52–73.

most "rational" and instead argued for a plant-based diet, both Klencke and Hahn agreed that the current conditions of immiseration were largely caused by a lack of attention to proper eating and food provisioning.[168] "It becomes clear that intellectual and well-developed men become mentally dulled or feral through prolonged exposure to unsuitable, animal-like food such as spoilage or discarded scraps, as is often the case in prisons," wrote Klencke.[169] When subjected to coarse and unsuitable foods, humans could be "lowered" down to baser instincts by these substances. The materialist view that diet could alter humans' temperaments and very substance was widespread.

If changes could be visible over a relatively short time, such as during a prison sentence, it followed that broader habits were also decisive for character. Materialism supported the view of diet as a primary cause of differentiation between different peoples. Klencke wrote, "If we can determine the cause of intellectual character (geistige Natur) of a person from his/her choice of coarse or fine fare, this knowledge also holds true on a larger scale for entire populations."[170] Vegetarians viewed heavy meat consumption as one manifestation of degenerate culture. A common tenet was that since meat involved killing, consumption desensitized humans and made them more aggressive. "It's only a small step from hunting animals to hunting men," as Eduard Baltzer once wrote.[171] The scientific materialism promoted by Moleschott was especially prone to vulgarization.

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[168] Moleschott, *Lehre*, 93–95.

[169] Klencke, *Nahrungsmittelfrage*, 142.

[170] Klencke, *Nahrungsmittelfragen*, 146.

[171] Eduard Baltzer, "Der Krieg," *Vereins-Blatt* 3, no. 25 (Jan. 2 1871): 385.

Both academic scientists and Life Reformers agreed that a poor diet could debase people. From this, it followed that a nourishing and fortifying one could improve them. In his 1859 popular treatise The Natural Diet, The Diet of the Future, Hahn espoused his view that dietary reform posed the only viable path to all other types of reform, whether in the field of science, politics, religion, or material welfare.[172] He produced a long list of vegetarians to support this view, crediting their diet for their aptitude or intellect.[173] In order to support this direct relationship between diet and fortitude or spirit, the vegetarian press frequently highlighted prominent historical figures who were (or were suspected) of sharing their habits.[174] This was the case of an 1868 article in the Vereins-Blatt praised the simple diet of bread, fruit, and water that sustained Giuseppe Garibaldi, the hero of Italian unification, as well as the laudatory attention paid to Richard Wagner's musical genius and his eating habits.[175]

Through proper nourishment, both the body and the spirit could be elevated. Hahn elaborated a concept of the human body in a state of constant exchange with its physical surroundings. Food provided a primary conduit. For better or worse, the body tended to fall

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[172] Hahn, *Die naturgemäße Diät, die Diät der Zukunft: Nach Erfahrung und Wissenschaft aller Zeiten und Völker* (Cöthen: Paul Schettler, 1859), 277.

[173] Hahn, *Die naturgemäße Diät,* 107–109.

[174] Barlösius provides a careful examination of subscriber registries. See Barlösius, *Naturgemässe Lebensführung*.

[175] In the original German: "Er focht immer wie unser Struve auf die Seite der Freiheit." "Garibaldi's einfache Diät," *Vereins-Blatt*, no. 3, 45 (1868):45–46. Or, for example, another appeared speculating on Goethe's relation to vegetarianism: F. Tetzner, "Goethe und Vegetarianismus," *Thalysia: Beilage zum "Vereins-Blatt,"* no. 10 & 11 (July, August1885): 75-77, 85–86.

into equilibrium with its environment through the act of eating. The mutable, open character became a common undercurrent of vegetarian thought. While the work of chemists and physiologists such as Moleschott provided academic validation for this view, the Life Reformers adapted parts of their teachings to develop and support their own lessons while rejecting certain conclusions, like the praise for meat.

Men like Hahn and Klencke based their views not only in the physiological results of Moleschott and others, but were also keenly attuned to other contemporary debates in the natural sciences. From the 1859 publication of Charles Darwin's The Origin of Species and following its translation into German the following year, major debates about evolution took place across Europe.[176] These tended to focus on the impact of the environment on heritable traits of an organism. Food played a crucial role in these developments, providing a constitutive link between an organism and its environment.[177] The influence of the evolutionary theories of Darwin and Jean-Baptiste Lamarck prompted interest in the many ways that organisms were shaped by their surroundings. These debates took placee in lecture halls and among specialists, but also through networks of associations and assemblies for the popularization of science, such as the Versammlung Deutscher Naturforscher und Ärzte and

[176] Alfred Kelly, *The Descent of Darwin: The Popularization of Darwinism in Germany, 1860–1914* (Chapel Hill: University of North Carolina Press, 1981); Pietro Corsi, "Darwinism in Germany, France, and Italy," in *The Darwinian Heritage,* ed. David Kohn (Princeton: Princeton University Press, 1985):683–729; Gunter Mann, "Ernst Haeckel und der Darwinismus: Popularisierung, Propaganda und Ideologisierung," *Medizinhistorisches Journal,* 15, no. 3 (1980): 269–283.

[177] Charles Darwin, *On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life* (London: John Murray, 1859), 98.

local chapters of natural science associations.[178] Enthusiastic publics gathered to hear lectures from German specialists who made their reputations (and their living) by drawing large crowds.[179]

The idea that humans were in constant exchange with their environment emerged out of this intellectual ferment. In particular, naturalist and artist Ernst Haeckel's work transforming Darwin's theories for a lay audience left an enduring mark. Haeckel, one of the most renowned scientific popularizers around the turn of the century, helped transform Darwin's ideas about biological development into a phenomenon with broad appeal. His frequent references to the nation-state as a "whole person" (Gesamtperson) proved durable, illustrating the overlay of social concepts with biological language about exchange and evolution.[180] In place of mechanistic language of inputs, outputs, and work, an organicist notion of life and community gained hold. This notion appealed to Life Reformers as an alternative to the inorganic, unfeeling world of industrial society.

Haeckel's popularization of Darwin's theories in The Origin, known in German as "Darwinismus," proved to be "less materialistic and more committed to idealistic and

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[178] For the increasingly intertwined history of the natural science and the public over the course of the nineteenth century and the landscape of Vereine, see Andreas Daum, *Wissenschaftspopularisierung im 19. Jahrhundert: Bürgerliche Kulture, naturwissenschaftliche Bildung, und die deutsche Öffentlichkeit, 1848–1914* (Munich: Oldenbourg Wissenschaftsverlag, 1998).

[179] Paul Weindling, *Health, Race and German Politics Between National Unification and Nazism, 1870–1945* (Cambridge: Cambridge University Press, 1993).

[180] Weindling, *Health, Race and German Politics,* 30-31.

pantheistic beliefs" than Darwin's own theorizing.[181] In the winter of 1867/68, Haeckel gave a series of lectures to lay audiences on Darwin and Lamarck, weaving evolutionary debates into his own interpretations of literature and national development. These lectures were published together in 1868 and went through nine editions before 1900.[182] Haeckel's rhetoric enraptured his audiences and, in turn, provided them with food for thought about such questions as how the individual related to the whole of society. He wrote:

> When I use the word "nourishment" (Ernährung) as the fundamental cause of change and adaptation, I use this word in its widest sense and understand it to refer to the whole complex of material changes which the organism and all its parts undergoes through the influence of its surrounding world. So nourishment is not just the act of consuming nourishing substances and the influence of different types of foods, but also the effect of water and the atmosphere, of sunlight, temperature, and all those meteorological phenomena that we understand under the term "climate" (Klima). […] All of these and other effects which transform the organism in its material composition need to be considered.[183]

Haeckel's organicist account of flows of material and energy between man and his surroundings provides a helpful illustration of the unencumbered way that nineteenth-century popularizers moved between disciplinary divisions, such as those between biology and economy.[184] Biology provided important inspiration for prominent intellectuals that served as

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[181] Weindling, "Ernst Haeckel, Darwinismus and the Secularization of Nature," in *History, Humanity and Evolution: Essays for John C. Greene*, ed. James R. Moore (Cambridge: Cambridge University Press, 1989), 311.

[182] Ernst Haeckel, "Vorwort zur neunten Auflage," *Natürliche Schöpfungsgeschichte. Gemeinverständliche wissenschaftliche Vorträge über die Entwickelungslehre im Allgemeinen und diejenige von Darwin, Goethe und Lamarck im Besonderen* (Berlin: G. Reimer, [1868] 1898).

[183] Ernst Haeckel, *Natürliche Schöpfungsgeschichte. Gemeinverständliche wissenschaftliche Vorträge über die Entwickelungslehre im Allgemeinen und diejenige von Darwin, Goethe und Lamarck im Besonderen* (Berlin: G. Reimer, [1868] 1874), 198.

[184] Weindling, "Dissecting German Social Darwinism: Historicizing the Biology of the Organic State," *Science in Context* 11, no. 3–4 (Autumn-Winter 1998): 619–637, here 621.

"simultaneously specialist knowledge and a reservoir of resources to conceptualize social change, as well as offering techniques to solve problems."[185] It also presented important contrasts with the views of physiologists by highlighting an understanding of organisms not as thermodynamic machines drawing on individual macronutrients, but as porous entities in dynamic exchange with the entirety of their surroundings. By the 1890s "Darwinismus" in Germany had been mobilized to support the cultural values of freethinking organizations that promoted a return to nature as a way of improving human life.[186] Vegetarian circles increasingly drew on and profited from the ideas and language of popular science as they gained followers around the turn of the century. The natural science associations in which Haeckel moved closely mirrored the development of vegetarian associations; both groups moved scientific knowledge outside the realm of the universities and rarified academic publics. In doing so, they played an important role in democratizing expertise.

Though the insights of physiologists such as Moleschott had initially provided support for the views of plant-based diet advocates, it was teachings about evolution and development– and the intense public interest in biological science– that transformed vegetarian discourse. Of course, Darwin's ideas and their transmission through Haeckel did not leave German academic science untouched. In a 1906 lecture, Max Rubner observed, "Over the passing century, Darwin's theory of evolution made a mark in circles he could have never imagined, far-removed from his background in the natural sciences, since his studies

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[185] Weindling, "Dissecting German Social Darwinism," 623.

[186] One such organization was Haeckel's Monist League, founded in 1905. See Weindling, "Ernst Haeckel, Darwinismus and the Secularization of Nature."

did not—and he would not have wanted them to—give any sort of support to philosophical materialism. Popularization created this new worldview, and it still reverberates today."[187] Despite his measured criticism of materialism, Rubner propagated the view that "We can see how far the somatic reaches into the intellectual."[188]Adherents of a natural lifestyle drew on academic science, sometimes directly and sometimes mediated by popularizers. Vegetarians synthesized ideas about science and individual improvement that they tested through self-experimentation and sensory observation. By the 1880s, they were disillusioned with the perceived rigidity and mechanistic directions of academic physiology and generally disgusted by the egoism among medical professionals and academics. Instead, new approaches from biology and evolutionary theory gained traction and explanatory power. With an ear towards developments in the academic scientific community, vegetarians increasingly denounced physiology as a discipline.

Critique and exchange: Debates over the "mixed diet"

Vegetarian circles not only drew on academic science, they also critiqued it in formidable ways. Contrary to the caricature of long-haired, barefooted men and women who lacked professional orientation and training, many vegetarians were scientifically literate and attentive to the developments within nutritional science. Life Reform figures like Hahn had contended as early as 1859 that their programs for dietary reform were superior to those

[187] MPG Archiv III. Abt. Rep. 8 Akt. Nr. 128–2: Rubner, "Leib und Seele, Akademie Vortrag, nicht gedruckt," ca. 1906.

[188] Rubner described this as: "Wie weit das Körperliche in das geistige Gebiet heineinreicht." MPG Archiv III. Abt. Rep. 8 Akt. Nr. 128–2: Rubner, "Leib und Seele, Akademie Vortrag, nicht gedruckt," ca. 1906.

proposed by "new physiologists" such as Moleschott, who "forgot the humans in their science."[189] While admittedly impressed by some of their work, Hahn argued they were not suited to providing dietary recommendations, as they took a view of humans that was too mechanistic. Vegetarians such as Hahn held that mainstream scientific materialism was responsible for social immiseration through its utilitarian, productivist outlook.[190] Knowledge about diet, he held, should not come from such calculations, but should be based on a more organic and holistic understanding of man in relation to both society and the natural world. Writing in 1859, Hahn could not have known the direction academic nutritional science would take. However, his criticisms provided a general pattern for the critique that would linger and become amplified in Life Reform circles by the 1890s.

Vegetarians' concerns represented a parallel movement to those of accomplished chemists and physiologists, who were also increasingly focused on the impact of diet on health.[191] In focusing on similar dimensions of the social problem, these groups arrived at dramatically different conclusions. Few among the established nutritionists at the turn of the century advocated for a vegetarian diet. Most dismissed the practice out of hand. Rudolf Virchow, the pathologist, anthropologist, and progressive politician, constituted an exception. He took a more sympathetic attitude towards the vegetarians, even crediting some of their objections to standard fare as notable. Though he dismissed their anthropological arguments, such as those turning on the evolution of teeth and jaw mechanisms best suited to eating

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[189] Hahn, *Die naturgemäße Diät,* x.

[190] Krabbe, *Gesellschaftsveränderung durch Lebensreform,* 15.

[191] MPG Archiv III. Abt. Rep 8 Akt. Nr. 124-5: Rubner, "Ernährung und Kleidung" (Vortrag, um 1900)

plants, as spurious, he granted that they were correct in appreciating the high quality of nutrients available in some plants. While conceding that they made some important points about the alarming quantities of meat, sugar, and Genussmittel in the modern diet, he continued to advocate for a "mixed diet" (Mischkost) of plants and meat.[192]

By the 1860s nutritional science looked increasingly at the process of energy transformations, although it had not yet succeeded in proving the equivalence of energy input and output.[193] Moleschott's vision of scientific materialism found echo in the work of those

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[192] Virchow references Baltzer's 1867 publication of *Die natürliche Lebensweise* in his lecture: Virchow, *Über Nahrungs- und Genussmittel, Vortrag, gehalten im Saale des Berliner Handwerker-Vereins* (Berlin: Charisius, 1868), 30. Corinna Treitel has interpreted Virchow's stance on vegetarianism more harshly. She writes, "Virchow went on to savage the meatless diet as 'one of the worst and most unnatural errors of the human race.'" Treitel, "How Vegetarians," 19. In fact, Virchow is not describing his own view of vegetarians, but rather the vegetarian view of the mixed diet, writing that ***vegetarians*** *characterized meat consumption [Fleischessen] as one of the worst and unnatural errors of the human race* (Full quote: In den letzten Jahren hat sich unter dem Namen der Vegetarianer eine, wenn auch unzusammenhängende und wenig zahlreiche, so doch recht thätige Sekte erhoben, *welche mit allen Hülfsmitteln der Wissenschaft und mit allem Ernste eines tief sittlichen Strebens das Fleischessen als eine der schlimmsten und widernatürlichsten Verirrungen des Menschengeschlechtes bekämpft* und durch eigenes Beispiel den Beweis zu lieferen bestrebt ist, dass die Pflanzennahrung genügt, um dem menschlichen Körper Gesundheit und Kraft zu erhalten." (Virchow, *Über Nahrungs- und Genussmittel,* 30). She also writes that Baltzer's book had "prompted Virchow's speech in the first place" (Treitel, "How Vegetarians, Naturopaths, Scientists, and Physicians Unmade the Protein Standard in Modern Germany," 20). I believe this characterization also to be false: Virchow's speech is premised upon more general concerns with the goal of bringing the fruits of recent scientific progress to a lay audience at the worker's lecture. Although it is unclear that there was a single impetus for the speech, Virchow does not even broach the topic of vegetarianism until page 30 of 54, and then only for 2.5 pages. Certainly, the opposite is true: Baltzer, deft publicist that he was, capitalized on the attention from Virchow and published a series of letters to him in 1868 (see discussion below).

[193] Elizabeth Neswald has focused on the growing interest of precision into these physiological experiments, particularly in Voit's lab. See Neswald, "Nutritional Knowledge between the Lab and the Field: The Search for Dietary Norms in the late Nineteenth and Early Twentieth Centuries," in *Setting Nutritional Standards: Theory, Policies, Practices,* eds. Neswald, David F. Smith, Ulrike Thoms (Rochester: University of Rochester Press, 2017), 29-51.

physiologists trained by Johannes Müller in Berlin, including Rudolf Virchow, Hermann von Helmholtz, and Emil Du Bois-Reymond in the 1860s. Among this group, the principle of Kraft, or energy, formed the basis of natural laws and exchange. It was exactly this sort of research agenda that Virchow called for in his 1868 lecture "On Food and Drink" to a Berlin worker's association. He declared,

> The confusion over the most advisable means of eating (Nahrungsweise) has only grown as a consequence of the extremely one-sided treatment of nutritional questions from a strictly chemical standpoint. In order to recognize the stimulating effects of food and drink on the body, chemical investigations play only a small role: physiological dimensions are decisive here.[194]

Virchow welcomed the involvement of physiologists. Complicated questions of nutrition could not be considered solely from a chemical point of view, but also needed to consider wider effects of different substances on the body. Virchow's plea for a shift from a chemical to physiological basis for researching nutrition proved prescient. First pioneered by Moleschott, and then Carl Voit, Max Pettenkofer and others, the "new physiology" established the discipline on the basis of an exacting quantitative science resting on the foundations of chemical and physical laws. Painstaking measures of consumption and excretion, whether of dogs lined up in cages and fed the same diet for weeks on end or of humans in respiration chambers, had become the core of the discipline.

Upon the publication of Virchow's lecture, several leaders of the Life Reform movement issued a public rebuttal. Eduard Baltzer seized the opportunity for a larger audience and published a rejoinder to Virchow from his base in Nordhausen in 1868. Under the pretense of being flattered by the mention of his name in the lecture, Baltzer took it as his

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[194] Virchow, *Über Nahrungs- und Genussmittel,* 54.

duty to further clarify his views.[195] Virchow's public grappling with questions of nutrition and modern science shined a spotlight on the movement as it gained traction. In the same year, Die Gartenlaube rejected a "harmless sketch" of vegetarianism as it conflicted with the views of a leading contributor, Herr Dr. Bock.[196] As the movement gradually grew beyond its original narrow group through its meetings and journals, it attracted more attention, mainly in the form of criticism. To Baltzer, this was undoubtedly a triumph to have merited public mention, and he took it upon himself to not let this escape public attention. In nine letters, he addressed Virchow and presented vegetarianism as rational, grounded in experience and science. Where Virchow had referred to it as a "sect," Baltzer took care to explain that it no longer had religion connotations. Instead, the Association for a Natural Lifestyle drew its membership from a "colorful mix" of faiths, professions, and classes.[197] Baltzer presented the group as ecumenical and distanced himself from any religious ties in an effort to thwart further attempts at marginalization. In his view, they were just the opposite: not beholden to ancient ritual or dogma, but dedicated in their pursuit of truth. He wrote, "No one has greater respect for the sciences than I do, but one may not confuse them with their temporary flashes of light."[198] The letters continue, drawing out the important overlap and resonance between the

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[195] Baltzer, *Die natürliche Lebensweise: der Weg zu Gesundheit und sozialem Heil. Briefe an Virchow über dessen Schrift: "Nahrungs- und Genussmittel"* (Nordhausen: Förstemann, 1868).

[196] Baltzer, *Die natürliche Lebensweise,* 2.

[197] Baltzer, *Die natürliche Lebensweise*, 5.

[198] Baltzer, *Die natürliche Lebensweise*, 25.

vegetarian movement and Virchow's teaching.[199] In particular, Baltzer focused on Virchow's statement that agriculture permitted the concentration of population. Here, he wrote, Virchow was speaking the language of the vegetarians. Hunting and fishing require large stretches of land for secure food for a small number of people, whereas "with each furrow that is dug into the earth, society gains a new occasion to proliferate and maintain this number."[200] While taking care to differentiate vegetarianism and highlight its benefits, Baltzer also demonstrated that there was a productive dialogue to be had with representatives of academic science.

Virchow prompted another vegetarian to publish with a corrective aim: Theodor Hahn. Several months after Baltzer's Briefe appeared, the journal Daheim ran a satirical article on Baltzer, calling him "Der Ritter vom Gemüse."[201] Hahn published his polemical piece, Der Ritter vom Fleisch, in response. In it, he aimed to take on the "experts," namely defenders of a meat-rich diet. Virchow was first on the list of a dozen doctors and professors to whom Hahn addressed himself. While Baltzer addressed Virchow warmly, full of patience and in search of mutual understanding, Hahn proceeded more aggressively. In his own estimation, he saw himself engaged in a jousting match between the "Ritter vom Fleische" and the "Ritter vom Gemüse."[202] Point for point, he aimed to dress down prominent figures, such as Virchow, Moleschott, and Voit, who promoted carnivorism. While on the one hand the publication

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[199] Especially in his low estimation of Liebig's school which led to the present trend of eating a meat-laden diet. Baltzer, *Die natürliche Lebensweise*, 10-11.

[200] Baltzer, *Die natürliche Lebensweise,* 36

[201] Hahn, *Die Ritter vom Fleische: Offene Briefe über die Ernährungsfrage, Zugleich ein Beitrag zur Lösung der sozialen Frage* (Berlin: Theobold Grieben, 1869), 4 and 64.

[202] Hahn, *Ritter,* 3.

aimed to show that meat consumption was unhealthy, it also took aim at the way that the featured academics brought supporting evidence to bear on dietary questions. Hahn accused them repeatedly of dogmatism, while the vegetarian lifestyle involved "the refining of the senses."[203] This contrast between experiential, bodily knowledge on the one hand and experimental, objective calculation on the other sharpened in the years that followed.

The tension between experimental, academic science and experiential, vegetarian critique proved to be productive. It lay at the heart of the exchange between Baltzer and Virchow in the late 1860s detailed above, which can be seen as a kind of origin debate that imprinted the relationship between academic science and the reform movement for decades to come. As Corinna Treitel has shown, vegetarian critique and activism entered academic science as a subject of inquiry in the aftermath of this exchange, eventually prompting a reevaluation of recommended protein values.[204] While academic scientists sought to diminish their influence, vegetarians perceived themselves to be important interrogators and crucially, communicators, with the responsibility of "initiating communication and traffic of ideas" between academic science and vegetarian critics, as well as between the results of science and the wider public.[205] Instead of confrontation, most vegetarians perceived themselves to be

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[203] Hahn, *Ritter*, v.

[204] For a broader view of this transformation in the protein recommendation between roughly 1850 and 1906, see Treitel, "How Vegetarians, Naturopaths, Scientists, and Physicians Unmade the Protein Standard in Modern Germany," 52–73.

[205] E. Thieme, "Unser Laienberuf und unsere Stellung zur Wissenschaft," *Vereins-Blatt* 4, no. 36 (1872): 561–562.

engaged in a gradual process of course-correction: as Eduard Baltzer wrote confidently in 1894, "science has not yet proved us wrong, instead science makes concessions to us."[206]

Physiology as Industrial Science

Physiology provided a new calculus of productivity at the very heart of the new "science of work" that emerged in late nineteenth-century Europe.[207] The strong orientation towards production capacity sharpened after 1880 as a result of internal dynamics within the field of physiology. Diet and nutrition played critical roles in creating labor power. Practitioners sought to maximize outputs on minimal inputs, demonstrating a productivist outlook towards workers. The place of thermodynamic principles in physiology was by then firmly enshrined and visible in the instruments of the discipline: in 1889 Max Rubner constructed a direct calorimeter in his laboratory at Marburg to demonstrate a near equivalence between energetic intake and output in dogs, which was then extrapolated to humans.[208] Calorimetry served as the ultimate illustration of the human body as a working machine. Rubner, a prodigy of Voit, held that, "the law of the conservation of matter, just like the law of the conservation of energy, proved eminently applicable."[209]

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[206] Baltzer, "Woher und Wohin?" *Vereins-Blatt*, (1894): 2708.

[207] Rabinbach, *Human Motor,* 23.

[208] Rubner, "Ein Calorimeter für physiologische und hygienische Zwecke," *Zeitschrift für Biologie* 25 (1889): 400-426.

[209] MPG Archiv III. Abt Rep 8 Akt Nr 129-3: Rubner, "Leib und Seele- Akademie Vortrag," (ca. 1906) 3.

These applications took place in industrial and institutional settings. Worker productivity was not only of interest to employers, but also to state officials. For example, in the 1880s, both popular and academic circles debated the relative value of potatoes and bread in workers' diets. A common justification for the superior productivity of the English worker was his diet of meat and wheat bread, while his German counterpart subsisted mostly on potatoes. In an exemplary passage from a practical guide for doctors published in 1881, the author evokes the metaphor of the body as a steam machine built of iron:

> …yet the iron is not significantly used through work—instead the energy comes from burning coal. The machine contains at any given moment only a relatively small quantity of coal, but it still needs a large quantity overall, since each time new coal is added to the firing stove. Muscular work in itself does not demand a protein-rich diet. Is it also to be assumed then, that our worker with his poor potato diet has all of his needs met? This would be a hasty conclusion, since the muscles are also used just as much as any other part of the body. The iron of the steam machine is used up over time, irrespective of whether the work is carried out at the cost of iron. And to replace this muscle use protein is absolutely necessary. A protein-rich diet gives the worker long-lasting, powerful muscles so that he can maintain his work machine in top condition.[210]

This analogy brilliantly illustrates German employers' and officials' belief that the goal of a worker's diet was to preserve and restore the body for the purpose of work. In a sense, he was to eat for an employer, not for himself or for personal health. Both the instruments and methods of physiology, which centered on laboratory testing of inputs and outputs and surveys of closed institutions, contributed data that was useful in drawing conclusions about aggregate workers' productivity. In doing so, physiological research also produced estimates of national power and suggestions for optimization.

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[210] "Ernährung," in *Real-encyclopädie der gesammten Heilkunde: Medicinish-chirurgisches Handwörterbuch für praktische Ärzte*, Albert Eulenburg, ed., vol. 5 (Vienna and Leipzig: Urban & Schwarzenberg, 1881), 76.

Vegetarians considered this research agenda not only to be lacking in consideration of the human spirit, but also to be methodologically and ethically bankrupt. Strong denunciations of physiological research emerged in Life Reform circles in the 1880s as a result of increasingly well-organized opposition to vivisection in animal experiments. Physiological departments of universities were notorious for performing vivisections in their experiments to observe digestion.[211] The issue was debated in the Reichstag and the Prussian Landtag over the course of the early 1880s, but the practice was defended under the banner of the "freedom" of science.[212] Both bodies ultimately declined to ban the practice. Vegetarians denounced physiological journals publishing works based on vivisection, including prominent journals such as Pflüger's Archiv für Phsyiologie, Hermann's Handbuch für Physiologie, Archiv Virchow, Berliner akademische Sitzungsbericht, Deutsche medicinische Wochenschrift, among others.[213] These titles constituted the flagship journals of the field and for many vegetarians (the overlap with the anti-vivisectionist movement was considerable), the entire discipline and its findings were thus compromised.

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[211] François Magendie's early nineteenth-century experiments in France touched off the first round of debates. For an account and documents related to the activism of Frances Power Cobb in England and similar campaigns across Europe, see *Animal Welfare and Anti-Vivisection, 1870–1910: Nineteenth Century Woman's Mission*, ed. Susan Hamilton (London: Routledge, 2004). For the movement in Germany and Switzerland, see Ulrich Tröhler and Holger Maehle, "Anti-Vivisection in Nineteenth-Century Germany and Switzerland: Motives and Methods," in *Vivisection in Historical Perspective,* ed. Nicolaas Rupke (London and New York: Croom Helm, 1987), 149–187.

[212] *Verhandlungen des Reichstages,* 66 (32. Sitzung, Jan. 23, 1882), 873.

[213] See "Vivisection," *Vereins-Blatt für der natürlichen Lebensweise,* 18, no. 184 (Aug. 1885): 2935–2936.

Physiology grew up alongside the processes of industrialization and rationalization of labor during the late nineteenth-century. As a discipline intimately linked with these priorities, it also contributed insights for optimizing techniques and processes in the name of greater efficiency. Its dominance in the field of nutrition reflected an industrial way of knowing. Vegetarian concerns responded with a critique of physiology precisely because of its rhetorical dominance in this wider system. Treating the body as a machine, or an oven, they held, was a brutally utilitarian way of thinking of eating and being. As one critic wrote in 1884, "Physiology occupies itself with the law of nutrition, but so far it has only produced numbers, which are simply won from chemical analysis and quantitative determination of today's concept of utilitarian (zweckmäßig) nutrition."[214] The focus on productivity had led to the visible immiseration and poor health visible in German cities. Rather than trust the further progress in the field of physiology, vegetarians responded by advocating for experiential, rather than experimental knowledge. In their view, nutrition should not center on questions of optimizing man as a productive unit but rather optimizing health and society.

Eating outside of Europe

The second part of the Life Reform critique of modern meat-based diets involved decentering European knowledge about food and diet. Academic scientists, colonial enthusiasts, and political economists eagerly looked outward for resources from other parts of

[214] Heinrich Lahmann, "Die vermeintliche Schädlichkeit pflanzlicher Nahrung," *Vereins-Blatt,* 18, no. 180 (April 1885): 2875–2876. Lahmann was trained as a medical doctor and an active member of the Life Reform milieu. He pleaded for a more practical approach to nutrition, moving away from physiological understandings and the outsized focus on nutritional chemistry and towards his theory of "*Dysämie*," or imbalance in the blood. See Lahmann, *Die diätetische Blutentmischung als Grundursache der Krankheiten: Ein Beitrag zur Lehre von der Krankheitsanlage und Krankheitsverhütung* (Leipzig: Otto Spamer Verlag, [1891] 1894).

the world that could be exploited and sought to accommodate this knowledge within existing hierarchies. Life Reformers, on the other hand, tended to present evidence from increased contact and exchange with extra-European lands as a viable alternative to the status quo. While the fascination with the exotic had long been a feature of popular culture both within and outside Life Reform circles, increased mobility paired with Germany's acquisition of overseas colonial holdings in 1884 led to greater exposure to other foods and cultures. The recourse to other dietary regimes to critique German society became particularly pronounced in the years after 1890.

Life Reformers seized upon foreign customs to better support their critique of their own. Mid-century vegetarians had already displayed a keen interest in foreign diets as a way of holding up a mirror to German culture. One strategy for communicating the validity, and the righteousness, of the vegetarian lifestyle was the publication of pseudo-travelogues. In addition to publishing conversion narratives and polemics which set out to dismantle dietary wisdom, key texts were published in the form of Montesquieu's Persian Letters. In 1843, Struve published his own version, Mandaras Travels. The book is ostensibly a series of letters from Mandaras, a young man from the Himalayas, writing to his lover and her father, who instructed him to make a journey to Europe before giving himself over to his bride. In addition to chronicling his travels, Mandaras clusters the letters around a series of meditations on different themes: "skepticism," "simplicity," and "man's relationship to the animal kingdom," are a few among those treated. Mandaras arrived at a European port from "the East," unfamiliar with Christian teachings but able to speak German, allowing him to converse with his hosts.

Struve's adaptation of the Persian Letters permitted him critical distance from his

homeland and customs. Mandaras, the enlightened outsider who is untainted by prejudice or dogma, reports his experiences back to his native land. In the second part, he returns to his home in an arcadian Himalayan village of Tal Suty. There, the extent to which German society is dictated by coercion and artifice is apparent: the stark contrast between the idyllic valley and German cities is clear. In Mandaras' homeland, absolute respect between humans and animals is the rule. Instead of scattering upon his approach, the birds seem to sing louder to allow for the enjoyment of their song.[215] In the fictional valley, respect for animals was considered the highest expression of man's superiority, and this spirit of justice extended to social relations as well: humans treated one another with dignity.[216] Struve's early preoccupation with Hindu vegetarianism proved the first in a long line of vegetarian writing admiring "Eastern" eating practices and become a classic text for later adherents.

Thirty-five years later, Baltzer published the first issue of the Vereins-Blatt of the Association for the Natural Lifestyle. The publication demonstrated the association's appetite for scientific information; in this respect they were omnivorous in the material they read and reproduced. The publication sought to connect readers across Germany and demonstrate the wide reach of their concerns and membership. Issues generally consisted of a featured essay on the tenets of vegetarianism, summaries of recent meetings of the association, summaries of recent relevant scientific publications, and news from prominent members and reports from overseas. This latter point could consist of news from similar groups, like those in London or Vienna, but also of travel reports or correspondence with members on a voyage. This outward gaze helped vegetarians to identify themselves as part of a global movement.

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[215] Struve, *Mandaras Wanderungen* (Leipzig: D.V. Struve [1843] 1906), 109.

[216] Struve, *Mandaras Wanderungen*, 307.

The Vereins-Blatt partook in the nineteenth-century enthusiasm for travel writing. It often featured excerpts of reports from larger expeditions to far-off regions of the globe that had been edited for their relation to diet. Editors, especially Baltzer, read and redacted these reports through a "vegetarian filter," sometimes leaving the material to stand alone and other times commenting on its contents. In an 1868 issue, an Austrian expedition to East Asia was featured, as it "promised to be of special interest for vegetarians" since the crew had been instructed to take careful note of eating habits.[217] While it was common practice for medical doctors and ethnologists on expeditions to note dietary features, it was rarely explicitly mentioned from the outset. The Vereins-Blatt features chronicled not only the practices that travelers encountered, but also often contained criticisms of those producing the accounts. For example, an 1870 issue featured a longer article dedicated to the nutritional observations from the circumnavigation completed by the Novara in 1859. The author did not care to conceal his distaste for the expedition's chronicler who "appeared to share all the prejudices of medical orthodoxy and therefore hardly provided an unbiased view."[218] Nonetheless, the voyage revealed a wealth of knowledge about different eating habits from the Cape of Good Hope to the Marquesas Islands.

On the one hand, reports from international scientific expeditions provided vegetarians with important observations. These encounters were held up as counterexamples to European diets and lifestyles. However, this required editorial work: editors tended to use existing

[217] "Die österreichische Expedition nach Ostasien," *Vereins-Blatt für Freunde der natürlichen Lebensweise (Vegetarianer)* 14 (Oct. 30 1868), 219.

[218] "Aus dem fernen Osten," *Vereins-Blatt für Freunde der natürlichen Lebensweise (Vegetarianer)* 16 (Jan. 24 1870), 241–246 and 17 (Mar. 1 1870): 157–163.

accounts to buttress their position by publishing excerpts or critiques of the original narrative. However, by 1900 the interest of the movement itself shifted to the tropics. They were attracted by the warm climates and the supposed freedom from European norms. The weekly periodical Die Lebenskunst, founded in Leipzig in 1906, regularly published essays and reports from German vegetarians in the tropics. As one correspondent noted, "German colonies are especially suited to absorb German emigrants […] that here a vegetarian can find the appropriate living conditions goes without question."[219] The author then proceeded to explain the advantages and drawbacks of each colony, concluding that they all had something to offer, but Samoa, "the pearl of the South Seas," was best-suited to vegetarian settlement when considered from the standpoint of climate, plants, governance, and disease.[220] That tropical zones, and especially Samoa, acted as an Edenic paradise for vegetarian settlement hopes should come as no surprise. Reports, correspondence, and travelogues satisfied this domestic appetite for the exotic. By the turn of the century, a symbiosis between Life Reform and colonial enthusiasm proliferated in the press.

If the vegetarians were omnivorous in their reading material, the German Colonial Society and Colonial Office were even more omnivorous, and creative, in exploring potential sources of income from their colonies. Germany's acquisition of formal colonies in 1884 also heightened public interest in overseas travel, and facilitated transport.[221] Since Germans came

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[219] Robert Blum, "Samoa," *Die Lebenskunst* 3, 16 (1908): 382.

[220] Blum, "Samoa," 382.

[221] Beginning in the 1880s, transportation became quicker and cheaper; the proliferation of ships and routes on the large shipping operators Woermann Line, Deutsche Ostafrika-Line, Hamburg Amerika-Line and Hamburg Bremer Afrika Linie allowed transportation from German harbors to African harbors. Since May 1907, German ships offered regular three-

by their colonies through a series of treaties formalizing private holdings, the actual resource wealth of these regions was disputed. Colonial promoters (especially the Colonial Society) as well as authorities encouraged taking stock of the available wealth in order to better exploit it. This involved turning an inquisitive, resourceful eye towards all available information about agricultural conditions, mineral deposits, and native ways of life. With the help of medical experts, naturalists and agricultural improvers, government officials hoped to increase the value of their territory by cultivating raw materials, or appropriate substitutes, in land they controlled. Observations of local diet provided a crucial pillar for this project. Recording native eating habits allowed colonial officials and scientists to glean information about how different plants were used. Such knowledge proved essential not only for local colonial administrators, who often struggled to adapt to the new climates, but also to officials back home working on substitution schemes or pharmacological research.

Practices of botanical collecting were common across European expansion projects.[222] However, comparatively little work has been conducted on collecting in German colonies. A closer look at these practices in the German colony of Southwest Africa demonstrates the motivations, and setbacks, these imperial autarky schemes encountered on the ground while attempting to record local dietary practices. Almost immediately, the Foreign Office began to urge local authorities in the German protectorates (Schutzgebiete) to assist in collecting. In

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week roundtrip voyages around all of Africa. BArch R 1001 78: "Unsere Kolonialwirtschaft in ihrer Bedeutung für Industrie und Arbeiterschaft" (1909), 85.

[222] For the case of the British Empire—by far the most studied—see Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven: Yale University Press, 2000) and John Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State and the Uses of Science in the Age of Revolution* (Cambridge: Cambridge University Press, 1998).

April 1887, the Foreign Office requested that the governor of German Southwest Africa support and facilitate the collection and transmission of edible or otherwise useful plants for the Prussian Agricultural Ministry.[223] Scientists in Germany also requested samples from the Foreign Office, which they then transmitted to the governor. The requests extended from raw materials to samples of plants from which they were derived, including leaves, flowers or fruits. The focus was on staple foods: grains, lentils, nuts, and root vegetables received priority.[224] In Berlin, researchers aimed to study these samples and determine whether they could be cultivated at a larger scale in a colonial setting or at home. However, there was also a lively botanical exchange between different colonies: for example, the director of the Royal Botanical Museum in Berlin recommended against planting coconut trees in coastal Swakopmund, since the climate was not favorable. However, he recommended that if this experiment was to be carried out, plants from the experimental garden in Togo at Lome should be used, as it was considerably dryer there than in the alternative garden in Cameroon.[225] Most preferable, the director continued, would be the cultivation of other desert plants such as eucalyptus, acacia and saltbush for animal feed. These plants could easily be obtained from British Cape Town.

Over a decade later, the Foreign Office continued to enjoin local colonial officials to support the project of collecting and acclimatizing, but appeals were met with apathy. After a

[223] NAN ZBU 1013 JX III C 1–2: Letter, Auswärtiges Amt to Goering, Kaiserliche Kommission für sudwest afrikanische schutzgebiete, Berlin Apr. 19. 1887.

[224] NAN ZBU 1013 JX III C 1–2: Letter, Auswärtiges Amt to Dr. Lucius, Kgl Staatsminister u. Minister für Landwirtschaft, Mar. 29. 1887.

[225] NAN ZBU 71 A II 02 Bd 3: Prof. Dr. G. Volkens, Königl. Botanisches Museum to Herrn Dr. A. Gerbert, Forsttechnischer Beirat, April 24, 1903.

renewed round of requests, district administrators responded noncommittally. While some noted that residents were open to helping, others noted that "among the current farmers there is no one who is interested in participating in this scientific collection."[226] Frustration mounted: in 1907, the director of the Botanical Center for the Colonies in the Royal Botanical Garden in Berlin complained to the Governor of Southwest Africa that expensive apparatuses for the return of samples had been sent to the colonies, but only a very limited number had been returned and the gesture was mostly met with silence. Thus, the director declared, from this point forward he would only send equipment to people who have proven themselves to be both knowledgeable and reliable about collecting practices.[227]

Knowledge about what to collect was drawn from previous expeditions, local observation, and especially local informants. In the southern part of Southwest Africa, the Herero missionary Samuel Kariko provided indispensable help in identifying plants and animals that served as food sources. With his help, a detailed table of foodstuffs, their designation in the local language, and the method of preparation was created.[228] German officials generally observed that populations indigenous to Africa tended to rely on a mostly plant-based diet supplemented with occasional meat. However, the population of Southwest

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[226] NAN ZBU 1013 JX III C 1–2: Letter, Oberleutnant Von Brandt, Kais. Distrikts Chef Rehoboth to Kaiserl. Gouvernement durch des Kais. Bezirksamt, Aug 23. 1904.

[227] See NAN ZBU 1013 JX III C 1–2: Especially A. Engler, Botanische Zentralstelle für die Kolonien am königl. Botanischen Garten u. Museum in Berlin, Oct. 10, 1907.

[228] NAN ZBU 71 A II 02 Bd. 3: "Zusammenstellung von Angaben des Hereros (Eingeborenen Misssionares) Samuel Kariko's über den Pflanzenkost der Hereros"; for the request for samples of "Feldkost" for display at the 1911 Hygiene Museum in Dresden, see NAN ZBU 918 HXL 3, Bd. 1, Letter to Gouvernement Windhoek, Kaiserl. Distriktamt Gobabis (Oct. 3. 1910).

Africa (exempting the northern population of Ovambo) proved an exception. Germans referred to the diet of tribes in Southwest Africa as "Feldkost" and placed a high value on investigating it, as:

> it is widely observed that through the growing influence of white immigrants, the Hereros, Hottentotts and Kaffers (sic) are becoming more and more accustomed to European foods and the "bush diet" (Feldkost) which they previously valued is now rejected and is only to be found among the bush people. For this reason, it is advisable that the plants that composed bush diet, of which we have very limited knowledge, are investigated for their botanical and chemical properties before they become completely forgotten.[229]

The evaluation of Southwest African plants was based on Joseph König's The Chemistry of Human Food and Stimulants, the same source for the recommendations in the Gesundheitsbüchlein.[230] The final goal of such a report, as the author of the report in the colonial agricultural journal Der Tropenpflanzer relayed, was to "determine, as far as possible, whether the foods in question serve only to cover the needs of the native populations or whether they are also important for trade. In doing so, we will also discuss whether the food in question is already exported from the protectorates, how much, and whether it is already enjoyed by European import lands in some form or might have application there."[231] While translating native plants into export goods was ideal, even local use had enormous practical value. During the Herero wars from 1904–1908, German Schutztruppe nourished themselves with Dschamma, a type of watermelon found in the west of the protectorate. Its

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[229] NAN ZBU 71A II 02 Bd. 3: Dr Adlung, *Sonderabdruck aus dem 'Tropenpflanzer' (Organ des Kolonial-Wirtschaftlichen Komitees)* 16, no. 10, 11, 12 (1912).

[230] NAN ZBU 71A II 02 Bd. 3: Dr Adlung, *Sonderabdruck aus dem 'Tropenpflanzer' (Organ des Kolonial-Wirtschaftlichen Komitees)* 16, no. 10, 11, 12 (1912), 2.

[231] NAN ZBU 71A II 02 Bd. 3: Dr Adlung, *Sonderabdruck aus dem 'Tropenpflanzer' (Organ des Kolonial-Wirtschaftlichen Komitees)* 16, no. 10, 11, 12 (1912), 3.

watery flesh served to deliver fluids, which were hard to come by in the dry climate, and its fruit could also be eaten and imparted a light, sweet taste.[232] Thus, native plants were needed to fuel German colonial ambitions, even if ordinary white settlers did not aid in their research.

Despite a lack of local interest in improving imperial scientific plant knowledge, setbacks, practices of observing indigenous people and plants revealed a strategy of imperial autarky that was promoted at home. The on the ground practices of collection eventually resulted in guides for the colonies that were published and promoted by the Colonial Society and displayed at the 1911 Dresden Hygiene Exhibit.[233] These publications served two important goals: first, they spread knowledge of the colonies and their economic potential to domestic readers; second, they promoted the view that German colonialism was a viable, and indeed profitable enterprise even in the face of continued failures and expensive wars.[234] In short, scientific research enforced the message that colonial administration was worth the

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[232] NAN ZBU 71A II 02 Bd. 3: Dr Adlung, "Beiträge zur Kenntnis einiger Eingeborenen-Nahrungsmittel," *Sonderabdruck aus dem 'Tropenpflanzer' (Organ des Kolonial-Wirtschaftlichen Komitees)* 17, no. 4 (1913), 2.

[233] A section of the 1911 Exhibition dealt with "Food of Natives in the Tropics" and included tables of the diets' chemical composition, colored slides and photos of food and people, an exhibit on animal husbandry in Southwest Africa, display cases of various fruits and plants, and included such attractions as a panorama of palm oil preparation in West Africa, sorghum winning East Africa, and the gable of a model stilted house from New Guinea. *Spezialkatalog der Gruppe Tropenhygiene der wissenschaftlichen Abteilung der Internationalen Hygieneausstellung, Dresden 1911*, ed. Professor Fülleborn (Dresden: Verlag der Internationalen Hygieneausstellung, 1911).

[234] In 1902, the somewhat disillusioned Vice President of the Reichstag, Hermann Paasche (father of Hans), undertook a three-month trip to visit German East Africa to see for himself the state of economic development there. He cited the expense of maintaining the colonies as a main motivation for his trip to see where, and how, investments were being made and whether it was possible to make their administration a profitable endeavor. See Hermann Paasche, *Deutsch-Ostafrika: Wirtschaftliche Studien* (Berlin: Verlag C.A. Schwetschke und Sohn, 1906).

effort.

In 1909, the Colonial Economic Committee published the short guide, Our Colonial Economy and its Significance for Industry and Workforce. It provided a catalogue of useful plants (Nutzpflanzen) found in German colonies with potential economic value. The introduction grounded the necessity of this work in the rapidly growing population, which required developing the cultivation of raw materials in the colonies. It cited the upset of the traditional order of exporting domestic agricultural products and importing industrial goods and tropical products as a disturbing reversal: "In recent times, the reverse development has been registered in light of Germany's transformation into an industrial state (Industriestaat). Manufactured goods are the chief export, while agriculture products and industrial raw materials are imported."[235] Since Germany's colonies were not "sufficiently economically developed," the nation was almost totally reliant on foreign powers for primary sector goods. To rectify this precarious and undesirable situation, the Colonial Committee recommended extensive improvement in colonial agriculture and transportation.

If German colonialism offered exposure to new peoples and foods, it also brought with it attention to the bodies of foreign workers. Demand for labor in the colonies presented European scientists and officials with a problem of difference manifested in diet, climate, and output. The location of German colonies in the tropical zone (with the exception of Southwest Africa) posed unique demands on the laborer's body and an impediment to development. As the Colonial Economic Committee wrote, "German Southwest Africa is the only one of our colonies where white settlers can perform manual labor in the same way as they can at home.

[235] See BArch R 1001 78.

In East Africa this is only true in the highlands and in the other territories Europeans can only really, and not for an extended period of time, perform intellectual work whereas the physical work must fall to the natives."[236] The author noted that there was some hope that these circumstances could be improved upon with careful study and the implementation of hygienic practices abroad. The issue of colonial work was bound to perceptions of racial difference. However, these were not totally inseparable from climactic concerns that were also expressed in physiology and diet. Scientists pursued the study of metabolism and effort among various groups of indigenous people. In light of the need for specialized equipment like calorimeters and respiration apparatuses, this sort of advanced physiological work could only be performed in the metropole.[237]

The response of the body to different climates had long provided interesting terrain for medical study and theory.[238] In July of 1900, Max Rubner undertook a study of two young men from Cameroon in his laboratory in Berlin. He was primarily interested in their capacity for work and how it was affected by the rate of perspiration from their skin, as well as their diets. "One could be tempted to believe that persons who grew up in tropical climates might show differences in transpiration," Rubner wrote as he introduced the study in the Archiv für Hygiene. The first man, Attanga, a 20-year-old servant of a military lieutenant, and the second, Jonas Andi, a 25-year-old butcher's assistant, agreed to participate in the study. Both

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[236] See BArch R 1001 76.

[237] Rubner, "Vergleichende Untersuchung der Hauttätigkeit des Europäers und Negers," *Archiv für Hygiene* 38 (1900): 148–159.

[238] For an examination of the role disease and climate played in conceptions of race in the British Empire, see Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire* (Cambridge: Cambridge University Press, 2018).

were attached to a respiration apparatus that measured temperature change in the air resulting from their perspiration over four-hour intervals at temperatures ranging from 26 to 35 degrees Celsius. The results showed that the two men perspired comparably to Europeans. However, the second part of the inquiry, Rubner stated, "it can hardly be denied that in the choice of foodstuffs there are differences, as plant-based foods are preferred in areas where European immigrants have not yet exerted their influence."[239] Since the high protein consumption in a meat-heavy diet required individuals to consume more water in order to sweat appropriately, it followed that avoidance of meat was advisable in such circumstances. Furthermore, "tropical" diets consisted of fruits and vegetables with a high water content, delivering necessary fluids without burdening the body. Rubner concluded that large quantities of protein were not suited for high temperatures, since protein raises the body temperature. "When custom and habit in tropical regions permit us to observe a reduction in animal products, and especially meat," Rubner wrote, "this is to be greeted as a favorable sign for the regulation of the body's water balance."[240] He concluded that this was as true for African workers as for Europeans. It was not a matter of inherent racial difference that prevented Europeans from working effectively in heat, but rather a question of adaptation through food and clothing choices. As much as regular contact with others may have reinforced notions of difference and supported colonial ideology, it could also serve to dismantle them.[241]

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[239] Rubner, "Vergleichende Untersuchung der Hauttätigkeit des Europäers und Negers," *Archiv für Hygiene* 38 (1900): 154.

[240] Rubner, "Vergleichende Untersuchung der Hauttätigkeit des Europäers und Negers," *Archiv für Hygiene* 38 (1900):159.

[241] See Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870–1950* (Chicago: University of Chicago Press, 2011).

While European colonial science sought to exploit foreign land, plants, and bodies, it also engendered a fascination and attachment to them back home. German ethnologists employed a comparative, hierarchical framework to comment on supposed differences between cultured peoples (Kulturvölker) and primitive ones (Naturvölker).[242] Yet for many critics of industrialized, urbanized society, the idealized image of Naturvölker provided an important contrast. Ethnographic and botanical research also contributed to identifying these differences. Especially after 1890, popular interest in so-called primitive peoples as a means of cultural criticism reached a fevered pitch. A short sketch of three figures active outside of Europe demonstrates how the imperial imagination and idealization of indigenous diets fed European cultural critique and utopian dreams among Life Reformers.

The case of Hans Paasche, as mentioned earlier, illustrates this cross-cultural fascination. Returning from his military tour in Africa, Paasche drew upon his experiences in a series of articles, lectures, and books dedicated to Life Reform. Feeding the appetite for travelogues in Europe, Paasche published a pseudo-travelogue, turning convention on its head and reimagining the voyage of a young African man to Germany. Paasche based his character Lukanga Mukara, a young noble from the shores of Lake Victoria, on a guide with whom he had once traveled. Paasche's Lukanga detailed his travels in a series of letters to his king.[243] Paasche himself was not free from prejudices, and the act of ventriloquizing an African noble

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[242] Andrew Zimmerman, *Anthropology and Antihumanism in Imperial Germany* (Chicago: University of Chicago Press, 2001) and Sebastian Conrad, *Globalisierung und Nation*.

[243] The letters from Lukanga were first published in 1912 and 1913 in *Der Vortrupp*, the magazine of the Youth Movement founded and edited by Paasche. They were later published as a collection. Hans Paasche, *Die Forschungsreise des Afrikaners Lukanga Mukanga ins innerste Deutschland* (Bielefeld: Fackelreiterverlag, 1925).

based on a servant he had had during his time there certainly calls forth disapproval from modern readers. However, the narrative technique, though an expression of naïveté, proved effective for drawing out the hypocrisies of life in modern Europe.

Paasche's time in Africa enabled him to diagnose the ills of his own country. According to his later essays, this experience made him question the progress of his own civilization and awakened deep reservations about the supposed benefits of colonialism.[244] The first curiosity that the perceptive Lukanga encounters is the use of paper and metal money to purchase real things, like food or firewood. He finds this practice absurd. Through this narrative instrumentalization, Paasche illustrated the state of moral and social decay in Germany. It was not just the existence of such counterintuitive value systems and institutions that were lampooned, but also the conviction that the German way was the best: "they call everything that they want to bring with them the same word: 'Kultur.'" [245] The prevailing obsession with the accumulation of wealth, the horrors of factory work, and the heavy air pollution all astonished the foreign visitor.

Paasche's Lukanga encountered many shocking features of German life, but the theme of the self-centered nature of modern man and his absolute certainty recurs. In his fifth letter home, Lukanga takes up the issue of eating habits, calling the Germans cannibals. In doing so, Lukanga turns on its head the trope of extra-European cannibals and their supposed savagery and unfitness for self -government. In an editor's note, Paasche gestures to the ongoing Fleischnot (see chapter 1 of this dissertation): "Lukanga belongs to a tribe of fruit eaters. It

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[244] Paasche, "Das verlorene Afrika," *Flugschriften des Bundes Neues Vaterland* 16 (1919).

[245] Paasche, *Forschungsreise,* 13.

must appear especially peculiar to such a man that at this moment in Germany one speaks of a famine because the meat is too expensive."[246] The system of prices, taxes, and tariffs all worked to keep the slaughtered animal out of the hands of those who most need it. The abject situation of food processing stunned the traveler. He chronicled the slaughter of cats and dogs that are sold as beef. Men and women blithely pass by slaughtered animals, having dulled their sensation to the pain and suffering of others. These vignettes from Germany's cities stood in direct contrast to reporting from Germans around the world, who described the precarious situation of overseas populations, particularly in Africa.[247]

Paasche was a high-profile figure in Wilhelmine Germany due to his publicistic activities and his privileged position as son of a prominent parliamentarian. However, other individuals also played on the public's fascination with "primitive" eating. The young author Ludwig Ankenbrand proves a case in point. Ankenbrand was an author and journalist who wrote for a variety of vegetarian journals, including Die Vegetarische Warte and Gesundes Leben, and became particularly taken with Buddhism while living in the Life Reform hub of Leipzig in 1911. Ankenbrand converted to Buddhism and continued his journalistic work for vegetarian papers as well as for the journal of Leipzig's Buddhist community, Buddhistische Warte. He then organized a circumnavigation of the world by foot with a small group of vegetarians in order to meet other vegetarians and create a worldwide reform movement while working as a correspondent for various journals.[248] With the aim of testing local vegetarian fare

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[246] Paasche, *Forschungsreise*, 43.

[247] In the *Deutsche Kolonialzeitung*, hardly an issue went by without describing the famine elsewhere. In Congo, several German researchers called the area of Laterite a "Hungergebiet." "Von der Expedition Stanley," *Deutsche Kolonialzeitung* 4, no.15 (Apr. 1887): 474–475.

[248] "Zu Fuß um die Welt," *Die Lebenskunst,* 16 (1911), 401.

and meeting leaders over the course of his travels, Ankenbrand claimed that his work would result in shared knowledge of a better life. His journey by foot attracted considerable attention, landing him a contract with the Leipzig illustrated periodical Nach Feierabend and its network of over one million subscribers.[249] He began his voyage in 1912 and was subsequently imprisoned in Ceylon with the outbreak of World War I, but returned to Stuttgart afterwards to continue living as a vegetarian and a Buddhist.[250]

More extreme is the story of August Engelhardt, born in Nuremberg in 1875. Engelhardt was trained as an apothecary's assistant and became interested in the Life Reform movement early on. After spending time at a vegetarian and nudist colony in the Harz mountains, he became increasingly irritated by the conventions of Europeans and resolved to move. In 1902 he traveled to German New Guinea. Shortly thereafter he acquired a coconut plantation on the island of Kabakon. Enthralled by his surroundings, he promoted a vegetarian lifestyle based primarily on nourishment from coconuts and sunshine with religious fervor. He encouraged others to join him by publicizing his plantation and lifestyle in frenzied prose in the vegetarian press. In one letter, he enclosed an ode to the coconut: "Drink your youth from the coconuts, suck in the eternal life from the breast of the palm tree!"[251] Remarkably, others

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[249] Jörg Albrecht, "Ludwig Ankenbrand: Buddhism and the Modern Reform Efforts," in *Religious Dynamics under the Impact of Imperialism and Colonialism: A Sourcebook*, eds. Björn Bentlage, Marion Eggert, Hans-Martin Krämer, Stefan Reichmuth (Leiden: Brill, 2016), 189.

[250] Albrecht, "Ludwig Ankenbrand," 187-190.

[251] Engelhardt, "Herrn Oberst Spohr zum achtzigsten Geburtstage," *Die Lebenskunst,* 3, no.13 (1908):317.

joined him.[252] The experiment ended badly, and Engelhardt was abandoned on Kabakon as other settlers departed ill. Engelhardt was imprisoned elsewhere as World War I broke out, only to return after, and eventually died in seclusion on Kabakon.[253]

The stories of these three men enraptured the German reading public and created an affinity between German vegetarians and the indigenous peoples abroad who supposedly lived according to their natures without the artifice of modern civilization. While Engelhardt's story pushed the limits of the absurd and garnered scorn even in vegetarian periodicals, it created a link between the "natural" lifestyle of vegetarians and tropical environments in popular culture. These stories may have owed much to the expanded infrastructure of empire, which permitted access and transit, but they also– in Paasche's case inadvertently– served to popularize it among the general public.

Conclusion

Vegetarians defined themselves in contrast to the conventions of modern industrial society. However, for the most part they did not wish to live secluded, but to engender change at home. Their challenge to modern nutritional science and a rational, or mixed diet, came

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[252] Engelhardt regularly wrote letters published in the Leipzig-based vegetarian journal *Die Lebenskunst*. See *Die Lebenskunst,* no. 2, 22 & 23 (1907) and 3, nos. 13, 21 & 22 (1908). A write up of his experiment with a warning to potential recruits appeared in the Social Democratic paper Vorwärts in 1908. The write up included the medical report from the head of the hospital in Herbertshöhe, where Engelhardt was brought for three weeks in January 1906. See "Kleines Feuilleton. Im Paradiese," *Vorwärts, Berliner Volksblatt,* no. 39 (Feb. 18 1908). Some of Engelhardt's teachings, such as going about in the sun with an uncovered head and his denunciation of mosquito nets, were also criticized in a serialized article in the paper: see "Aus Süd und Nord," *Die Lebenskunst,* 3, nos. 3, 4, 5 & 6 (1908).

[253] August Engelhardt and August Bethmann, *Eine Sorgenfreie Zukunft: Das neue Evangelium, Tief- und Weitblicke für die Auslese der Menschheit– zur Beherzigung für alle– zur Überlegung und Anregung* (Kabakon bei Herbertshöhe: Reform-Verlag, 1906).

from a suspicion of experimental knowledge collected for the purpose of exploitation and material gain. The alternative they proposed was rooted in experiential, bodily knowledge, grounded in attention to the senses and the self. While rejecting industry and urbanism of the German Empire, they often readily accepted the benefits of living in a colonial power and the access it provided. These global encounters permitted a decentering of the German habits and received wisdom. Drawing on the work of economic botany in the German protectorates, as well as travelogues and infrastructures of the age of new imperialism, vegetarians developed their critique of academic nutritional science to better incorporate notions of porous bodies sensitive to environment and diet. These encounters provided an opportunity to develop self-critique, asking what it meant to eat and live well.

CHAPTER THREE

Surrogate Foods in Peace and at War, 1914–1918

In the early autumn of 1914, the networks of trade that had nourished Germany collapsed. The lifelines which had delivered staples from abroad to feed its burgeoning population were severed. Accordingly, the decades-long march of improvement in the standard of living resulting from this brisk trade ground to a halt. What had been judged in some circles as a problem of plenty, reflected in growing waistlines and a bevy of digestive disorders, developed rather quickly into one of scarcity.[254] Divergent horizons of expectation for the war, appraisals of Germany's food stores, and insufficient information about future harvests all contributed to difficulties in addressing the problem of food provisioning during World War I. Sustaining the nation required a recognition of limits, careful planning, and recalibration. Under these conditions, Germans became reacquainted with the political problem of hunger. By examining controversies surrounding the creation and monitoring of surrogate foods, this chapter offers a new view of wartime hunger seen through debates about the very nature and substance of food itself, as well as an exploration of how the relationship between population and national economy was brought out of the abstract and into German households.

Questions of how best to feed and nourish the population were hashed out in debates surrounding surrogate foods. As an alimentary category, surrogacy refers to the substitution of one product for another. At its most basic level, such a program might consist of simply

[254] Rudolf Otto Neumann, *Die im Kriege 1914–1918 verwendeten und zur Verwendung empfohlenen Brote, Brotersatz- und Brotstrechmittel unter Zugrundelegung eigener experimenteller Untersuchungen* (Berlin: Springer, 1920) 1.

substituting one domestic crop for another, as, for example, Friedrich List and others had called for the use of surrogates for the potato in the wake of the mid-century blight.[255] The recommendation hinged on planting traditional cultivars that had predated the potato in the affected regions.[256] Another variant of surrogacy entailed selective breeding of plants to better suit the local environment or demands. Projects of import substitution had been underwritten by European monarchs and enterprising private individuals and created networks of ecological exchange that encircled the globe. Here, the story of the sugar cane and beet proves instructive.[257] A third path to surrogacy hinged on technical refinement, which entailed harnessing industrial capabilities to minimize costs and increase availability of a familiar product, as in the case of margarine for butter.[258] The final type of surrogacy, an idée fixe in

[255] The twin measures of cultivating surrogates and being frugal with existing stocks were recommended, see "Luginsland: Deutschland," in *Das Zollvereinsblatt*, ed. Friedrich List, 5, no. 40 (Oct 4, 1847): 675.

[256] It is important to note that not all surrogates were enabled by advances in manufacturing or chemistry; calls for a return to traditional variants was also a powerful strategy for remaking the German food economy during the First World War. This is very much in line with David Edgerton's argument that inventions and technological breakthroughs have been overvalued in narratives of technological progress. *The Shock of the Old: Technology and Global History since 1900* (London: Profile Books, 2006).

[257] Surrogacy projects grew up alongside the pursuit of rational natural resource management, as practiced in the cameralist tradition of Germany and much of Northern Europe. See David Lindenfeld, *The Practical Imagination: The German Sciences of State in the Nineteenth Century* (Chicago: University of Chicago Press, 1997); Lisbet Koerner, *Linnaeus: Nature and Nation* (Cambridge: Harvard University Press, 1999); Fredrik Albritton Jonsson, "Scottish Tobacco and Rhubarb: The Natural Order of Civil Cameralism in the Scottish Enlightenment," *Eighteenth-Century Studies* 49 no. 2 (Winter 2016): 129-147. On the related project of acclimatization in empire, see Michael Osborne, "Acclimatizing the World: A History of the Paradigmatic Colonial Science," *Osiris* 15 (2000): 135–151.

[258] Franz Soxhelet, *Über Margarine. Bericht an das General-Comité des landwirthschaftlichen Vereins in Bayern* (Munich: J.S. Lehmann, 1895).

many nineteenth-century fantasies of progressive intellectuals, was the total replacement of agricultural products by substances created in laboratories. Such was the vision that animated French chemist Marcellin Berthelot, who delivered a lecture in 1894 to the Chambre syndicale des produits chimiques with the following bold prediction:

> In the year 2000 there will be no more agriculture in the world, nor will there be shepherds or laborers […] A day will come where every person will take a small nitrogen pill with a little lump of fat for nourishment […] all of this will be manufactured in a most economical manner and in an inexhaustible quantity by our factories.[259]

Berthelot's fantasy of a world without agriculture resonated far beyond his address. His praise for the past century of chemical progress promised freedom from want and work. It was warmly received by August Bebel, who quoted from the address, suggesting that the absence of cultivated soil would make man less territorial and accordingly, more humane.[260] If man had evolved from hunting and gathering to agriculture, the next stage of his development would be his entire liberation from the soil. It would be an age of plenty, enabled by the great strides made in science and industry. For both Bebel and Berthelot, escape from hunger was fundamental to their utopian vision. More than that, it was not just an escape from hunger, but from food itself through the elimination of agriculture. As a tedious occupation and source of competition and discord, agricultural work itself presented an impediment to human happiness. Despite their different political orientations, Berthelot and Bebel did not conceive of these futures as artificial, but instead as a natural extension of freedom and the unrestrained

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[259] Marcelin Berthelot, "Discours de M. Berthelot prononcé au Banquet de la Chambre syndicale des produits chimiques, le 5 avril 1894," in *Science et morale* (Paris: Éditions Calmann-Lévy, 1897).

[260] Bebel, *Woman and Socialism*, trans. Meta Stern (New York Socialist Literature Co, [1879] 1910), 391.

pursuit of happiness. Consuming nutrients in pill form was not "unnatural," it was elemental, allowing humans to assimilate the most basic units of their composition. Technological progress promised to liberate humans from nature's constraints. By the turn of the century, these four types of surrogates had been introduced in various contexts, or in the latter case, seemed just on the horizon riding the tailwinds of recent scientific advances. Writing in 1893, one German chemist claimed that surrogate foodstuffs had long been treated with contempt as the "stepchildren of industry," but recent technological advances dictated that their time was finally ripe.[261] Yet despite the promise, surrogacy did not see its day until the outbreak of hostilities in 1914, when it shaped the experience of the war.

While the existence of surrogate foodstuffs predates World War I, it was during this conflict that they surfaced as a solution to the problems of the domestic food economy, particularly between 1916 and 1918. The urgency with which programs of research and quality-monitoring were implemented speak to the perceived potential of these products; alongside rationing and price fixing, surrogates were one of the tools available to officials to combat the worst effects of the blockade. By encouraging such projects, officials hoped to meet minimum nutritional thresholds and consumer demand—especially demand for foreign imports and colonial products to which the public had become so accustomed—by exploiting underutilized resources. Absent the traditional stream of imports, surrogates came to play an integral role in German economic life; the creation, dispensation, and policing of these products therefore constituted an essential experience of the war on the home front.

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[261] Theodor Koller, *Die Surrogate. Ihre Darstellungen im kleinen und deren fabrikmässige Erzeugung: ein Handbuch der Herstellung der künstlichen Ersatzstoffe für den praktischen Gebrauch von Industriellen und Techniken* (Frankfurt: H. Bechhold, 1893), iv.

It is impossible to capture the history of surrogate foods in isolation from the broader history of German technology. As Berthelot's lofty rhetoric indicated, hopes for the future of food were inextricably bound to ideas about and evidence of progress in other spheres. Breakthroughs in other fields, especially in agricultural science where the fixation of atmospheric nitrogen had recently been accomplished, stoked the expectations of the public and scientists for the transfer of such "miracle" technologies into other domains.[262] The specific project of remaking food sources that could be grown and manufactured domestically fit into concurrent technological developments elsewhere in Germany.[263] Successes in the field of chemistry, whether combating plant disease or producing fertilizers, were superimposed upon hopes of gaining control of food sources.[264]

Treating surrogates as a technology allows us to understand them as part of this wider landscape of technological expectations, and highlights the underlying assumption that progress in science and industry could overcome scarcity in early twentieth-century Germany. Hygienists and economists alike hoped that consumers could eventually be reoriented to prefer domestic, economical products. Surrogacy projects promised to help the nation by

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[262] Haber-Bosch Process demonstrated in 1909.

[263] Helen Anne Curry has argued for American geneticists seeking to produce variation "on demand," the narrow field and the larger landscape of technological improvements were "completely entangled with other areas of innovation, both in their material production and in the outcomes anticipated from them…." Curry, *Evolution Made to Order: Plant Breeding and Technological Innovation in Twentieth-Century America* (Chicago: University of Chicago Press, 2016), 3.

[264] Jonathan Harwood has examined the work of optimizing plant breeding in this period that also helped to stoke this general vision of technological promise and progress. Harwood, *Europe's Green Revolution and Others Since: The Rise and Fall of Peasant-Friendly Plant Breeding* (London: Routledge, 2012).

figuratively expanding the borders of the nation through economizing tactics. In an appeal to the German state to take its role in production of foodstuffs more seriously, prominent physiologist Max Rubner wrote in 1911:

> The tasks of hygiene and political economy correspond so closely here that it may not be easy to decide with which the main responsibility lies… the successes in increasing the available sources of food will not come about unless we concentrate on improving the methods for winning nutritional substances from materials that are not yet considered fit for human consumption.[265]

The transformation of "non-foods" into food formed an essential part of this project. In this estimation, technological progress in agriculture and food manufacturing would ensure growing yields, gradually replacing products from overseas to provide a rich, varied, and domestically available diet.

Attention to the ways that surrogate foods were employed as technologies also allows for an appreciation of the role these products played as a means of social control to stave off the political problem of hunger. An overarching awareness of this problem and its danger to morale during the war prompted the search for solutions. As indicated by the four profiles of surrogates introduced above, the category housed a variety of products and proved controversial. Contemporary practitioners wrestled with how best to circumscribe the category and police new products. And, while many of these creations, such as powdered or oil-based egg substitutes (see Figure 6), were reviled by the population, others, like malt coffee, lupines, and a variety of spreads, exhibited remarkable staying power. Their

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[265] The original German reads: "Es decken sich hierin hygienische und volkswirtschaftliche Aufgaben so sehr, dass es nicht leicht sein dürfte, zu entscheiden, wo das Schwergewicht der Verantwortung ruht […] Die Erfolge in der Nahrungsmittelvermehrung werden sich aber auch noch auf anderen Wegen erzielen lassen, indem die Methoden der Gewinnung von Nahrungsstoffen aus Materialien, welche für den menschlichen Genuss untauglich sind, sich verbessern." Rubner, *Lehrbuch der Hygiene: Systematische Darstellung der Hygiene und ihrer wichtigsten Untersuchungs-Methoden* (Vienna: F. Deutlicke, 1890), 113.

proliferation during the war ultimately served to create a narrative of German exceptionality in resource stewardship that became a powerful source of national pride leading up to the Second World War.[266]

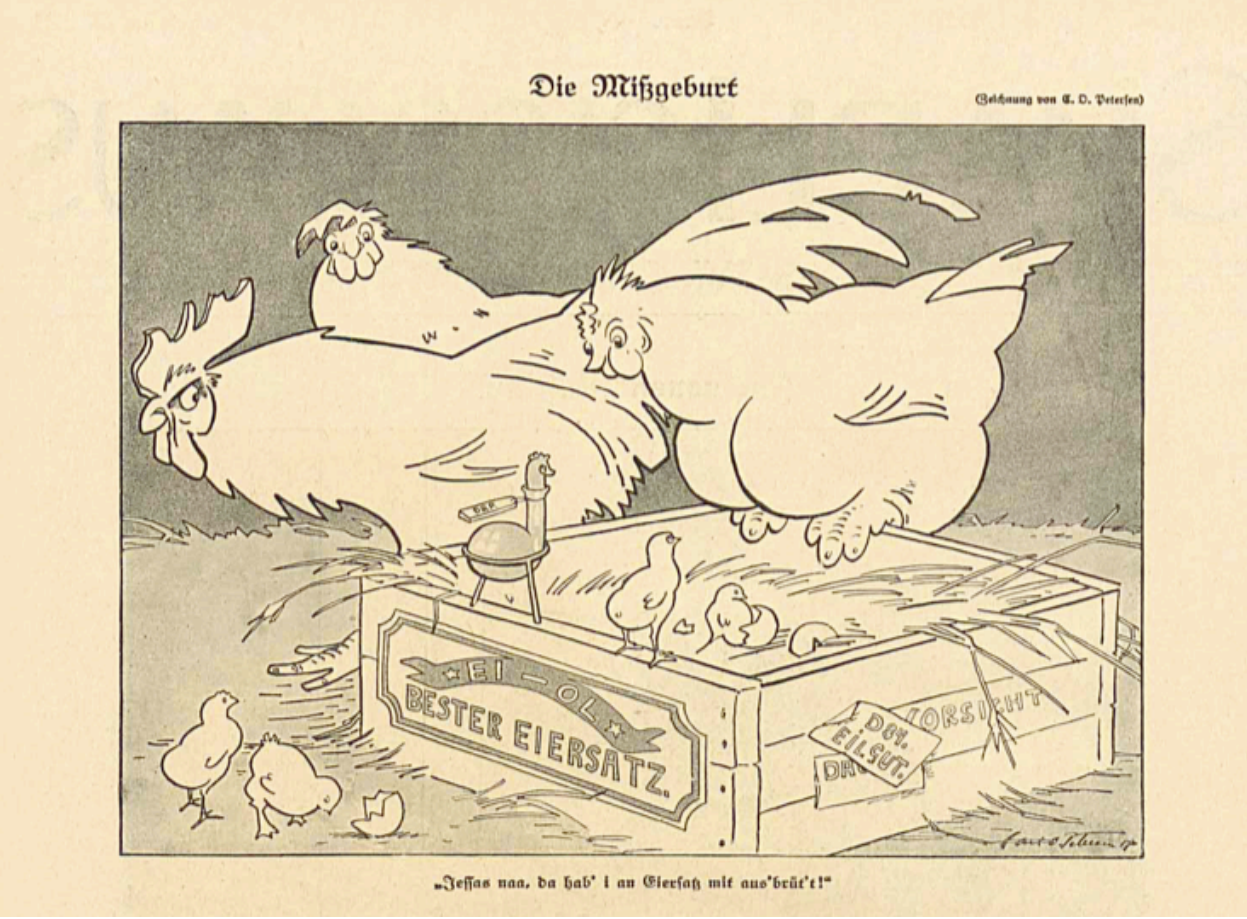

Figure 6 A cartoon from the satirical magazine *Simplicissimus* entitled "The Freak of Nature" illustrates a hen who has given birth to egg replacement oil (in chick form) alongside her normal brood. She exclaims, "My goodness! I've also hatched an egg replacement

[266] In 1917, the claim that Germany's enemies marveled its resourcefulness and food management was made. Ernst Wagemann, "Die Nahrungswirtschaft des Auslands," in *Beiträge zur Kriegswirtschaft*, 9 (March 1917): 1. Alice Weinreb has made this argument about the experience of hunger more generally during the First World War. Weinreb, *Modern Hungers*. Adam Tooze also highlights the appeal the promise of a return to plenty promoted by the Nazis carried in the 1930s. Tooze, *Wages of Destruction*: *The Making and Breaking of the Nazi Economy* (London: Allan Lane, 2006) 1–37.

Surrogate foods were a heterogeneous group drawing on both old and new technologies. The category encompasses both ends of the spectrum: the calls to tap into traditional knowledge, for example, by collecting chestnuts and foraging for wild vegetables, and at the other extreme the repeated attempts to mechanically, chemically, and finally biologically "debitter" lupines for human consumption which forms a case study at the core of this chapter. In considering surrogate foods as a technology, I draw upon David Edgerton's notion of "creole technologies," which he uses to designate the creative utilization of available materials to make technologies work.[267] Though manufacturers tended to emphasize the novelty of their products, for the most part surrogates relied on tapping into old or disused practices.[268]

During the First World War, surrogacy programs were instrumental in confronting the overwhelming shortages and their political ramifications. In order to persevere under the British blockade, the food supply needed to be carefully managed and recalibrated. Surrogacy and rationing represented two main strategies for overcoming shortages. Previous scholarship has tended to treat surrogates rather circumspectly; admittedly many were an affront to consumers.[269] Despite the murky border between fraud (Schwindel) and surrogate (Surrogat),

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[267] Edgerton's work adopts a use-centered approach, as opposed to a traditional innovation-centered one. Edgerton, *Shock of the Old,* xiv.

[268] Cf. discussion of "promissory technologies" in Adam Hedgecoe and Paul Martin, "The Drugs Don't Work: Expectations and the Shaping of Pharmacogenetics," in *Social Studies of Science* 33, no. 3 (Jun. 2003), 327–364.

[269] Belinda Davis, *Home Fires Burning: Food, Politics, and Everyday Life in World War I Berlin* (Chapel Hill: UNC Press, 2000); Anne Roerkohl, *Hungerblockade und Heimatfront: Die kommunale Lebensmittelversorgung in Westfalen während des Ersten Weltkrieges*,

the existence and proliferation of these products were essential to creating a semblance of normalcy and consumer choice during the war. Though the nutritional significance of surrogate foods was hotly debated, official memos, studies, and press reports show that consuming and policing substitute foods was an important facet of life on the home front. In Belinda Davis's study of wartime Berlin, she highlights the mounting discontent with Ersatz foods that culminated in the summer riots of 1917. By the end of the war, she writes, "the term 'ersatz' took on new meaning. While before the war it had signified simply a substitute, it had now come to mean 'fake' or 'artificial,' 'inferior substitute,' and even wretched." [270] There can be no doubt that some of these products were disgusting and, in some cases, detrimental to consumers' health. However, Davis's brief examination of the issue does not do justice to the concerted effort to leverage technological progress into a solution for wartime shortages. Instead of making a value judgement about this category and the wide range of products and consumer experiences it encompassed, this work simply acknowledges that the promotion and policing of Ersatzmittel represented a coordinated response to shortage by the wartime bureaucracy. Additionally, since this category of products constituted a significant consumer expenditure, by some estimates comprising 1/6 of total wartime food spending, they merit study.[271] Though in many cases the longevity of these products on the market proved limited, at one time they did satisfy the needs of various users and many

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(Stuttgart: Franz Steiner, 1991); Roger Chickering, *The Great War and Urban Life in Germany: Freiburg, 1914–1918* (New York: Cambridge University Press, 2007).

[270] Davis, *Homefires,* 207

[271] A study conducted after the war estimated that spending on Ersatzmittel comprised 1/6 of total food budget during the second half of the war. Rudolf Meerwart, Adolf Günther, Waldemar Zimmermann, *Die Einwirkung des Krieges auf Bevölkerungsbewegung, Einkommen und Lebenshaltung in Deutschland* (Stuttgart: Dt. Verl.-Anst., 1932), 455.

remained in circulation long after the fighting ceased. Amid a regime of rationing, approved surrogates could offer both nutrients and variety, confronting both physiological and psychological dimensions of hunger. Choosing and promoting appropriate surrogates hinged on the cooperation between agronomists, physiologists, and food chemists to marshal resources effectively within the severely restricted wartime economy. Before turning to the role of surrogates as one solution to German hunger during World War I, we must look back to the work of physiologists attempting to understand hunger, starvation, and minimum daily values in the preceding decades.

Reproducing hunger in the laboratory

At the turn of the twentieth century, Germany no longer faced subsistence crises. Instead, it encountered the problem of plenty. Alongside their studies of overconsumption and stimulation, scientists probed the definition of need, reducing life to its most essential requirements. Such work attracted the interest of the state as a means of social control and planning. In the final decades of the nineteenth century, physiology became in large part a science of minimums. With the help of new instruments and practices such as calorimetry, a more sophisticated understanding of hunger and need developed in laboratory settings.[272] Dana Simmons has shown for France how the science of need developed over the course of the nineteenth- and twentieth centuries, providing the foundations of the postwar welfare state. By focusing on the transition of scientific expertise from laboratory to the realm of social policy, Simmons demonstrates "The notion of minimum needs is a vital element of political

[272] On overconsumption and stimulation: the classic study is Anson Rabinbach, *Human Motor: Energy, Fatigue, and the Origins of Modernity* (New York: Basic Books, 1992). On the sciences of minimums: Simmons, *Vital Minimum* and "Minimal Frenchmen: Science and Standards of Living, 1840–1960" (PhD diss., University of Chicago, 2004).

economy and a foundation for modern social regulation."[273] In Germany these assessments of minimums were also made to bear increasing weight. The promotion of social hygiene as an antidote to fin-de-siècle ills meant that researchers and bureaucrats became increasingly tightly bound together.

Here a brief excursus into the development of sciences of need, specifically of hunger, is warranted. Widespread famine had last reared its head in Germany in the 1840s. The press reported in harrowing detail from Upper Silesia, where famine paired with a typhus epidemic claimed thousands of lives. In a single year, reports circulated that 10% of the population died in the Pless district.[274] Famed pathologist and progressive politician Rudolf Virchow traveled to this region in early 1848, while it was in the throes of starvation and illness to produce a report for the Prussian Ministry of Education. He wrote in damning terms of the situation and castigated the bloated and ineffective Prussian bureaucracy for the despair he encountered.[275] In doing so, he rejected the understanding of famine as an absolute shortage and defined hunger in social terms. The misery in Upper Silesia was not a natural disaster, but the cumulative effect of the neglect of a self-interested bureaucracy. Virchow thought that distribution, rather than absolute shortage, was the root of the problem. His diagnosis of the problems in Upper Silesia concerning the political economy of famine remained influential to subsequent generations of hygienists and reformers.

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[273] Simmons, "Minimal Frenchmen," xi.

[274] In the original German: "Die Erde bringt viel mehr Nahrung hervor, als die Menschen verbrauchen." Rudolf Virchow, *Mittheilungen über die in Oberschlesien herrschende Typhus-Epidemie* (Berlin: Verlag von G. Reimer, 1848), 167.

[275] Virchow, *Mittheilungen*, 177

In the decades following the "Hungry Forties," European observers increasingly perceived hunger as something extra-European: suffering populations and skeletal corpses belonged in the colonial setting. The famines that swept Africa and Asia were, to European eyes, a result of hopelessly inferior management and handy evidence for the seizure of property and resettlement of populations.[276] Of course, abject poverty continued to exist within European cities, but hunger and starvation were seen as increasingly foreign. Social hygienists such as Virchow and later Alfred Grotjahn entered cities' working-class districts and diagnosed chronic undernourishment (Unterernährung), but outright famine had all but disappeared. What had once existed outside, available for observation came indoors as an object of study.

In February of 1888 a man called Giovanni Succi presented himself in the Physiological Laboratory of the Royal Institute for Advanced Studies in Florence. He was about 40 years old, of average height and a bit round.[277] His request was an unusual one: he asked for scientific supervision of a thirty day fast he planned to undertake. He had already performed the feat in Milan and Paris, and now hoped to attract a large audience in Florence. Hunger was a precious condition for physiologists, who sought to understand how it affected the entire body as well as individual organs and tissues. It was rare that physiologists had the chance to observe an individual in otherwise healthy condition from beginning to end of a fast.[278] Of the studies of "hunger artists," the Italian Professor of Physiology Luigi Luciani's

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[276] Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London: Verso, 2000).

[277] Luigi Luciani, *Das Hungern. Studien und Experimente am Menschen*, trans. Dr. M.O. Fraenkel (Hamburg and Leipzig: Verlag von Leopold Voss, 1890), 5.

[278] Luciani, *Das Hungern,* ix.

study of Succi was among the most renowned.[279] The German translation of Luciani's study appeared in 1890 was presented with a foreword by the esteemed physiologist and materialist Jacob Moleschott, who praised Luciani's study and the service of Succi's "fanciful and strange hunger adventure that had so advanced the cause of science."[280]

Hunger was one of the most important aspects of physiology because of the way it affected the entire organism. To understand metabolism, one had to understand hunger. Early and path-breaking research was carried out using rabbits and dogs as test subjects, such as those in Carl Voit's Munich laboratory.[281] But while these animals proved useful (and expendable), there could be no substitute for human experimentation.[282] As Max Rubner explained, understandings of public nutrition remained in a very primitive state. Provisioning for wide segments of the population was not the same as providing for the highly regulated institutional populations in hospitals or prison that human experiments were often carried out on. The quest for discovering the so-called "normal needs" (Normalbedürfnisse), or generally valid quantities of protein, fat, and carbohydrates was misplaced, according to Rubner.

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[279] Succi's fasting is taken by many to be the basis for Franz Kafka's short story "Ein Hungerkünstler," *Die Neue Rundschau* (Oct. 1922).

[280] Moleschott, Foreword to *Das Hungern*, viii.

[281] Elizabeth Neswald, "Nutritional Knowledge between the Lab and Field: The Search for Dietary Norms in the Late Nineteenth and Early Twentieth Centuries," *Setting Nutritional Standards: Theory, Politics, Practices,* Neswald, Ulrike Thoms, David F. Smith, eds. (Rochester: University of Rochester Press, 2017): 29-51.

[282] Katja Sabisch, Birgit Griesecke eds., *Kulturgeschichte des Menschenversuchs im 20. Jahrhundert* (Frankfurt/M: Suhrkamp, 2009); Ulrike Thoms, *Anstaltskost im Rationalisierungsprozeß: Die Ernährung in Krankenhäusern und Gefängnissen im 18. und 19. Jahrhundert* (Stuttgart: Franz Steiner Verlag, 2005).

Nutrition was more than an exercise in arithmetic to be practiced at a large scale.[283]

Finding a window into the process proved to be challenging: few humans willingly subjected themselves to prolonged starvation. For this reason, one-man shows such as Succi's provided an exciting opportunity for physiologists. European publics gathered to observe these hunger artists, paying to witness the spectacle. Faces pressed together to watch men (they seem to have been exclusively male) oscillate between choreographed physical activity and torpor. For scientists, there was a redemptive side to these otherwise strange displays: it was not uncommon for the artists, like Succi, to seek out scientific supervision and thereby certify the integrity of their fasts. By entering into a mutually beneficial relationship with scientific institutions, hunger artists could validate their performances while physiologists could advance their own research agendas. Shifts of supervisors administered tests and charted changes in the hunger artist's basal body temperature twice a day. Hoping to better understand the body's mechanisms for dealing with hunger, the observers monitored his respiration, circulation, and the content of his excretions. To this end, experiments on hunger artists provided valuable data points, with the battery of tests and measurements providing a precise "balance of accounts."[284] Scientists prized the data collected from these individual experiments, as these offered more precise insights into human need than any of the previously available statistical surveys.

Luciani concluded that Succi had withstood his thirty-day fast and maintained function within "physiological limits." Or put differently, the subject had not been made ill by a lack of food. Drawing on his work on Succi and decades of previous experiments, Luciani concluded

[283] MPG Archiv: III Abt Rep 8 112/6, Rubner, "Der Staat und die Volksernährung" (1914).
[284] Luciani, *Das Hungern,* 136-137.

that "physiological hunger" was a safe state. While humans would experience several days of unpleasant hunger sensations during the first days of a fast, this feeling would subside as the individual entered the state "physiological hunger."[285] A similar experiment on the hunger artist Cetti undertaken by the physiologists Hermann Senator, Nathan Zuntz, and Immanuel Munk in Berlin demonstrated the transitory nature of the feeling as the subject settled into a state of physiological hunger.[286]

Scientific consensus held that a person would transition out of a state of physiological hunger and into one of starvation, eventually ending in death. In his experiments on a variety of animals in 1859, Moleschott stipulated that a loss of more than 40% of body weight would result in death by starvation.[287] Luciani agreed: Succi remained in good health for the duration of the fast, he wrote, because of his slow metabolism and ample fat stores. But to define starvation, or death by hunger, more precisely, one had to go deeper and observe the normal functioning of a "regulatory system" in the body.[288] Luciani's experiments supported the conclusion that:

> As long as the use of tissue of this regulator has sufficient substitute material (Ersatzmaterial) to maintain function within normal limits, the process of inanition remains physiological; if the performance of different tissue do not suffice–at least not in a relative sense–to maintain the regulator, then it must be the case that it cannot regulate properly and physiological inanition becomes an illness that leads, in the shortest of times,

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[285] Additionally, Succi elected to take a small dose of a narcotic serum (mainly laudanum) during his first two days, which helped numb him to this unpleasant sensation.

[286] Curt Lehmann, Friedrich Mueller, I. Munk, H. Senator, N. Zuntz, "Untersuchungen an zwei hungernden Menschen," *Archiv für pathologische Anatomie und Physiologie und für klinische Medicine* (1893).

[287] Luciani, *Das Hungern,* 71.

[288] "Regulator" is used here in different contexts to refer to the body's systems as a whole and also to the nervous system in particular. In this usage, he is referring to the latter.

to the total collapse of the system.[289]

The body's "Ersatzmaterial" was stored and available to help maintain body temperature, but these stores did not hold out forever. In the controlled and comparatively short trials of the hunger artists, the subjects experienced significant weight loss. However, they did not enter the state of physiological hunger described above, where tissue and muscles gradually lost mass and could no longer provide fuel for vital organs. This process, which ultimately led to death, formed the basis of understanding for the narrow, physiological definition of starvation. In his 1890 Handbook of Hygiene, a reference work for students of medicine, sanitation officials, doctors and administrators, Rubner cites the studies of Luciani and Senator and Zuntz as a cornerstone of modern human physiology.

Human physiology provided one way of understanding starvation. The appearance of starvation (emaciation, sallow skin) and the feeling of hunger certainly helped researchers understand the condition. Researchers also began to investigate the quantity and quality of food required to keep deficiencies at bay, just as they began to consider the regularity of the food supply and its distribution across classes.[290] In short, to starve did not necessarily mean to

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[289] In the German translation: "Solang infolge des Gewebeverbrauchs diesem Regulator genügendes Ersatzmaterial zur Erhaltung der Funktionen in den normalen Grenzen geboten wird, solang verläuft der Involutionsprozess der Inanition physiologisch; wenn die Leistungen der verschiedene Gewebe nicht mehr ausreichen um den Regulator (wenigsten relative) in seinem Bestand recht zu erhalten, so muss er notwendigerweise verfallen, er wird nicht mehr gehörig regulieren und die physiologische Inanition wird zu einer krankhaften, die in kurzem zu völligem Einsturz des Gebäudes führt." Luciani, *Das Hungern,* 233-34.

[290] Jürgen Osterhammel provides a useful list of six questions related to understanding famine in order to analyze its incidence globally. I have reproduced the first four here and elected to omit the latter two, as the view of wartime Germany as experiencing famine is not one that is widely held. Osterhammel, *Die Verwandlung der Welt: Eine Geschichte des 19. Jahrhunderts* (Munich: C.H. Beck, 2009), 300–314.

lose 40% of one's body weight. Starvation did not remain constant across time and culture: for a relatively well-off population unaccustomed to any sort of privation, one could imagine a much lower threshold for thinking in terms of starvation. Finally, the psychological element proved crucial. During Succi's fast, he claimed he was unaffected by hunger; in fact he insisted that during his period of fasting his physical strength actually increased.[291] Luciani offered autosuggestion as an explanation for Succi's persistence: "Apparently it's only auto-suggestion that can explain this paradox that contradicts the best principles of physiology!"[292] Even in a laboratory setting, psychology played a decisive role in experiences of hunger.

These observations informed the way that authorities confronted the threat of hunger in 1914. With a view to the psychology of hunger and the importance of choice, German authorities pursued a program of surrogacy alongside rationing, which has long been the subject of studies of the home front during World War I.[293] Surrogates, which ranged from longstanding substitutes (such as rye for wheat) to new artificial, chemical concoctions (saccharine as sweetener) promised to resolve problems of food security by technological means. In addition to confronting the serious shortages which threatened starvation in some areas, the wartime administration took consumer habit seriously, noting that a total lack of variety in food posed a danger on the home front. In this sense, the program of surrogate

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[291] Succi's assertion was laughed off by the supervising team. The results of his performances using a Handdynometer were explained away by the author as Succi's drawing on the power of autosuggestion. Luciani, *Das Hungern,* 55-56.

[292] Luciani, *Das Hungern,* 57.

[293] For the literature on rationing, see Alice Weinreb, *Modern Hungers;* Davis, *Home Fires Burning*; Roerkohl, *Hungerblockade*; Matthias Middell and Felix Wemheuer, eds., *Hunger, Ernährung und Rationierungssysteme unter dem Staatssozialismus (1917-2016)* (Frankfurt: Peter Lang, 2011).

foods was not merely a matter of stretching domestically available products (although it certainly was), but also making war more appetizing by maintaining a façade of choice. Scientists and administrators availed themselves of the fact, per Rubner, "[…] that the laws of nature don't specify anywhere any single mode of nutrition; just as other creatures can be nourished in different ways, so can man."[294] According with this view, Rubner was against the elimination of choice: from the earliest days he advocated for local measures that took customs and traditions into account and was wary of overreach and regimentation.[295] For Rubner, it was imperative that the administration remain attentive to disturbing the public's psyche—in order to do so, conditions had to approximate "normal life" as best as possible. He gestured to the loss of morale that would ensue, concluding,

> A population that cannot expect any variety in the conditions of its nourishment will very rapidly demonstrate psychological effects, becoming easily irritated and discontent, entering a depressive condition and exhibiting a lack of desire to perform intellectual or physical work. A large section of the world is ruled from the stomach.[296]

If a large part of the world was ruled by the stomach, it made sense to better

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[294] In the original German: "…dass die Naturgesetze nirgendwo nur eine Ernährungsweise verlangen, wie andere Lebewesen kann auch der Mensch verschieden ernährt werden." Rubner, *Deutschlands Volksernährung im Kriege* (Leipzig: Verlag 'Naturwissenschaften,' 1916) 34.

[295] In 1914: MPG Archiv: III Abt Rep 8 112/6, Abschrift, "Die Staat und die Volksernährung," 7. In 1916 he advocated against further rationing and publicly criticized the overreach of further measures: Rubner's opposition to further rationing, see Rubner, *Deutschlands Volksernährung im Kriege*, 41.

[296] In the original German: "Eine Bevölkerung, die ohne Aussicht auf eine Änderung der Ernährungsbedingungen an Nahrung leidet, zeigt bald die psychische Wirkung, leichte Erregbarkeit und Unzufriedenheit, depressorische Zustände und Unlust zu Leistungen auf geistem und körperlichem Gebiet. Ein grosser Teil der Welt wird eben vom Magen aus regiert." Rubner, *Deutschlands Volksernährung im Kriege,* 35, 43.

understand and manage its demands. Efforts to mobilize physiology began fitfully in the first decades of the twentieth century. The foundation of the Kaiser-Wilhelm-Institut für Arbeitsphysiologie (KWI) in 1913 represented an important step forward in achieving this goal. Rubner, who occupied the Chair for Physiology at the University of Berlin at the time, was named concurrently as director of the new KWI. In a report to Adolf von Harnack, President of the Kaiser Wilhelm Society (Kaiser-Wilhelm-Gesellschaft), Rubner outlined the "critical-experimental" orientation of the new institute, which would aim to dismantle common falsehoods about physiology and especially about nutrition, and replace them with useful recommendation for how to nourish the German people in light of the nation's available resources.[297] An essential component of this work, he wrote, involved overcoming disciplinary siloing that prevented the creation of useful knowledge:

> Only through the collaborative work of political economists and nutritional physiologists can we obtain a truly objective view. There are many cases that prove that it is not the lack of means to subsist, but the faulty assumptions about actual physiological needs or mistakes in the use and assemblage of food items that are the sources of the bad state of affairs.[298]

Recalibrating the relationship between supply and demand was thus one of the essential tasks of the new institute. In practical terms, this meant that Germany would need to increase its useable resources and return to simple, rural ways of eating. To do so would require

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[297] MPG Archiv: I Abt. Rep 1A 1350, "Rubner to Harnack," August 2, 1913, 19.

[298] "Nur durch eine gemeinsame Arbeit der Nationalökonomen und der Ernährungsphysiologen kann eine wirklich objective Entscheidung erfolgen. Es lässt sich in zahlreichen Fällen beweisen, dass nicht der Mangel an Subsistenzmitteln, sondern die irrigen Voraussetzungen über den wirklichen physiologischen Nahrungsbedarf oder Fehler in der Verwendung und Zusammenstellung der Nahrungsmittel die Quelle den Misstandes sind." MPG Archiv: I Abt. Rep 1A 1350, "Rubner to Harnack," August 2, 1913, 21.

examining colonial products closely and determining whether they could be replaced with new and more "culture-worthy" (kulturwürdig) alternatives.[299] Rubner's direct reference to research on surrogate products underscores their centrality to creating a viable economy before the blockade imparted a sense of urgency.

Such was the state of affairs as Germany entered the war. Unfortunately-- though not unsurprisingly-- it was not starvation, nor physiological hunger that posed the greatest threat to Germans' wellbeing. In addition to the physiological existence minimum, there was an equally important social existence minimum.[300] As one wartime author wrote, the greatest danger was a new sickness, one he dubbed Hungerangst.[301] The author excoriated those among the population who feared hunger, questioning whether they had ever even experienced it:

> Most people claim to experience hunger which is only the result of their eating habits and gluttony. We require a complete reorientation of our teaching of nutrition. The large mass experiment of the war has thoroughly transformed the views of physiology and political economy. Many clearheaded individuals have already seen that with minimal nourishment we can remain healthy and energetic, but the people must be resolute and diligent about observing the food needs of their own bodies. These scientific and practical experiments are almost never carried out. It's more comfortable to leave this work to the 'hunger artists' than to envy these ascetics who come to know the limits of their own needs and their willpower.[302]

The lines between the emotional response to hunger as a specter on the horizon and the actual condition of hunger were blurred. Nonetheless, even in the middle of wartime deprivation the hunger artists remained a reference point, at least according to this author, for observing the

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[299] MPG Archiv: I Abt. Rep 1A 1350, "Rubner to Harnack," August 2, 1913, 22.

[300] Paul Mombert, *Bevölkerungspolitik nach dem Kriege: Nahrungsspielraum und Volkswachstum in Deutschland* (Tübingen: J.C.B. Mohre (Paul Siebeck), 1916), 10.

[301] BArch R 86 5417: "Eine neue Krankheit," *Reichs Gemüse und Obstmarkt*, March 10, 1917.

[302] B Arch R 86 5417: "Eine neue Krankheit," *Reichs Gemüse und Obstmarkt*, March 10, 1917.

process of starvation. These wartime accounts posed the question of what it meant for a relatively well-off nation to starve. To answer it, psychological and social considerations had to be taken into account alongside physiological ones. Surrogate foodstuffs contributed to solutions along both dimensions, delivering nutritional value as well as the veneer of consumer choice and normalcy.

Belated mobilization on the home front

The deferral of a coordinated response to the blockade was a mix of naïve hope, negligence, and a decision to maintain morale on the home front. Drastic rationing measures risked eroding German resolve, so a policy of eating as usual was pursued. In September of 1914, a young American journalist crossed into Germany. Astonished by the meaty sandwiches on display at a train station, he remarked on the bounty, given the circumstances, to a companion. His friend replied, "Are you crazy? Why the Germans have more food than is good for them. They are a nation of gluttons in fact."[303] Several weeks later, in the second month of the war, the same man found himself in Berlin where he saw only the most feeble measures in place: in a restaurant on Leipzigerstrasse, the usual menu remained. Only a sign admonishing customers to save food served to remind diners of the war. Upon inquiring about the sign with the waiter, he was advised to ignore it: "Now everybody is falling back into the old eating habits."[304] The issue of appetite was still taken seriously by officials. Though well aware that German diets exceeded any sort of physiological minimum, the satisfaction of

[303] George Abel Schreiner, *The Iron Ration*: *Three Years in Warring Central Europe* (New York and London: Harper and Brothers, 1918) 4.

[304] Schreiner, *Iron Ration*, 6.

consumers remained an important pillar of decision-making and a justification for benign neglect.

The spirit of 1914 electrified the German academy. As their students mobilized for the front, academics offered their expertise to the war effort and their international standing to the defense of Fatherland.[305] Rubner was among the signatories of the now infamous "Manifesto of the Ninety-Three" from 1914, which provided a defense of German atrocities in Belgium, though he had already showed himself to be adept at navigating the worlds of science and the military before the outbreak of war.[306] With Rubner at its helm, the KWI was pulled into the war effort, first in a voluntary display of patriotism and later as a dependent of the ever-expanding war bureaucracy. In August of 1914, a meeting of the Kaiser Wilhelm Society with representatives from each institute took place in Berlin to discuss how they might proceed with their own activities. The group emphasized that much of their work already dovetailed with war preparations, with Rubner highlighting the importance of hygiene and physiological studies for a nation at arms.[307] By the summer of 1917, the KWI was receiving support from

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[305] The now infamous proclamation signed by 93 German intellectuals and published in October 1914 in defense of the Fatherland is often cited as the primary example of this enthusiasm among academics. Ludwig Fulda et al., "An die Kulturwelt! Ein Aufruf," (Oct. 4, 1914).

[306] He periodically received invitations to present his findings in short courses to military staff doctors and these requests became more frequent during the war, see MPG Archiv III. Rep 8 88/15: "Kriegsministerium, Medizinal Abteilung to Rubner," (April 19, 1912); "Kriegsministerium to Rubner," (Jun 10, 1915); "Kriegsministerium to Rubner," (Oct. 5. 1915). He became a member of the Fachärztlicher Beirat of the Sanitätsamt des Gardekorps for the duration of the war, see MPG Archiv III. Rep 8 88/15: "Körting, Generalarzt, Sanitätsamt des Gardekorps to Rubner," (Dec 29, 1914).

[307]MPG Archiv I Abt. Rep 1A 1350: "Beratung wegen der aus Anlass des Krieges erforderlichen Anordnungen. Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften," (Aug. 12, 1914).

the War Ministry (Kriegsministerium), War Nutrition Office (Kriegsernährungsamt) and the War Committee for Substitute Fodder (Kriegsaussschuss für Ersatzfutter) which provided funding for two chemical assistants and partially underwrote the costs of animal experiments.[308] With these additional resources at his disposal, Rubner's KWI remained a hub of activity. In particular, the Berlin physiologist devoted himself to the problem of food surrogacy. The results of these experiments were published regularly in the journal Archiv für Physiologie.[309]

The wartime contents of the Archiv lend insight into the priorities of physiologists and their experimental work. Just as military leaders discussed war aims in the New Year of 1915 and the parliament (Reichstag) debated more ambitious territorial gains, the food situation on the home front became increasingly untenable. Beginning in the winter of 1915–1916, investigations of suitable surrogates were routinely undertaken. As the dwindling grain supply became clear, bread ration cards were introduced in January and investigations into the manufacture of nutritious bread substitutes became a national priority. Rubner deplored the lack of sophistication in creating these substitutes. He railed against the simplistic understanding of chemical composition that failed to take digestibility into account and his lab raced to conduct tests and produce recommendations.[310] Physiologists tested the properties of

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[308] MPG Archiv I Abt. Rep 1A 1350: "Protokoll über die Sitzung des Verwaltungsrates des Kaiser-Wilhelm- Instituts für Arbeitsphysiologie," (June 5, 1917).

[309] MPG Archiv I Abt. Rep 1A 1351: "Harnack to Herrn Minister der öffentlichen Arbeiten," (January 28, 1920), 5.

[310] In the original German: "In immer steigendem Maße machte sich in der Literatur der in der Physiologie längst unhaltbar erkannte Standpunkt geltend, ein Nährmittel kurzweg nur nach seiner chemischen Zusammensetzung als gebrauchsfähig zu beurteilen, ein Irrweg, von dem bis heute auch die halbpopuläre medizinische Literature nicht abzubringen ist." Rubner, "Die

various grain substitutes, drawing inspiration from eating practices in other regions and animal feeding.[311] All varieties of historical means of "stretching" bread, as well as new techniques using previously unknown substances were tested.[312] Rubner investigated the use of finely milled birchwood in bread, as well as the digestibility of hazelnuts, fruits, spelt, spinach, turnips, and barley, all products that grew prodigiously in German soil.[313]

The war pushed the issue of rational resource management to the fore. In the heady days of August 1914, the implications of a British blockade were not fully appreciated. While it stoked the engine of public outrage, uniting military and civilians against Britain's harsh sanctions, the material consequences were not adequately assessed. Over the first few months, Britain tightened its blockade and expanded the definition of contraband to include foodstuffs. By the fall of 1914, German consumers could no longer count on imports from neutral countries. As the blockade situation evolved early in the war, German authorities struggled to adjust their planning. Similarly, German agriculturalists found themselves embattled, as they were no longer producing for the global food market but instead fighting to take in the harvests with a pronounced shortage of manpower and fertilizers. The German economy became increasingly isolated as Allied enforcement of contraband reached into neutral countries, and Romania, a large supplier of agricultural products, entered the war on the side

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Verdaulichkeit des durch Säuren aufgeschlossenen Holzmehles von Koniferen," *Archiv für Physiologie*, no. 1 & 2 (1916), 40-41.

[311] Rubner, "Die Zusammensetzung des Birkenholzes," *Archiv für Physiologie,* no. 2 & 3 (1916), 71–119.

[312] Rubner, "Untersuchungen über Vollkornbrote," *Archiv für Physiologie* no. 5 & 6 (1918), 255.

[313] Rubner, "Die Verdaulichkeit der Haselnußkerne." *Archiv für Physiologie*, no. 4 & 5 (1916), 281.

of the Allies in August 1916. Britain maintained its stranglehold (against German hopes) through the Armistice and until the signing of the Treaty of Versailles in July 1919.

The extent to which German authorities adequately prepared for and administered to the country's food needs has long been the subject of historiographical debate, as have the effects of the war on German health outcomes.[314] The lack of reliable statistical knowledge about German agriculture quickly became a target of the President of the Food Office, Adolf Batocki, claiming that in this respect practitioners had failed the nation.[315] Accounts of wartime hunger and its health effects appeared in the months following the armistice as the

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[314] In his study of World War I, Avner Offer determined that while Germans did not starve in large numbers, their nutritional health suffered a significant setback, causing the standard of living to regress by about one decade. This represented a jarring and unhealthy break in the progress of past decades.The shortage was exacerbated by the lack of fats, an essential and widely-enjoyed component of the pre-war German diet. Offer, *The First World War: An Agrarian Interpretation* (Oxford: Oxford University Press, 1989). More recently, Mary Elizabeth Cox has analyzed a cache of new anthropogenic data after discovering the records of approximately 600,000 schoolchildren's heights and weights recorded between 1914 and 1924 at the archive of the Deutsches Hygiene-Museum in Dresden. Her statistical analysis confirmed that children suffered from deprivation, with 1918 as the year of most severe malnourishment, acknowledging variation across years, regions, and class. Cox, "Hunger games: or how the Allied blockade in the First World War deprived German children of nutrition, and Allied food aid subsequently saved them," *Economic History Review,* 68, no. 2 (2015): 600-631. This work confirms narratives of suffering we have firsthand from diaries and publications.

[315] Batocki highlighted the failure of economists and their statistical surveys to properly reflect the state of German agriculture in his contribution to the first issue of the journal *Beiträge zur Kriegswirtschaft*. He wrote, "Der grösste Teil der Reibungen und Schwierigkeiten, die sich der Kriegswirtschaft entgegenstellt haben und noch weiter entgegenstellen, beruht auf den überaus mangelhaften Grundlagen volkswirtschaftlicher Erkenntnis, die bei uns Behörden wie Bevölkerung beim Eintritt in den Krieg besassen. Ein Hauptgrundlage volkswirtschaftlicher Erkenntnis ist die Statistik. *Sie hat, darüber müssen wir, ohne irgend einer bestimmten Stelle Vorwürfe zu machen, uns klar sein, auf dem Gebiet der landwirtschaftlichen Erzeugung und Ernährung versagt*." Batocki, "Einführung zur Kriegswirtschaft," in *Beiträge zur Kriegswirtschaft* 1, no.1 (1916): 1. For the role of statistics in measuring national productivity, see Adam Tooze, *Statistics and the German State, 1900-1945: The Making of Modern Economic Knowledge* (Cambridge: Cambridge University Press, 2001).

population's suffering became the target of philanthropic efforts from the West. Herbert Hoover's American Relief Association, the Rockefeller Foundation, Carnegie Foundation, and others arrived in the late days of the war to assess the German situation. Unsurprisingly, German accounts tended to emphasize the duress, and indeed the privations of the civilians at the hand of the Allies was never far from popular memory in the 1920s and 30s, serving as a powerful fount of collective experience to be drawn upon. As Alice Weinreb has deftly shown, hunger was as much a subjective individual, political, and cultural experience as a physical state. In both senses, it was conditioned by material realities and projections of food availability. Such projections were not the province of bodily, individual knowledge but instead of statistical calculation. Hunger and starvation were not perceived immediately, but as lurking on the horizon. In order to mitigate dire shortages, authorities were forced to act.

In August 1914, there was no state organization or central authority to administer to the food supply. Rubner had decried the lack of foresight in times of peace: "To be sure, when there is a meat shortage or a bad harvest or something like this, waves of concern go through the land and the Parliament finally has something to say. But then interest fades and they again fall silent on the topic of public nutrition (Volksernährung)."[316] In his vision, research and planning would entail close cooperation between economists and physiologists. Only from this multidisciplinary perspective could the issues be addressed in their full complexity. Despite Rubner's agitation for such an advisory body at conferences and in publications in the preceding decade, it remained out of reach.

The outbreak of war and tightening of the blockade elevated concerns about

[316] MPG Archiv I HA Rep. 112 6: "Der Staat und die Volksernährung," v; see also Rubner, *Volksernährungsfragen* (Leipzig: Akademische Verlagsgesellschaft, 1908), 10.

Germany's food supply into a topic of daily public speculation. In response, Paul Eltzbacher, Rector at the Handelshochschule in Berlin, assembled a commission of fifteen specialists drawn from different disciplines to assess the German situation. Eltzbacher recognized the need for an appraisal of Germany's food prospects during the blockade from several different angles, and the presence of physiologists, political economics, geologists, agronomists, veterinary specialists, and a home economist on the commission confirms his commitment to an interdisciplinary, multi-faceted approach. Writing the report demanded that the authors adopt a heterodox stance at the time: it required them to envision a long war–not through any lack of faith in the German military, but in order to adequately plan for the exigencies of diminished manpower and reduced harvests over years. Nineteenth-century wars had taught all the wrong lessons; a four-year war was almost unthinkable and, within the dominant school of national economics, it was dismissed as something beyond the realm of economic possibility.[317]

The group spent four months on the work, hoping to generate an assessment quickly so that government planners could take it into account. When the report was finally published in December, the authors conceded that a great deal of time had been lost in delaying initial preparations. Though the gestation took longer than expected, they delivered recommendations periodically over the course of their research so as to better bring production and consumption into alignment with the realities of a war economy. The inaction

[317] Karl Thiess, Professor of Staatswissenschaft at Cologne explained that economic preparation for the war had been made based on the experiences of short crises like the war of 1870, for economic panics and for the Morocco crises. See B Arch R 3601 53: Thiess, "Die Organisation der Volksernährung im dritten Kriegsjahr: Vortrag, Kriegsärtztlicher Abend" (Nov. 7 1916). See also Heinz Haushofer, *Die deutsche Landwirtschaft im technischen Zeitalter* (Stuttgart: Verlag Eugen Ulmer, 1963), 225.

of the first few months aside, the group concluded that Germany's food supply would hold out thanks to the strength of its agricultural sector and the resolve of its people. The Eltzbacher Commission, and the newspapers that parroted them, characterized the British starvation scheme (Aushungerungsplan) as a new step in the escalation of warfare and a repeat of their crimes against women and children in the Boer War.[318] By preventing trade and applying pressure to neutral countries, they argued, the British gradually stretched the definition of contraband, choking off crucial German supply chains. With the exception of Austria, Germany held little hope for cooperation from neighbors. Among the most important effects of the war, the authors noted, was the sudden turn away from the previously flourishing fields of world economics (Weltwirtschaft) and study of the private sector economy (Privatwirtschaft). Practitioners in these two fields had suddenly lost their grasp on world affairs, unable to describe their current circumstances as Germany's food future came to be circumscribed by its borders. The war would be won by staving off these twin enemies of internationalism and individualism, both embodied by England. In the words of the report, "Among the many achievements that we owe to the war, maybe the greatest is that it has reinvigorated our sense of national consciousness (Volksbewusstsein)."[319] Renewed national spirit aside, German authorities on the home front faced formidable practical challenges.

In concrete terms, the study determined that on average, pre-war production and imports had allowed for a diet that exceeded physiological needs by about 50 percent.[320] In

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[318] Eltzbacher, Paul, ed., *Die deutsche Volksernährung und der englische Aushungerungsplan: Eine Denkschrift* (Braunschweig: Friedrich Vieweg & Sohn, 1914), 4.

[319] Eltzbacher, 7.

[320] Eltzbacher, 77

order to make its calculations, the commission reached for the past decades of physiological studies grounded in the notion of the "hygienic protein minimum," which represented the smallest quantity of protein which a man can take without harm to his constitution or his activity.[321] After examining calculations from the Imperial Statistical Office, Germans stood more favorably in relation to physiological requirements than to past consumption habits. The deficit, wrote the Commission, would be easy to meet in terms of total calories, but more difficult in terms of available protein. The shortfall of protein was expected to be about 3% below recommended values, though a staggering 33% behind average pre-war values.[322]

The Eltzbacher report was not only descriptive, but also advanced a program to conserve resources: by detailing areas in which improvements could be effectively estimated, and a number of others which evaded estimation, the goal was to moderate the experience of wartime privation. The recommendations fell into two broad categories: a readjustment of production in the realms of agricultural cultivation, livestock raising, and export, and then a readjustment of the standard of living. This second arena encompassed the household and individual levels. To achieve this, the authors sought to dismantle pernicious nutritional myths.[323] The introduction of surrogate foodstuffs straddled both the categories of readjusting

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[321] Eltzbacher, 31. Rubner, *Handbuch,* 53. For further discussion of debates surrounding the protein minimum around 1900, see chapter 1 of this dissertation and also Corinna Treitel, "How Vegetarians, Naturopaths, Scientists, and Physicians Unmade the Protein Standard in Modern Germany," in *Setting Nutritional Standards: Theory, Policies, Practices,* eds. Elizabeth Neswald, David F. Smith, Ulrike Thoms, (Rochester: University of Rochester Press, 2017), 52–73.

[322] Eltzbacher, 79.

[323] Avner Offer describes Batocki's retrospective acknowledgement that one of the KEA's main failings was the spread of nutritional knowledge favoring plant over animal food. Offer, 67.

production and the standard of living. By making shrewd substitutions, Germans would be able to manage and perhaps even thrive. The Eltzbacher report set out to restructure some of the most formative ways that Germans related to their surroundings and translate anxieties into solutions.

After increased import restrictions and the bad harvest of 1915 (due in large part to the shortfall of fertilizer), the shortages were making themselves felt. Over the winter of 1916, the dire situation was assessed anew. One author in the Hamburgischer Korrespondent complained,

> No one could find the current state of German food provisioning entirely unobjectionable. No one would accept the "necessity" of our sugar policies and allow himself to be convinced that the incomprehensible difficulties concerning the potato supply were unavoidable.[324]

Early missteps, such as the continued exportation of sugar into the fall of 1914, favored by industry, had soured the mood for many consumers. Talks of creating a centralized authority for food distribution began as newspaper commentators rued the regrettably late measures.[325] The same newspaper author welcomed the creation of such an authority, provided that it functioned on a more egalitarian basis, "in order to maintain the spirit of 1914 among the people through 1916."[326] Hopeful that any change might represent an improvement, consumers awaited news of the reorganization.

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[324] BArch R 8034 II 7895: "Organisation und Führerschaft," *Hamburgischer Korrespondent* (May 13, 1916).

[325] See BArch R 8034 II 7895.

[326] BArch R 8034 II 7895: "Organisation und Führerschaft" *Hamburgischer Korrespondent* (May 13 1916).

"Allgemeine Nährpflicht": Creation of the War Nutrition Office[327]

The long-awaited reorganization came on May 13, 1916 with the introduction of a program for the full unification of all aspects of people's nutrition. The War Nutrition Office (Kriegsernährungsamt, henceforth KEA) was founded "out of the needs of the times, in order to overcome need, and to prevent future crises."[328] In the first years of the war, the burdens of administering the food supply had been distributed between different authorities in Berlin and at the state level. In light of the shortages of the winter of 1915/16, it had become clear that a centralized authority was necessary. Its creation delegated responsibilities from the upper house of the German parliament (Bundesrat), which decided in economic matters during the war, to a new "food dictator," as the office was called. Though the new authority remained under the purview of the Chancellor (Reichskanzler), in practice the office would make its own decisions.[329] Calls for strong and capable leadership of the agency yielded sensational headlines such as "Dictator for Food Supply," and "Give Us an Interior Hindenburg!"[330] The KEA was organized at the national level in Berlin with subordinated offices across regions

[327] "Allgemeine Nährpflicht," a play on "allgemeine Wehrpflicht," or mandatory military service, was a common expression by summer 1916. BArch 3061/ 483: *Nachrichtendienst für Ernährungsfragen* (Jun 9 1916).

[328] In the original German: "Aus der Not der Zeit, zur Überwindung der Not und zur Vorbeugung weiterer Notstände." BArch R 86 2049: "Das Kriegsernährungsamt. Begründung, Organisation, bisherige Tätigkeit."

[329] See BArch R 86 2049: "Das Kriegsernährungsamt. Begründung, Organisation, bisherige Tätigkeit." Conversations over the legal basis and situation of the new authority took place for months prior to its founding, as indicated in the disagreements taking place in the Königliche Preussiche Staatsministerium. See GStAPK I HA Rep. 90A 4643: "Sitzung des Königlichen Staatsministeriums," (May 1, 1915), 1–12.

[330] See B Arch R 8034 II 7895.

and districts. Its first president was to be Adolf von Batocki, who had distinguished himself as governor of East Prussia by rebuilding the province after it had been ravaged by fighting in 1914.

The daily press across German cities celebrated the move towards centralization. Various middle-class and conservative papers suggested that in order to address the knotty problems of production, supply chains, and distribution, it seemed self-evident that the nation needed a centralized authority to rule by decree. In the Social Democratic newspaper Vorwärts, this move was met with skepticism. Social Democrats not only opposed the measure on account of their suspicion of technocratic centralization, but they also charged that by creating the KEA as an independent office shielded from other ministries, the decision foreclosed the possibility of public oversight. "This complete exclusion of the public stirs in us the most vivid fears," wrote one author.[331] It was exactly this sort of critique and exchange that had been lacking since the outbreak of war, when the press had been bound by tight censorship laws.

The creation of the KEA can be read on the one hand as a major step towards the centralization of food management; a single authority had been empowered to make decisions about the production and distribution of food during the war. However, the tactics of the KEA largely relied upon decentralization, delegation, and even deference to various existing regional outposts. The new office's attitude towards surrogates was ambivalent, at once promoting their use and acknowledging their dangers. The diversity of the German diet and various locational and logistical problems prohibited consistent treatment across the nation.

[331] See B Arch R 8034 II 7895.

While the new body responded to a pressing public need for the presentation of a unified home front, it in fact constituted retrospective recognition of many activities that had long been practiced.[332]

The search for the perfect protein source

Amid the search for surrogate foods, perhaps none occasioned such volatile shifts between high hopes and dashed promises as the lupine. "These days it is not only craft, but also science that goes into our bread," wrote one newspaper of lupine-based bread in 1917.[333] The author likened the lupine to one of nature's puzzles that needed to be solved; if only it could be debittered thoroughly and efficiently then German food independence could be guaranteed. Lupines had long been touted as a sort of miracle food, a high-yield plant well-suited to the sandy soil found in much of northeastern Germany, with seeds rich in protein. Proponents of both selective breeding techniques and technical refinement attempted to transform the cheap, protein-rich seeds into a staple suitable for the German diet. The raw material with which boosters had to work, however, was far removed from this nutritional and

[332] Recognition of existing practices was a necessary part of wartime resourcefulness. For example, in June 1917 a Kriegsausschuss für Sammel- und Helferdienst was established. In a variety of flyers and memorandums to local associations, the committee called upon the population to ensure that a complete use and recovery of all commercial and household waste was undertaken. Pamphlets, memos and posters helped to disseminate knowledge about useful materials. Additionally, an exhibit on the topic was set up to educate the public in March of 1918. GStAPK I HA Rep 90A Nr. 2714: Rundschreiben, Berlin, June 1917, and "Denkschrift zur Sammlung von Abfallstoffen und Wildfrüchten," (August 1917) and To the Königl. Preuss. Staatsministerium (Mar. 2, 1916).

[333] "Nicht nur die Kunst, auch die Wissenschaft geht in diesen Tagen nach Brot, und zwar in des Wortes ureigenstem Sinn." BArch R 86 2207: "Die zu Ehren gekommene Lupine," *Gemüse und Obstmarkt* (Aug 1, 1917).

agricultural salve. It required intensive research, and trial and error to create a suitable product.

The lupine was not native to Germany, but Frederick the Great was rumored to have introduced it from the Mediterranean. Impressed by its utility as a green manure (a great advantage in helping along the poor, sandy soil of Brandenburg), Frederick issued a cabinet order in 1784 to have lupines imported from Italy. After his death the popularity of lupine cultivation waned, so that they were subsequently re-introduced several times in German lands. Over the course of the nineteenth century, lupine cultivation had spread widely thanks to the agitation of a few leading estate owners, whose membership in the German Agricultural Society (Deutsche Landwirtschafts-Gesellschaft, henceforth DLG) and activism on behalf of the plant helped to popularize it.

Yet the lupine continued to vex agricultural improvers and chemists alike. Despite the success of its cultivation, its use for human consumption remained evasive due to a high alkaloid content that imparted a bitter taste and made it toxic. The exact mechanism by which the lupine was poisonous was the subject of some debate. While it was recognized that the seeds contained mildly toxic alkaloids, the consensus on best practices for removing these alkaloids had not yet developed. Mechanical procedures were onerous and tended to produce waste, while chemical interventions denatured the valuable proteins. Further complicating matters was the identification of "lupinosis" in the 1870s, in which herds of sheep were stricken ill from consuming lupine-based feed.[334] Farmers were unknowingly engaging in a sort

[334] Results of inquiry into origins of sickness appear, along with recommendation to reduce lupine cultivation for feed, in "Untersuchungen über die Lupinen-Krankheit der Schafe," *Milch-Zeitung: Organ für die gesamte Viehhaltung und das Molkereiwesen*, 8, no. 46 (Nov. 1879): 682-683.

of "lupine roulette" in which large quantities or conditions of soil and dampness could contribute to a higher toxicity. Conflicting diagnoses complicated the matter. Was the sickness a result of alkaloids in the lupines themselves, or a fungus on the lupines? Was this latter diagnosis merely evidence of "the tendency of plant pathologists to ascribe all sicknesses to fungus," as one veterinarian opined?[335] One report cited the plight of a Hanoverian farmer who had grown lupines for two years on the same land to feed his sheep, until all at once 120 of the 450 sheep in his flock became extremely sick, with 80 eventually "kicking the bucket."[336] Whether the origins of the sickness that devastated sheep herds lie with the plant itself, the climatic conditions or the circumstances of its storage, there was a consensus that the use of lupines as feed should be reduced. Farmers grew to mistrust lupines as feed and cultivation declined in subsequent years around the turn of the century.[337]

Facing the difficulties of the wartime economy, especially after the winter of 1917, attention once again turned towards the lupine. As the Eltzbacher Commission's initial

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[335] Magnus, quoted in "Untersuchungen über die Lupinen-Krankheit der Schafe," *Milch-Zeitung Organ für die gesammte Viehhaltung und das Molkereiwesen*, 8, no. 46 (Nov.1879) 682-683.

[336] Winckel, *Die Lupine und ihre Bedeutung für Landwirtschaft und Volksernährung* (Berlin: Parey, 1920), 45.

[337] Experimentation continued at agricultural research stations and in some manufacturing circles. For example, several processes for debittering the lupine through technical means were devised (Kellner, using pressure cooker and alternate heating/cooling—*this one was most widely used in agricultural circles up through 1919*; Löhnert, heating and cooling to separate). In the 1880s, Walter Leistkow in Bromberg devised a process of debittering lupines and making them a suitable coffee substitute. While Leistkow's process rendered them fit for human consumption, the taste remained overwhelmingly bitter. Though they proved acceptable as a coffee substitute, evoking the same [bitter] taste as the beans, the unpleasant taste proved to be a barrier to wider usage. BArch R 86 2207: "Die zu Ehren gekommene Lupine," *Gemüse und Obstmarkt,* no. 176 (August 1, 1917).

assessment predicted, Germans experienced the most acute shortages in protein. With a reduced livestock population, lupine cultivation promised not only to fill the gaps in the nation's fodder, but to remedy the protein shortfall for humans. Of all the macronutrients, protein shortage made itself most visible and provoked panic. At the cellular level, generations of hygienists and food chemists had been taught protein was a necessary minimum for regeneration and thus a prerequisite for life. Renewed attempts to create a nitrogen-rich preparation from lupines were made. A study by Max Winckel, among the greatest proponents of lupine research, reported that between 1913 and 1920, the cultivation of lupines had increased by two and a half fold.[338]

During the summer of 1917 these hopes reached a fever pitch, with the Mitteilungen aus dem Kriegsernährungsamt heralding their recent successes using a combination of modern mechanical technology and breeding to produce lupine flour fit for human consumption.[339] In anticipation of this shift, and to meet the need for animal feed, lupines came under centralized management (Beschlagnahme) in 1917. Meanwhile, within the KEA the War Committee for Plant and Animal Oils and Fats (Kriegsausschuss für pflanzliche und tierische Oele und Fette) wrote to the Imperial Health Office (Kaiserliches Gesundheitsamt), urging further research into lupine-based products to ameliorate the protein deficiency (Eiweissnot).[340]

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[338] Max Winckel, *Die Lupine*, 16.

[339] For examples, see *Mitteilungen aus dem Kriegsernährungsamt* 15, no. 41 (June 1917) and *Mitteilungen aus dem Kriegsernährungsamt* 24, no. 52 (July 1917).

[340] BArch R 86 2207: Der Kriegsausschuss pflanzliche und tierische Oele und Fette, an Präsidenten des Kaiserliches Gesundheitsamts (Aug. 17, 1917).

Bringing lupine-based products to the wider population required testing. Over the winter months of 1917 and 1918, the Imperial Health Office supervised experimentation with lupine-based products on prisoners. 1,600 Russian prisoners of war were fed meals with debittered lupine flour for three weeks in order to test whether the substance was well tolerated in humans. One thousand kilograms of lupine flour were released from the Committee on Oil and Fats for the purpose of the experiment, which was to be supervised by the prison physician and a representative of the Imperial Health Office. Over three weeks, the flour would be introduced and the quantity would be gradually increased, with observers attentive to stomach disturbances and heart and kidney irregularities. The prison population provided an ideal control for such experiments, and others were carried out on the Russians at Frankfurt an der Oder, including the testing of salted fish and the artificial sweetener Dulcin.[341] The representative of the health office took morning urine samples from a select 50 of the 1,600 prisoners to test for irregularities at three intervals: prior to the beginning of the study, after the first week, and at the very end.

During the first week, the prisoners were fed a preparation of lupine flour at lunch on Sunday, Tuesday, Thursday, Friday and Saturday so that in total they did not consume more than 40 g per day, or less than 200 g total. The flour was to be consumed mixed with at least twice as much of another starchy material. In the second and third weeks the frequency would be increased to once daily and up to 300 g of lupine flour per week. A menu consisting of four options was included: barley broth, potato soup, bean soup, and a rutabaga dish, all made with

[341] B Arch R 86 2207: Kriegsministerium, Abt. für Gefangenenernährung, an Präsidenten KGA, "Abschrift mit Beziehung auf die zwischen Herrn Geh. Rat Kerp und Geh. Reg Rat Dr. Rost und dem diesseitgen Vertreter getroffenen Verabredungen," (Dec. 7, 1917).

lupine flour, composed the fare. The supervising doctor, Dr. E Rost, noted that these items did not provoke resistance or complaints from the prisoners or the kitchen personnel responsible for preparing the meals.

In his final report, dated February 29, 1918, Rost deemed the experiment to be a success. There had been neither damage to kidneys, circulation, or digestion, nor complaints of other health disturbances that could be linked to insufficiently prepared lupine meal. In fact, the 50 prisoners who were monitored closely overwhelmingly gained weight (44 gained, 5 lost, 1 remained the same). Rost cautioned against over-interpreting this result: the weight gain, he wrote, was not to be attributed to the lupine flour but to the undisturbed provisioning of food at the camp during the experiment. His conclusion recommended its use in the wider population.[342]

Such work might have inspired the confidence of the supervising physicians, but it proved more difficult to win the approval of the KEA. Charged not only with looking after the health of the German population, but also with making decisions about whether items were economically rational or not, the KEA continued to treat refined lupine products for human consumption with skepticism. True, the experiment had gone well, and the reviews of products sent to the Imperial Health Office had returned some favorable results. However, the process of debittering lupines remained onerous: it was both time and materially intensive—some of the proposed processes used alcohol, which was in short supply, while others could only be carried out using expensive equipment. The ideal was a process that would permit debittering to be conducted at the small scale of the individual household and without the

[342] B Arch R 86 2207: Report, Prof. Dr. E Rost, "Abschliessender Bericht, über den mit entbitterten Lupnienmehl im Kriegsfangenenlager zur Frankfurt/so angestellten Versuch," (Jan. 31 to Feb 21, 1918), 7.

types of specialized equipment that was largely unavailable during the war.[343] On these grounds, none of the processes submitted for review could be fully endorsed.

By the spring of 1919, the hopes for the widespread use of lupines for humans remained unfulfilled. In May, the Health Office declared that attempts to debitter lupines for human consumption had not met the standards of safety and reliability and thus removed lupines from the category of controlled foods. While lupine-based products remained objectionable for humans, it was agreed that they were invaluable for feed and fertilizer, and thus were released from the system of centralized management and price setting they had been subjected to since 1917.[344]

While this release may be read as official abandonment of the project, it also permitted new experimental freedom. Instead of being subjected to a process of oversight which demanded petitions in order to receive even small quantities for experimentation, lupines could be purchased on the open market.[345] Through the war, the lupine had won wide acceptance in agricultural circles. Shaken by Germany's protein poverty, prominent agriculturalists banded together in 1919 to form the Association for the Promotion of Lupine Cultivation (Verein zur Förderung des Lupinenbaues). Led by prominent agriculturalist and conservative politician Conrad Freiherr von Wangenheim, the association aimed to promote the lupine as a path to food sovereignty in Germany. By encouraging planting and attempts at

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[343] BArch R 86 2207: Gutachten, Juckenack (Feb 19, 1918).

[344] BArch R 86 5487: "Freigabe der Lupinenbewirtschaftung," (May 20, 1919)

[345] Indeed, the Kriegsernährungsamt received many requests for quantities of lupines from manufacturers hoping to prove the merits of their debittering process on a larger scale. See BArch R 86 5487: C.F. Hildebrand, Hamburg to Reichsgetreidestelle (Sept. 20 1918) and also Winde to KEA (Oct. 5, 1918).

breeding and debittering and publishing relevant information for distribution to farmers and manufacturers, the association aimed to help national recovery, with a special focus on the suffering estates in the northeast.[346] The association later crystallized in a special committee dedicated to the promotion of lupine cultivation within the overarching organization of the DLG.[347] The committee adopted a three-pronged strategy: first, they initiated a propaganda campaign to encourage planting so that the area under lupine cultivation in Germany would grow ten to twentyfold; second, they encouraged breeding experimentation that would lead to high quality seeds that were easy for farmers to grow and debitter; and third, they strove to improve the current means of debittering. The group solicited membership and contributions from the circles of agriculturalists, scientists, industrialists, and bureaucrats to fulfill their goals. At their meetings, the cultivation of lupines was considered from all angles. Discussions ranged from the best practices for technical debittering using existing machinery in sugar factories to the latest breeding experiments.[348]

In 1919, the same year as the founding of the Association for the Promotion of Lupine Cultivation, on the occasion of the fortieth meeting of the Association of Experimental Agricultural Stations (Verband landwirtschaftlicher Versuchs-Stationen), participants wrestled with determining which wartime food and fodder surrogates "had proven themselves to be usable and economically rational in order to bring them over into the peace economy of

[346] BArch R 86 5487: "Verein zur Förderung des Lupinenbaues," *Deutsche Tageszeitung* (Feb. 20 1919).

[347] See BArch R 8072 136.

[348] BArch R 8072 136: Sonderausschuss der D.L.G. zur Hebung der Lupinenbau, Sitzung am Sept 28, 1921.

the future."[349] Lupine cultivation was one of the enduring successes that the participants regarded as part and parcel of the wartime economy. Agriculturalists reckoned that its extensive cultivation would remain for some time.[350] Intensified efforts to breed a debittered, or "sweet" lupine were driven by the chronic shortages of the 1920s. Successful breeding would eliminate the need for cost and time intensive technical debittering, shortening the production chain from field to fodder. In 1930, the breeding efforts undertaken by the Kaiser Wilhelm Institute for Plant Breeding at Müncheberg registered successes. An informational press release from the agricultural publication Landwirtschaftshilfe carried the headline "Breeding of sweet lupines successful, a rescue for the German East?"[351] The East, which had suffered from a long agricultural depression and was constrained by light and sandy soil, was eminently suitable terrain for lupine cultivation. The economic recovery of the region hung in the balance, as did the nation's import independence. As the author of the release noted, the successful cultivation of sweet lupines liberated Germany from the importation of foreign feed.[352]

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[349] In the original German: "sich als brauchbar und wirtschaftlich erwiesen hat, [um diese] in die Friedenswirtschaft der Zukunft mit hinüberzunehmen." "Verhandlungen der 40. (ordentl.) Hauptversammlung des Verbandes im Sitzungssaal des neuen Archivgebäudes zu Schwerin (Mecklenburg) am 18. und 19. September 1919," *Die landwirtschaftlichen Versuchs-Stationen. Organ für naturwissenscahftliche Forschungen auf dem Gebiete der Landwirtschaft* 56 (1920) 138.

[350] "Verhandlungen der 40. (ordentl.) Hauptversammlung des Verbandes im Sitzungssaal des neuen Archivgebäudes zu Schwerin (Mecklenburg) am 18. und 19. September 1919," *Die landwirtscafhtlichen Versuchs-Stationen. Organ für naturwissenschaftliche Forschungen auf dem Gebiete der Landwirtschaft*, 56 (1920) 138.

[351] BArch R 86 5487: *"*Züchtung von Süsslupinen gelungen, Rettung für den deutschen Osten," *Landwirtschaftshilfe* (Jun 16, 1930).

[352] BArch R 86 5487: Agrarkorrespondenz, *Landwirtschaftshilfe* (June 16, 1930).

The abandonment of managed distribution of lupines did not end the search for a lupine-based food. In fact, the official abandonment of the project may have fostered a new wave of innovation and experimentation, as they became easier to secure.[353] Anticipating this widespread access, the Ministry of Health suggested that lupine-based products come under the purview of regional centers for surrogate foods, using the existing infrastructure to police basic standards of alkaloid removal to ensure the integrity of products brought to the market. As multistep processes for technical debittering evolved, the system of testing and permitting the resulting products had to be maintained. The pursuit of the lupine as a "miracle food" illustrates just one of the ways that surrogate products promised to fill nutritional gaps left by the blockade. Its suitability for domestic agriculture and high protein content unleashed strong interest in establishing cultivation on a large scale.

Policing surrogacy

The blockade strained German society at all levels. By the time the KEA was organized in May 1916 enterprising individuals had long been scrambling to fill the gaps created by a lack of familiar products. Surrogate foodstuffs were presented as a strategy to overcome limits, but they also introduced problems of their own.[354] A robust market for surrogate products developed, especially in urban areas and particularly in the later years of the war.

The deployment of surrogates also reveals the powerful mediating role that chemists

[353] BArch R 86 5487: Reichsgesundheitsamt an Reichsernährungsministerium (July 12, 1919) 7.

[354] See BArch R 86 3285.

and physiologists occupied between the state, food producers, and consumers. Alimentary expertise emerged from the wartime government's promotion of recommendations for safe and nutritious foods. Food experts were rendered indispensable by their role in policing new products. Through research into alternative foodstuffs and distribution, and also by implementing a network of certification that encouraged enterprising individuals to innovate, the KEA leveraged scientific expertise to manage an acute shortage of food. In light of the belated creation of the KEA in 1916 and its early reliance on local and regional outposts in distributional and regulatory matters, it is clear that surrogacy programs were heavily indebted to the enterprising scientists and food manufacturers who created new products and could be seen as taking up their patriotic mantle.

The proliferation of such substances presented an intractable problem for authorities who were charged with policing quality on the one hand, and reorienting economic life to support the war economy on the other. Activities beyond the reach of the law flourished, including black market trading and "stretching." Regulations were often slow to keep pace: with a backlog of samples to test and limited manpower, policing the wartime food industry proved to be a Sisyphean task. And, where one community or state did manage to regulate the surrogate market, the products tended to migrate to another where they remained uncontrolled. The uneven character of regulation between South German states and Prussia prompted one Bavarian food chemist to single out Prussia's failure to confront this problem, claiming it had been transformed into the "hideout" for low quality wares that had been rejected elsewhere.[355] The chemist echoed calls for a nation-wide system of certification and

[355] In the original German: "augenblicklich ist Preussen der Unterschlupf für diese Waren […] was nirgends zugelassen wird, wandert nach Preußen." S. Rothenfußer, "Ersatzmittel für

regulation; as a matter that concerned policing health properties as well as ensuring that scarce products were not squandered in the manufacturing process, surrogates required national-level oversight. The absence of a uniform stance on surrogate products rendered efforts to enforce standards largely ineffective.

In part, the difficulty stemmed from a lack of consensus on the meaning of and the criteria for surrogate foods. The term "Ersatzmittel" was used widely in regular speech but a definition proved evasive. As one study from 1893 explained, a "Surrogat" was a product that was cheaper or easier to obtain than the original product, but also approximated the properties and effects on the body.[356] The same author explained that in certain cases, a Surrogat might become an Ersatzmittel by succeeding in not only being cheaper and easier to manufacture, but also possessing a full range of other properties absent from the original. The oft-cited example here was that of beet sugar. The parallel existence of these two categories of Ersatzmittel and Surrogat, the latter more forgiving and the former more precise (and desirable), remained in the decades leading up to World War I.

With the outbreak of hostilities, the term Ersatzmittel lost the attributes of a narrower, more preferable substitute. Instead, it became the default term for any sort of substitute, taking the place of Surrogat. Contemporaries attributed the shift not to the changing material circumstances, but to a conscientious effort to suppress foreign words.[357] What had previously

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Lebensmittel und deren Beurteilung," *Zeitschrift für Unterschung der Nahrungs- und Genussmittel* (*ZUNG*), 35 (Jan-July 1918) 19.

[356] See Koller, *Die Surrogate*.

[357] Lüning, "Diese Bezeichnung ist leider dem Kriege gegen die fremde Wörter gefallen." See "Diskussion," *ZUNG* 35 (1918) 14.

been treated as two distinctive categories– Ersatz, a narrow and almost seamless replacement, and Surrogat, a less-desirable substitute– became one. In this case, the patriotic washing of language came at the expense of conceptual clarity.[358] Pursuit of linguistic purity also served to obfuscate distinctions that had long been in place.[359] The lack of precision was inconvenient, to say the least, given the vulnerability of the German food economy. It also represented an interesting snare in the process of promoting specialized expert knowledge: although consumers were delivered into the hands of food and chemical experts to determine basic needs and the integrity of products, the currents of patriotism restricted the linguistic field in which they operated. With the waning acceptability of the usage of "Surrogat," the two categories collapsed in common parlance and created a hurdle for those experts charged with "protecting consumers."[360]

To further complicate matters, the word "Ersatz" in German functioned in several different contexts. In the summer of 1918, the Munich chemist Heinrich Trillich published an essay in Deutsche Nahrungsmittel Rundschau in which he outlined six different ways that "ersetzen"—to replace—was used in the German language.[361] At different turns, it could mean

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[358] I have elected to use surrogate throughout, since in English it has the advantage of encompassing both *Surrogat* and *Ersatzmittel* in the narrower sense.

[359] The same question applied to the use of rationing (*Rationierung*). The publication *Der kleine Anzeiger* published an open call soliciting suggestions for an appropriate and thoroughly German substitute word. The editors then took it upon themselves to write to offices that continued to employ "Rationierung" to complain and share their suggestions. See B Arch R 3601 465: "Ein deutsches Wort gesucht" *Kleiner Anzeiger*, (Oct. 10, 1916) and "An die Schriftleitung der 'Mitteilung für Preisprüfungsstellen'" (Oct. 19, 1916).

[360] "Diskussion," *ZUNG* 35 (1918) 15.

[361] BArch R 86 5454: Trillich, Schreiben an Kaiserlichen Gesundheitsamt, (Jul.1 1918), enclosed "Über Ersetzen, Ersatz, Ersatzmittel und Einschlägiges."

to replace something fully with an equivalent, to compensate for something lost, a more abstract sense of to console, to go without, or, more straightforwardly, to use something in the place of something else. The flexibility of the term contributed to the difficulty in defining what exactly an Ersatzmittel was.

On the occasion of the fifteenth annual meeting of the Association of German Food Chemists (Verein Deutscher Nahrungsmittelchemiker), which met in October 1917, the question of what, exactly, was meant by Ersatzmittel was the subject of debate. The main presenter, Adolf Beythien, argued that it was not sufficient that a substance merely served the same purpose as the original, but it had to also possess similar properties. Yet even with this qualification, the problem remained thorny: was it sufficient to be similar in the sensory realm, through either color, texture, taste or smell? Or should it be similar on the whole, producing an approximation of both the nutritional properties and sensory qualities like taste and texture? Or was it instead the inner composition of a substance that was the essential determinant of its suitability? Beythien reported that the circumstances of life on the home front had emboldened chemists to declare products "Ersatz" that did not in the least resemble the product they purported to replace.[362] Manufacturers tended to defend their products as replicating other important or desirable properties of a given food, while food chemists (such as those in attendance) prioritized nutritional value. In the competition between these two value systems, the chemists had an important task. Since commercial interests had proven to be predatory— one attendee decried the term Ersatz as a part of "capitalist American-style

[362] Adolf Beythien, "Was ist unter Ersatzmittel für Nahrungs- und Genussmittel im Sinner der einschlägigen Verordnungen zu verstehen? 27. Oktober 1917" *ZUNG* 35 (1918): 6-7.

exploitation"[363] —food chemists guarded the public interest.

Of course, the problem of adulterated foodstuffs was not new to the Industrial Age.[364] But it took on new dimensions with growing chemical possibilities and an ever-expanding market for finished goods. Food chemists were trained to police the boundaries of foodstuffs and ensure their purity, or at the very least, their suitability for human consumption. It was, to quote one meeting attendee, their responsibility to avoid the creation of an egg replacement that would "make a chick retreat ashamed and blush."[365]

While the chemists presented a variety of viewpoints, the KEA attempted to highlight the redeeming qualities of some of the products. In a note to the Imperial Health Office, Hans Stadthagen of the Section for Political Economy of the KEA commented on a draft of Juckenack's memorandum on Ersatzmittel, suggesting the addition of a line to the conclusion to provide what amounted to a warning of the "wolf in sheep's skin" of substitute foods. Stadthagen defended some of these products, writing, "On the other hand, it must be recognized that there are also many good Ersatz foods on the market that are totally welcomed by consumers."[366] Beyond the broad consensus that food products should not be detrimental to consumers' health, attendees agreed upon little else. The war had the effect of condoning

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[363] S. Rothenfußer, "Ersatzmittel für Lebensmittel und deren Beurteilung," *ZUNG* 35 (1918), 18.

[364] The image of the predatory miller in E.P. Thompson's "Moral economy" stands out for his association with food adulteration, mixing his bread with with chalk, lime, bean flour and human bone. Thompson, "Moral Economy," 97. In Germany, the Food Law (*Nahrungsmittelgesetz)* of 1878/79 was the first Reich-wide measure to legislate against the proliferation of adulterated products that accompanied more advanced industrial processes.

[365] Rothenfußer, "Ersatzmittel für Lebensmittel und deren Beurteilung," *ZUNG*, 35 (1918), 18.

[366] BArch R 86 5454: Volkswirtschaftliche Abteilung des Kriegsernährungsamt an Auerbach, Regierungsrat des KGA (Jul. 29, 1918).

previously disreputable practices, such as cutting one substance with another. In the absence of clear wrongdoing, it was difficult to fix standards for policing surrogate products.

Conclusion

The attitude of food chemists and officials towards surrogate foods at the end of the war was ambivalent at best. Yet despite fatigue among the public, many of these products successfully navigated the transition to the peacetime economy and enjoyed a long afterlife. When the blockade was finally lifted, Germans still faced years of shortages. And, long after trade resumed, the memory of the precarious years remained. Yet their experiences of hunger and suffering also came to define them as a nation of remarkable fortitude. In particular, surrogate foods became a symbol of the ability of Germans to make do (durchhalten) under duress. The status accorded to these products, which represented a combination of the fruits of German soil and ingenuity, in popular memory speaks to the resonance of concerns about national self-sufficiency in interwar Germany. Privileging domestic resources over imported ones promised to extricate the nation-state from a web of foreign dependencies. In an unstable political climate, food independence was looked upon favorably as a means of ensuring security and minimal disturbances to the food supply. The appeal of surrogates, as a technology and a program for reforming the German economy, remained strong throughout the Weimar years and into the 1930s.

German political economists spoke of the relationship between population and available food resources in terms of Nahrungsspielraum, a difficult to translate term that

equates roughly to "nutritional maneuvering room."[367] In a narrow sense, this concept referred to the extent of territory necessary for a state to sustain its population with domestically produced foodstuffs. At the turn of the twentieth century, this equation of Nahrungsspielraum with a nation's territory remained an interesting theoretical model, and for some it represented an ideal, but one without much purchase on reality. Another broader definition coexisted alongside this narrow one: in this formulation, technical progress and networks of trade would serve to extend the food supply beyond the borders of the nation-state.[368] The two notions of Nahrungsspielraum represented competing visions of the future of food. The first was a Malthusian vision of limits to growth, whereas the second displayed a "cornucopianist" orientation, which assumed trade and technology would allow humans to meet growing demand for food.[369] It is to this latter category that surrogates belong, as a technology for overcoming shortage and figuratively expanding the maneuvering room of the nation through assiduous use and reuse. However, the first conception of Nahrungsspielraum as physical land available for agricultural activity coexisted with this latter one. The following chapter will deal with a proposed solution to import-dependency in this first sense, one that enjoyed great popularity in the aftermath of the war: the process of internal colonization.

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[367] See Max Weber, *The Theory of Social and Economic Organization,* trans. A.M. Henderson and Talcott Parsons (Glencoe: Free Press, 1947), 143; Mombert, *Bevölkerungspolitik*. 1–45.

[368] Mombert, *Bevölkerungspolitik*, 8–10.

[369] Warren Belasco, *Meals to Come: The History of the Future of Food* (Berkeley: UC Press, 2006), 20–28.

CHAPTER FOUR

The Cultivating Imperative: Settlement Projects in the Early Weimar Years, 1919–1923

Germany emerged from World War I a broken nation. Military defeat, years of chronic shortages, revolutionary violence, and regime change drew out the transition to "peace." The new Weimar government set to work trying to rehabilitate the hobbled economy while still stabilizing and attempting to stave off a crisis of legitimacy. The four and a half years during which Germany had been cut off from international trade and operating with an economy totally oriented towards sustaining the war effort defied easy remedy. Debate and progress towards possible solutions were often stymied by the bitterly partisan political climate: the Social Democratic majority in the new government found itself empowered, while both Communists and conservatives were enraged by the shape of the new order.

Despite the polarized climate, there were a few points of agreement between individuals across the political spectrum. Engineering a solution for the shortages of food, but also other basic materials including fabrics and building materials, assumed outsized importance in economic discussions.[370] Not only were these items essential to rebuilding the

[370] On the economic challenges of demobilization, see Gerald Feldman, "Economic and Social Problems of the German Demobilization, 1918–19," *Journal of Modern History* 47, no. 1 (Mar., 1975): 1–47. On the naiveté of the Reichsernährungsamt in negotiating provisioning at the end of the war, see Wolfgang Eckart, "'Schweinemord' und 'Kohlrübenwinter'– Hungererfahrungen und Lebensmitteldiktatur, 1914–1918," *Medizin, Gesellschaft und Geschichte* 31 (2013): 273–293. On the way that food riots in Berlin in 1918 became politicized, see Belinda Davis, *Home Fires Burning: Food, Politics, and Everyday Life in World War I Berlin* (Chapel Hill: UNC Press, 2000); for Freiburg, see Roger Chickering, *The Great War and Urban Life in Germany: Freiburg, 1914–1918* (New York: Cambridge University Press, 2007); for the state of Westphalia, see Anne Roerkohl, *Hungerblockade und Heimatfront: Die kommunale Lebensmittelversorgung in Westfalen während des Ersten Weltkrieges* (Stuttgart: Franz Steiner, 1991).

country and fortifying its citizens, but food security was widely recognized as essential to morale. The waves of uprisings across Germany in 1918 and 1919 wound their way from port cities to munition factories, from the capital in Berlin to industrial centers of the Ruhr and the agrarian hinterlands. The successive revolts gave the impression of a revolution without end. The impulse to put down these insurrections and placate the population to some degree rested upon assuring material security and comfort for ordinary Germans. To this end, the provisional government began immediately advocating for food deliveries and reestablishing ties to the world market. Weighing concerns about repeating the same mistakes that had brought Germany to its knees against the urgency of aid, politicians saw their decisions endlessly scrutinized in the court of public opinion. The actions they took in the immediate aftermath of the signing of the Treaty of Versailles contributed to the fractious climate both in the government and on the streets.

This chapter examines German ideas and practices of settlement in the early years of the Weimar Republic. Settlement policies were both a direct response to concerns about the insufficiency of German space as stipulated in the peace, and the results of a decades-long development in thinking about land in terms of scientific agricultural and nutritional potential. The chapter argues that settlement policies, and specifically their foundation in the 1919 Settlement Law, promoted a vision of self-sufficiency that allowed flexibility at different scales, presenting a combination of high-modernist planning alongside elements of traditional rural life.

As both an immediate and long-term solution to the acrimonious political disputes and shortages, the Settlement Law of August 1919 aimed to initiate the process of the "re-

agrarization" of Germany.[371] The devastating shortages and effects of the war led to greater recognition of the importance of the primary sector. Projects of national regeneration rested upon the success of rebuilding agriculture to compensate for both lost territory and lost manpower. However, this end was not pursued through agricultural collectivization but rather through decentralization with emphases on independence (Selbständigkeit), self-sufficiency (Selbstgenügen), or self-help (Selbsthilfe). As Max Sering, a preeminent agricultural economist with conservative and nationalist political leanings and the architect of the law, explained, "The German Empire must once again become an agrarian state (Agrarland) in order to achieve a high degree of economic self-sufficiency.[372] One publication, intended as a guide for those interested in availing themselves of opportunities that the new legislation presented, echoed Sering's sentiments, writing,

> Aside from our manpower, the German ground and soil is nearly the only thing that remains for us. For the common good, it is essential that we exploit these to their fullest potential and protect them from party political agitation and misuse. Only from the land can we reconstruct our political and economic life. In it lie the deepest roots of our strength.[373]

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[371] Georg Stieger, *Der Mensch in der Landwirtschaft: Grundlagen der Landarbeitslehre* (Berlin: Paul Parey, 1922), 2.

[372] Sering, *Die Verordnung der Reichsregierung vom 29. Januar 1919 zur Beschaffung von landwirtschaftlichem Siedlungsland* (Munich and Leipzig: Duncker & Humblot, 1919), 184. Sering conducted his academic investigations with a mind towards political activity. During WWI, he served as the chairman of the academic committee of the Prussian Ministry of War and drafted settlement plans for conquered lands in the East. For an illuminating view of the continuities--and differences--between Sering's settlement plans and Nazi colonization attempts in the East, see Irene Stoehr, "Von Max Sering zu Konrad Meyer—ein 'machtergreifender' Generationswechsel in der Agrar- und Siedlungswissenschaft," in *Autarkie und Ostexpansion. Pflanzenzucht und Agrarforschung in Nationalsozialismus,* ed. Susanne Heim (Göttingen: Vandenhoeck & Ruprecht, 2002): 58-90.

[373] BArch R 8034 II 364: Dr. Burchhard, *Führer durch die neue Siedlungsgesetzgebung* (Halle: Otto Thiele, 1920).

In the early Weimar years, politicians and economists presented a conception of a self-sufficient nation as a decentralized one, consisting of millions of individuals with food independence and access to land. Despite many concessions to conservative leanings, for the most part these projects and their supporters did not hold up the ideal of a peasant farmer. Practical agricultural guides tended to heap large praise on small- and middle-sized farmers for their supposed diligence. As a result of their resilience as independent producers and their intensive use of the land, the family farmer was cast as the standard bearer of the Weimar Republic by the coalition of Social Democrats and Liberals who engineered settlement policy. As Sering reflected, "The small farm is in a position to provide the national economy (Volkswirtschaft) with the highest possible quantity of food and raw materials, as long as it finds the necessary support through cooperative and other public enterprises."[374] He and his colleagues (among them noted agronomist and advocate of the small farm, Friedrich Aereboe) envisioned individuals engaged in a hybrid of old and new; farming for their families using scientific farming, new technologies, and methods appropriate to their size to improve their yields.[375]

The renewed drive to return Germans to an agrarian way of life echoed the slogans of the popular "back to the land" movements of the nineteenth century.[376] However, in Weimar

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[374] Sering, *Verordnung,* 206.

[375] The subject of these interlocking scales of economy in food provisioning is treated in depth in the next chapter, Ch. 5.

[376] For more on nineteenth-century settlement movements, see Anne Feuchter-Schawalk, "Siedlungs- und Landkommunebewegung," in *Handbuch der deutschen Reformbewegungen, 1880–1933,* eds. Diethard Kerbs and Jürgen Reulecke (Wuppertal: Hammer, 1998): 227–244

these calls became more pointed: experts presented settlement as a scientifically-validated practice, and as a panacea to the various economic and social ills facing the nation. In this period, settlement gained importance as an instrument of agricultural policy which preceded all other goals of social reform and national renewal.[377]

A Peace without Bread

Historians have long studied German objections to the terms of the Treaty of Versailles. The signing of the treaty had the effect of a second defeat due to the scale of reparations, loss of territory, and overall humiliation it imposed. The nation seethed with resentment towards the "coercive peace" (Gewaltfrieden). While the psychological wound gaped, economists delivered assessments of what the loss meant in concrete terms. Immediately, the calculus of defeat began, crowding newspaper headlines with grim prognostications of Germany's dashed hopes for economic recovery. The legacy of the enormous reparations, dubbed a "Carthaginian peace" by John Maynard Keynes, cast a pall over the nation.[378]

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and Klaus Bergmann, *Agrarromantik und Großstadtfeindschaft* (Meisenheim am Glan: Hain, 1970).

[377] As discussed further below, settlement and internal colonization schemes covered a varied and shifting terrain of social, economic, and demographic concerns at different points in time. For a comparative discussion of internal colonization schemes in interwar Europe see the contributions by Liesbeth van de Grift and Dietmar Müller in *Governing the Rural in Interwar Europe,* eds. Liesbeth van de Grift, Amalia Ribi Forclaz (London: Routledge, 2017). For an examination of the interwar settlement schemes in Britain and the migration towards social political justifications, see Johannes Paulmann, "Ein Experiment der Sozialökonomie": Agrarische Siedlungspolitik in England und Wales vom Ende des 19. Jahrhunderts bis zum Beginn des Zweiten Weltkrieges," *Geschichte und Gesellschaft* 21, no. 4 (1995): 506–532.

[378] Keynes, *The Economic Consequences of the Peace* (New York: Harcourt, Brace and Howe, 1920).

Keynes' post-Versailles pessimism found amplification in Germany. While in his diagnosis, food insecurity was one of the four factors contributing to Europe's precarious recovery, the situation in Germany presented an even more extreme case of these dependencies.[379] In the days following the conclusion of the peace, various estimates were made for how it would devastate Germany's economic life, both immediately and in the long term. Not only the legacy of the wartime blockade, but also the further economic subjugation contained in its terms left Germans unconsoled. The demands highlighted the advantage of thinking in tangible, especially edible, goods, as the purchasing power of the German mark was burdened and devalued.[380] The Prussian Statistical Office (Preussisches Statistisches Landesamt) contributed its own assessment of the damages in June 1919. In it, the office attempted to translate the loss of territory into a loss of food. According to these calculations, Prussia (Germany's largest province) had lost 1/5 of its entire production of bread cereals and 1/4 of its entire production of barley, potatoes, and sugar beets. Further, it had lost over 1/5 of its harvest of winter rapeseed, which would result in unthinkable hardship not only for the

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[379] Adam Tooze has convincingly argued that the post-war arrangement primed the way for America's rise; this was especially true in that European nations were overwhelmingly dependent on its food supply by the end of the war. Tooze, *The Deluge: The Great War, America and the Remaking of the Global Order, 1916–1931* (London: Allen Lane, 2014).

[380] The end of the wartime blockade ushered in a "currency blockade" (*Valutablockade*), which deprived the Reichsbank of control over the mark and required German payments to be made in foreign currency. Max Rubner railed against this measure, which he considered to be just as inhumane as the previous blockade measures. Rubner, "Die kommende Friedensernährung," *Zeitschrift für ärztliche Fortbildung* 17, no. 10 & 11 (1920): 5. For more on the postwar economic settlement, see Carl-Ludwig Holtfrerich, "Aus dem Alltag des Reichswirtschaftsministeriums während der Großen Inflation 1919–1923/24," in *Das Reichswirtschaftsministerium der Weimarer Republik und seine Vorläufer: Strukturen, Akteure, Handlungsfelder*, ed. Carl-Ludwig Holtfrerich (Oldenbourg: de Gruyter, 2016) especially 287–303 and Gerald Feldman, *The Great Disorder: Politics, Economics, and Society in the German Inflation, 1914–1924* (New York: Oxford University Press, 1993), 637.

production of oils, but for the manufacture of concentrated feed (Kraftfutter), which was indispensable to restoring the nation's diminished livestock holdings. These statistics pre-occupied the public and permitted them to quantify their fears.

Newspapers heightened the hysteria. In one article, "The Loss of Food through the Terms of the Peace," the Deutsche Tageszeitung, a conservative-leaning daily newspaper, published the Statistical Office's estimates. Enumerating the lost territories in East Prussia, West Prussia, Posen, Silesia and the Rhine Province, the paper reprinted the figures crop by crop.[381] Wheat, rye, barley, potatoes, legumes–all the staples–appeared in both Doppelzentner and percentages, and made these losses intelligible for citizens who previously had little interest in agricultural yields.[382] The article continued, drawing together these projected crop losses with mounting population pressure:

> The Entente mocks us by saying that these losses of foodstuffs are offset by the fact that we have six million inhabitants fewer to feed with reference to the residents of these separated territories. But this logic is totally flawed, since these territories are agricultural surplus areas, from which the population of many other receiving areas must be fed. Additionally, we expect that a large number of the residents of these lost territories will return to their Heimat, and out of love for the German Fatherland, will try to eke out a new existence on what German land that remains so that they might not fall under the yoke of oppressive foreign governments. These figures presented above are very helpful, they show us emphatically that the loss of these territories, aside from their political significance, will considerably worsen our economic lives.[383]

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[381] BArch R 86 5418: "Die Verluste an Nahrungsmitteln durch die Friedensbedingungen," *Deutsche Tageszeitung* 297 (Jun 21, 1919).

[382] *Doppelzentner* is a unit of weight equivalent to about 100 kg.

[383] B Arch 86 5418: "Die Verluste an Nahrungsmitteln durch die Friedensbedingungen," *Deutsche Tageszeitung* 297 (Jun 21, 1919).

The calculus presented here was emblematic of a shift in spatial thinking occasioned by the terms of the peace treaty. Instead of thinking of territory solely in terms of areal loss, Germans came to imagine land in terms of quantities of food that might have stilled the hunger of the still-suffering population. Elsewhere, the Reform Union of Farms (Reformbund für Gutshöfe), a band of large landholders in western and southern Germany, undertook similar publicistic activity to impress upon the nation the importance of farms. In 1919, they published "Scenes of Our Nutritional Statistics," a series of infographics demonstrated the distorted relationship between food, population, and land under after the peace settlement. The emerging picture was grim (See Figures 7, 8, 9). The infographics were made available as projection slides for the purpose of education and presentation.[384] Publications like that of the Reform Union and the Tageszeitung reinforced and promoted this version of a twentieth-century Malthusian trap, popularizing "academically" generated knowledge within economics and fusing it with the legacy of hunger that Germans had faced during the war.

[384] Reformbund der Gutshöfe, *Schaubilder aus der Ernährungsstatistik* (Bad-Naueheim, Reformbund der Gutshöfe, 1921).

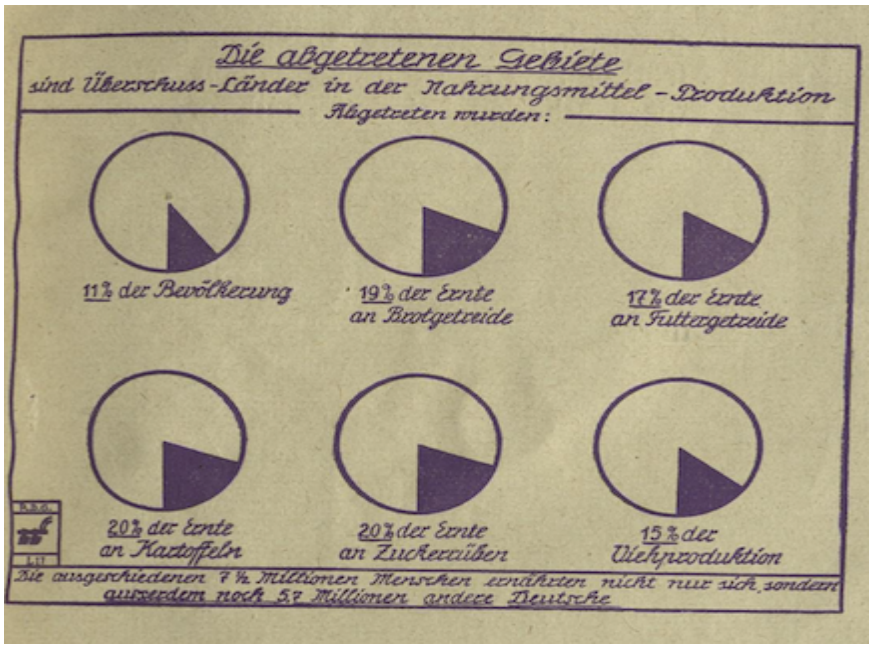

Figure 7 "The ceded territories are surplus lands of food production," Reformbund der Gutshöfe, 1919.

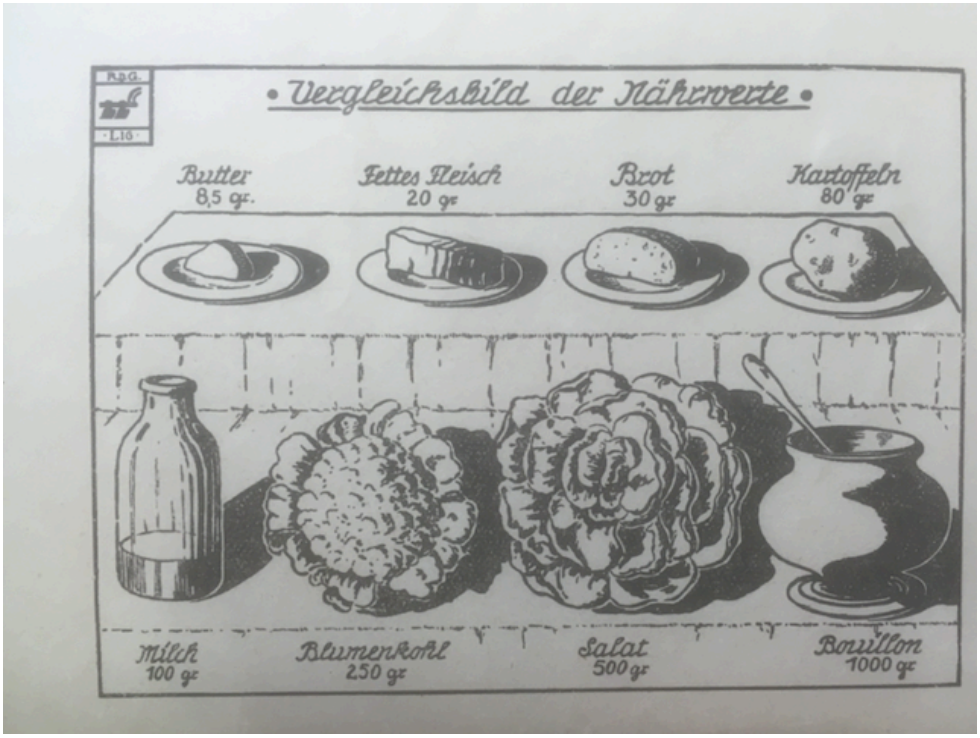

Figure 8 "Comparative picture of nutritional values," Reformbund der Gutshöfe, 1919.

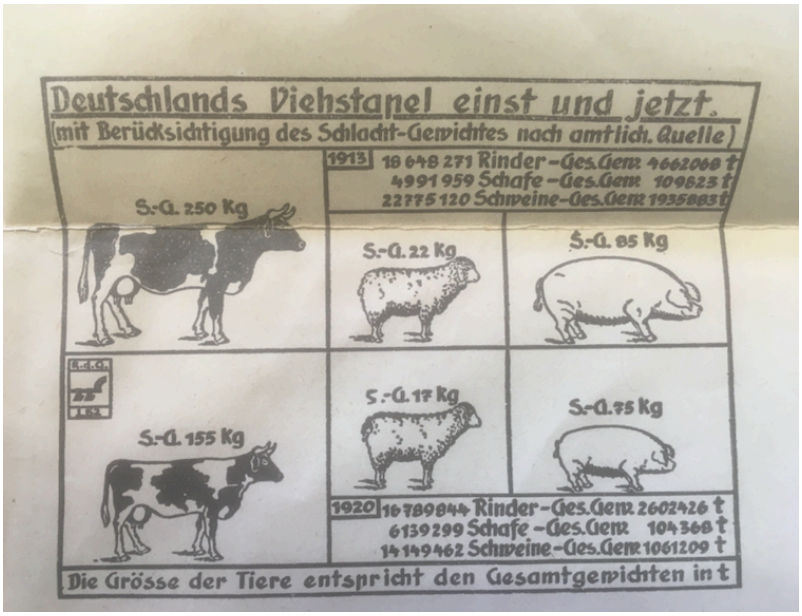

Figure 9 "Germany's livestock population, then and now," Reformbund der Gutshöfe, 1919.

The interchangeability of land and food on display in the example from the Tageszeitung above was more than just an immediate reaction to the imposition of a punitive peace that left a defeated Germany consigned to a backseat in the new world order. It also reveals an epistemic shift that had been underway for several decades in the way Germans regarded space and land. Lost land was of course not just empty space, it was also German cultural space with deep links to the nation evident in language, folk tradition, style of home, and mores. Nineteenth- and early twentieth-century anthropologists and historians staked their claims about German nationhood and belonging of various peoples and territories by drawing together all of these meanings. Studies of cultural life, such as those pioneered by Wilhelm Heinrich Riehl, forged links to the deep past and enjoyed immense popularity in nationalist

circles.[385] And yet while these "cultural sciences" inscribed certain spaces with Germanness, their logic appeared compelling only to a limited subsection of the population before 1919.[386] The intellectual work of reattaching Germany's lost territories to the imagined, "natural" nation took off during this decade, particularly through the disciplinary formation of Ostforschung, or "Eastern research," which provided legitimizing narratives for German claims to former territories and areas beyond. Essentially, these scholars devoted themselves to claiming much of Central Europe as German space.[387] But again, the mobilization of

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[385] Wilhelm Heinrich Riehl was a popular author whose writings discussed the organic nature of the German people and society (Volk) which could only be understood as fully integrated with its history, ecology, and landscape. Riehl, *Land und Leute* (Stuttgart and Tübingen: J.G. Cotta Verlag, 1854). Riehl's work was enormously influential on the development of *Volkskunde*, a blend of cultural and social scientific studies popular in German-speaking lands. For the influence of Riehl and later *völkisch* thinkers on later historical practice, see: Willi Oberkrome, *Volksgeschichte: Methodische Innovationen und völkische Ideologisierung in der deutschen Geschichtswissenschaft, 1918–1945* (Göttingen: Vandenhoeck & Ruprecht, 1993); and for the influence of German völkisch though on French historical sciences (and specifically the Annales School), see Peter Schöttler, *Die "Annales"-Historiker und die deutsche Geschichtswissenschaft* (Tübingen: Mohr-Siebeck, 2015).

[386] Woodruff Smith describes how the practice of "cultural sciences" (generally anthropological in orientation, though broadly defined by Smith) in Germany became incorporated into the initially "purely scientific" concept of *Lebensraum* during the 1920s. Smith, *Politics and the Science of Culture in Germany, 1840–1920* (New York: Oxford University Press, 1991), 219. However, the notion that the concept was "purely scientific" seems spurious, especially given the cross-fertilization of students of natural sciences and political and economic sciences (*Staatswissenschaften*) in the decades around the turn of the century. For a more nuanced view of the relationship between modern society and the construction of a modern vision of nature, see Lynn Nyhart, *Modern Nature: The Rise of the Biological Perspective in Germany* (Chicago: University of Chicago Press, 2009).

[387] As early as the December 3, 1919 meeting of the Rat der Volksbeauftragte, the theme of using scientists to promote ideas of difference between Poland and German ways of life was discussed. See BArch R 43-I 1324: "Kabinettssitzung vom 3. Dezember 1918," 159–167. Michael Burleigh's work remains a touchstone account of *Ostforschung* and its connections to the politics of the Weimar Republic and later the Third Reich. Burleigh, *Germany Turns Eastward: A Study of Ostforschung in the Third Reich* (Cambridge: Cambridge University Press, 1988).

cultural, historical, and ethnological studies which cast these lands as German spaces formed just one piece of the shift in spatial thinking after 1919.

The experience of hunger transcended the political spectrum; it was immediate and existential. Appeals to a starving nation helped to pose the complicated questions of international sovereignty and treaty-making in the simplest terms. Moreover, the success of developments in agricultural and nutritional sciences permitted the translation of lost territory into such existential terms. Germany's detached territories became inscribed with potential by agricultural and nutritional calculations relaying estimates of what these areas could provide to individual, but also national bodies. How many tons of wheat had been lost? How many calories of sustenance squandered? These predictive capabilities rendered the land thick with meaning that could be squared with personal experience. The promise of sustenance made explicit by the tabulations effectively mobilized Germans across political constituencies, fomenting resentment towards the victors and concerns about the future.

Three versions of territorial thought

The outcome of Versailles made this future more uncertain, as it failed to establish a clear path forward to rebuild the German economy. The treaty entangled Germany in a web of reparations, loans, and networks of foreign oversight and dependency. In response to these terms, Germans developed a particular attraction to the rhetorical power of appeals to the land. Discontent with the terms roiled through the country. Some citizens rallied around revanchist claims to severed territories to the East.[388] Others increasingly agitated for the return

[388] Robert Nelson, "The Archive for Inner Colonization, The German East, and World War I," in *Germans, Poland, and Colonial Expansion to the East*, ed. Robert Nelson (New York: Springer, 2009), 65–93.

of Germany's overseas colonies, while a third group embraced a grossdeutsch union with Austria to restore the cultural and economic unity of German-speaking Central Europe. These positions tended to attract adherents to the right of the political spectrum, though they were somewhat successful at mobilizing a broader coalition of supporters.[389] However, Germans of all political orientations could agree that German land under its current use was both insufficient and inefficient.

The three varieties of territorial thought mentioned above correspond to traditional notions of colonialism: they are expansive and acquisitive, demanding more area for a great number of people. In the Weimar Republic, German politicians approached the issue of land reform from another angle, which falls under the broad heading of settlement, or Siedlung. The concept of Siedlung was polysemous; it was used to describe a variety of phenomena ranging from the establishment of allotment gardens, to suburban garden cities, to constructing agricultural settlements on newly redeemed land. It was closely linked with internal colonization (innere Kolonisation), which referred to a long history of attempts to bring more agricultural land under cultivation. In opposition to the calls for extension of Germany's borders, settlement offered an alternative that is better thought of as "intensive" colonialism by making existing land more productive. The decision to pursue policies

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[389] Erin Hochman's work on the resurgence of *grossdeutsch* thought in the Weimar Republic and First Austrian Republic also highlights these territorial ambitions, woven together through feelings of the punitive peace and contiguous land and cultural traditions between the two states. She convincingly argues that the union of Germany and Austria was not just the product of the Nazi and conservative right, but represented the goal for a different strain of nationalism, one she dubs "republican nationalism," which was less bellicose but still desired this unification. Hochman, *Imagining a Greater Germany: Republican Nationalism and the Idea of Anschluss* (Ithaca: Cornell University Press, 2016).

supporting this vision came about through sober appraisals of Germany's situation after 1919: the improbability of restoring lost territory, the urgent need to ameliorate a food and housing shortage, and the shift in the notion of territory outlined above, in which territory was space thick not only with cultural attachments but also agricultural and nutritive potential. In order to address the dire need for greater foodstuffs without reentering a web of foreign dependencies, Weimar politicians and political economists were quick to advance a comprehensive program of Siedlung to promote self-sufficiency, expand arable land, encourage intensive agriculture, and dilute urban concentrations.

The concept of Siedlung had a much longer history reaching back to the foundational stories about the German Empire. Proponents placed their projects in a line of illustrious historical precedents dating back to the middle ages.[390] The successful internal colonization efforts by Frederick the Great formed an important reference point in the Second Reich.[391] German settlement was distinguished from its European neighbors, especially those to the East or those with trade outposts overseas, by their energetic efforts to improve the land. As Gustav Schmoller wrote, "Colonization, whether in the most general or narrow sense, is a constant step forward, a process of transformation, it is a deed (That)– perhaps the greatest,

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[390] From the middle of the nineteenth century, the colonization efforts of Germanic people in the Middle Ages as well as in the early modern period became a recurring theme in popular literature and history, thematized in the work of Gustav Freytag and Heinrich von Treitschke, among others. For a discussion of the reception of German, and particularly Prussian, colonization efforts in the Middle Ages in the nineteenth century, see Philipp Ther, "Deutsche Geschichte als imperiale Geschichte," in *Das Kaiserreich Transnational,* eds. Sebastian Conrad and Jürgen Osterhammel (Göttingen: Vandenhoeck & Ruprecht, 2004), 129-148.

[391] Gustav Schmoller, "Die preussische Kolonisation des 17. und 18. Jahrhunderts," *Schriften des Vereins für Sozialpolitik* 32 (1886) 1–43. See also David Blackbourn, *The Conquest of Nature: Water, Landscape, and the Making of Modern Germany* (New York and London: W.W. Norton, 2006).

that a people can fulfill. Only the strongest and most virtuous peoples have colonized and only in the periods of their most illustrious flowering, of their upwards trajectory of development, have they colonized."[392] Pushing even further into the past, the period of German cultural bloom and economic prosperity following the depopulation and devastation of Brandenburg during the Thirty Years' War (1618–1648) was also an oft-cited example of successful Germanic colonization. In the aftermath of World War I, the hope was to emulate this success. In doing so, proponents in universities and government situated settlement in a long tradition of German, and especially Prussian, projects seminal to national identity. Most compelling, German officials mobilized a familiar script, one that had reaped illustrious successes in the wake of a devastating war over four centuries earlier in order to nourish the longing for a narrative of twentieth-century German redemption. Despite many of the novelties of Weimar settlement schemes, they sat comfortably within a familiar historical framework.

Of course, the more immediate precedents for the Weimar plans for Siedlung were not the works of Frederick the Great, but projects pursued in the newly unified Germany of the 1870s. In a first wave of projects after 1871, the matter of unified Germany's borders appeared to be settled. Bismarck's subsequent disavowal of further conquest foreclosed the acquisition of more territory and introduced a limiting factor to nation-building.[393] German

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[392] Schmoller, "Die preussische Kolonisation," 2.

[393] Bismarck alternately referred to the German empire as territorially "gesättigt" or "saturiert," as in an address on January 11, 1887 before the Reichstag: "wir gehören zu den- was der alte Fürst Metternicht nannte: saturirten Staaten, wir haben keine Bedürfnisse, die wir durch das Schwert erkämpfen können." *Stenographische Berichte*, Band. 93, 336. See also Klaus Hildebrand, "Im Zeichen der 'Saturiertheit.' Die gezügelte Macht," in *Deutsche Außenpolitik 1871–1918* (*Enzyklopädie deutscher Geschichte,* vol. 2) Munich: R. Oldenbourg Verlag, 2008), 3–21.

policies turned inward, fortifying their position in international politics by sweeping away internal dissent and creating a dynamic economy.

Furthermore, during this period a lively and decades-long debate over the ability of soil to replenish itself took place in academic circles, worrying those who saw population growth in urban areas.[394] As agricultural science crept back into the university beginning in 1862 from its place in agricultural academies, the soil debate found a much wider audience.[395] If land was becoming slowly exhausted and no amount of artificial fertilizer could restore its fertility, as some held, the cultivation of new, virgin lands seemed more urgent.[396] These anxieties were compounded by the speculative frenzy of the early 1870s, which confronted consumers with inflated prices which exceeded growth in personal income. Increasingly, a nation with a strong agricultural backbone came to be prized among factions of economists, scientists, and politicians who viewed the food supply as precarious.[397]

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[394] Corinna Treitel, *Eating Nature,* 151–161; Uekötter, *Die Wahrheit ist auf dem Feld,* 153; Franz Oppenheimer, "Das sogenannte Gesetz vom abnehmenden Bodenertrag," in *Jahrbuch der Bodenreform* (1907) 184ff.

[395] In the first decades of the nineteenth century, Albrecht Daniel Thaer established agricultural education on a scientific basis after admiring the progress made in the previous decades in England. He established an experimental farm at Möglin at Prussia to train future farmers. Thaer's institute was the first in a series of agricultural training schools that existed outside of the university landscape. For an account of the tension between science and practice in agricultural science, see Jonathan Harwood, *Technology's Dilemma: Agricultural Colleges between Science and Practice in Germany, 1860-1934* (New York: Peter Lang, 2005).

[396] The development of the Haber Bosch process in the 1910s contributed greatly to this debate. See Margit Szöllösi-Janze, *Fritz Haber 1868–1934: Eine Biographie* (Munich: C.H. Beck, 1998).

[397] On the intellectual history of statistics and German economics, see David Lindenfeld, *The Practical Imagination*: *The German Sciences of State in the Nineteenth Century* (Chicago: University of Chicago Press, 1997) 195; more generally on the relationship between statistics and objectivity in Europe, Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in*

Although anxieties proliferated during this period of economic depression, these difficulties did not yet speak for internal colonization. This agenda was moved along by demographic concerns that became increasingly acute in the 1880s in Prussia's East. The desire to "Germanize" parts of the Prussian east culminated in the law adopted by the Prussian parliament in April 1886 to "strengthen the German element in the provinces of West Prussia and Posen against Polonizing attempts by settling German peasants and workers."[398] These racialized population concerns dovetailed with increasingly vocal interest group politics among agrarians.[399] None other than Max Weber reflected this confluence of interests in his study of agricultural workers east of the Elbe. Weber attacked Polish workers on the basis of their "differently constructed stomachs" and their agricultural practices, which threatened to depress the standard of civilization in Germany over time.[400] Weber saw these migrants as an existential threat because of their more optimal physiology, allowing them to thrive without adopting the improved methods of intensive, scientific agriculture. Put otherwise, the Poles' "lower" needs made them hardier and able to supplant Germans on their own land, out-eating and out-surviving German stock in a competition for land and resources.

Science and Public Life (Princeton: Princeton University Press, 1996).

[398] "Gesetz betreffend die Beförderung deutscher Ansiedlungen in den Provinzen Westpreußen und Posen vom 26. April 1886," *Archiv für Innere Kolonisation,* 1, no. 4 (1909): 300–302.

[399] Dörte Lerp has highlighted the racialized foundations of German settler colonial practices that grew out of experiences in both Prussia's eastern provinces and German Southwest Africa. Lerp, "Farmers to the Frontier: Settler Colonialism in the Eastern Prussian Provinces and German Southwest Africa," *The Journal of Imperial and Commonwealth History,* 41, no. 4 (2013): 567–584.

[400] "Die ländliche Arbeitsverfassung (1893)," in *Max-Weber-Gesamtausgabe*, eds. Wolfgang Mommsen and Gangolf Hübinger, I/4 (Tübingen: Siebeck, 1984), 444-469.

In a second wave of enthusiasm for settlement, from roughly 1890 onwards, the fears of scarcity occasioned by trade dependencies became more acute as a result of changing trade policies.[401] Debates over whether Germany's future lay with an agrarian or an industrial future attracted intense public interest, and a change of course in the early 1890s saw the adoption of a more liberal trade policy under Chancellor Caprivi. In a nod to the perceived inevitability of an industrial economy, the new trade agreements removed some of the protections in place for the agricultural sector.[402] Proponents of the agrarian-based state rejected the premise of a division of labor between raw materials-producing countries and those that produced industrial and finished goods. The global economic division of labor allowed the delivery of New World staples to Europe at a much lower price than domestic counterparts could offer, but it came at the price of economic dependence. These cheap imports tended to be tinged by the regret of politicians and economists who saw long-distance trade as a disruption of the natural economic order. Concurrently, population fears prompted the introduction of the Rentengut, an installment-based plan for the sale of land to small-holders, to facilitate property acquisition East of the Elbe.[403]

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[401] See the debates between proponents of an agrarian-based state and those favoring an industrially-oriented economy in Kenneth Barkin, *The Controversy over German Industrialization, 1890–1902* (Chicago: University of Chicago Press, 1970).

[402] For a history of the protective tariffs in Germany and their effects across the agricultural sector, see Rita Aldenhoff-Hübinger, *Agrarpolitik und Protektionismus: Deutschland und Frankreich im Vergleich, 1879–1914* (Göttingen: Vandenhoeck & Ruprecht, 2002).

[403] B Arch R 86 4552: W. Abelsdorf, "Siedlungswesen (Innere Kolonisation)," *Handwörterbuch der sozialen Hygiene,* eds., Alfred Grotjahn and Wolfram Keup, (1912): 401–410. Though Prussia passed a Rentengut law in 1890, it remained effectively unused until another was passed in 1891 under Johannes von Miquel's tenure as Minister of Finance. See Arthur Aal, *Das preußische Rentengut: Seine Vorgeschichte und seine Gestaltung in Gesetzgebung und Praxis* (Stuttgart: Cotta, 1901).

The confluence of old lands and new political interests at the end of the nineteenth century produced a particular expression of German ideas of improvement. To resist the downward pressure on prices of cheap New World products, German agricultural interests crystallized around the German Agrarian League (Bund deutscher Landwirte), which gave agrarian interests a political platform.[404] Meanwhile, in state governments, regional chambers of agriculture (Landwirtschaftskammern) were established in the 1890s to further the transmission of modern, intensive farming techniques.[405] Fears of becoming like England, a commercial island unable to meet its own food needs without its empire, stalked Germany, whose colonial holdings were comparatively small. Preoccupation with perceived scarcity was further enforced by statistical surveys, which stoked fears about population growth, migration, and agricultural productivity.[406] Meanwhile, immiseration in cities and flight from rural areas posed an additional problem for politicians and social reformers. The project of settlement, or internal colonization, promised to increase arable land and directly contribute to sustaining robust population growth. In this way, the recasting of German territory as a

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[404] Hans-Jürgen Puhle's work on the role of the BdL as a key agent of interest politics in the Kaiserreich remains a cornerstone for understanding German conservatism. The classic being: Puhle, *Agrarische Interessenpolitik und preussischer Konservatismus im wilhelminischen Reich (1893–1914): Ein Beitrag zur Analyse des Nationalismus in Deutschland am Beispiel des Bundes der Landwirte und der Deutsch-Konservativen Partei* (Hannover: Verlag für Literatur und Zeitgeschehen, 1966), as well as Puhle, *Politische Agrarbewegungen in kapitalistischen Industriegesellschaften* (Göttingen: Vandenhoeck & Ruprecht, 1975).

[405] The Prussian provinces opened a Landwirtschaftskammer in 1894; between 1900 and 1911 they grew up in 11 other states. For a study of regional plant breeding efforts, see Jonathan Harwood, *Europe's Green Revolution and Others Since: The Rise and Fall of Peasant-Friendly Plant Breeding* (London: Routledge, 2012).

[406] Like those of the Association for Social Policy (*Verein für Sozialpolitik*) examining the phenomenon of flight from the land. Cf. Chapter 1.

natural resource was not just a response to material need, but also came about through mobilizing political constituencies and popular support around its cultivation.

Wartime provisioning had strained the relationship between city and countryside. While tensions predated the war, the failure of harvests and deliveries led urban dwellers to look upon their rural counterparts with increasing suspicion. Rumors circulated that German farmers were gorging themselves and their families while urban residents starved. The accusations ranged from the charge of withholding products from the state-controlled economy in favor of black-market sales, to manipulating local markets by creating artificial shortages, and even to simply permitting food to rot in order to obtain higher prices. The infamous "hamstering" runs, a reference to the habit of city people of venturing out into the countryside to obtain often by theft, foodstuffs, was just one manifestation of this imbalance and of widespread mistrust (see Figure 10).[407] The urban-rural divide remained a major cultural, and in turn political fault line throughout the Weimar years.

[407] "Hamstering" became increasingly common after the hard year of 1917, when urban residents would use Sundays to go to rural areas and obtain products directly from farmers. In the surroundings of big cities, potatoes were stolen from the fields and reports circulated of cow theft from pastures. Max Rubner, "Das Ernährungswesen im allgemeinen," in *Deutschlands Gesundheitsverhältnisse unter dem Einfluss des Weltkrieges,* Franz Bumm, ed. (Stuttgart, Berlin and Leipzig: Deutsche Verlags-Anstalt, 1928)2:3–41, see especially 10.

Figure 10 Cartoon from Simplicissimus Magazine. An elderly woman is depicted scrawling a denunciation letter. The caption reads, "In these times of hamstering, anonymous denunciations are not merely a pleasure, but a patriotic duty." Simplicissimus 21, no. 16 (July 18, 1916): 194.

In this sense, the reconstruction of the agricultural sector was not just a problem of making land available and fertile, but also of rebalancing prevailing population dynamics. It was widely accepted in agrarian and economic circles that the best path to restoring German power was through a thorough re-agrarization of the nation. In addition to the primary reason of securing greater harvests, the related issue of population balance was often cited. Settlement projects fulfilled a distributional goal in two key ways: they settled thinly populated areas to create a buffer of strong German populations and suppress foreign elements, but they also functionally restored balance between urban consumers and rural producers.

Food provisioning of course extended beyond providing for the existing population and required considering patterns of demographic growth and change. In a February 1918

presentation to the German Association for Welfare and Heimat Protection (Deutscher Verein für Wohlfahrt- und Heimatpflege), leading agricultural economist Friedrich Aereboe addressed the necessary conditions for a robust agricultural sector after the war. The question of agricultural work, he suggested, could be considered from an economist's perspective as first a question of population, second a national question, and third and finally a matter of food security. Yet no matter which of these dimensions received priority, the "correction of the completely pathological relationship between countryside and city" was necessary.[408] According to Aereboe's estimates, Germany could easily nourish 100 million inhabitants if 40 million lived in the countryside; it could only nourish 70 million without the help of imports, when only 17 million live in the countryside. The assumption of course, was that the population in the countryside was engaged in some form of work in the primary sector, whether just producing for subsistence or for the market. Seen this way, achieving a balance between city and countryside was crucial to the survival of the nation and a sustainable path to food independence.[409]

Aereboe was hardly alone in this view. The preoccupation with attracting large number of small settlers in the first order, and agricultural workers in the second, to rural areas occupied leading academics and policymakers. In addition to the loss of territory, the draining of the agricultural labor force posed a serious problem to German agriculture.

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[408] "Welche dieser drei Probleme wir aber auch anschneiden mögen, obenan steht immer die Forderung einer Korrektur des völlig krankhaft gewordenden Verhältnisses zwischen Landbevölkerung und Stadtbevölkerung." Friedrich Aereboe, *Die ländliche Arbeiterfrage nach dem Kriege. Vortrag gehalten in der Hauptversammlung des Deutschen Vereins für ländliche Wohlfahrts- und Heimatpflege am 18. Februar 1918* (Berlin: Paul Parey, 1918), 4.

[409] Aereboe, *Die ländliche Arbeiterfrage*, 4-5.

Weimar settlement projects strove to attract a large agricultural work force and bind them to the land, reversing decades of dependence on foreign migrant workers.[410] It was estimated that 1.2 million foreign workers were in Germany at the beginning of the war, of which over 500,000 Polish migrant workers, performing primarily agricultural work.[411] In August 1914, between 200,000 and 300,000 Russian-Polish agricultural workers were refused permission to return home. As the war continued into October, this decree was extended to include all Polish workers within Germany.[412] In spite of these measures, the home front experienced a major labor shortfall as conscripts departed for the front. To compensate for the deficit, prisoners of war were engaged as forced laborers. During the lead up to drafting a Settlement Law for the new republic, many approaches to the issue were discussed. The solution to the

[410] Aereboe identified the Caprivi era as delivering a blow to German agriculture by favoring the introduction of Polish and Ruthenian seasonal workers instead of setting prices for agricultural goods high enough to maintain German workers. Aereboe, *Die ländliche Arbeiterfrage*, 6.

[411] *Statistisches Jahrbuch für das Deutsch Reich*, 30 (1915), 416. See also Ulrich Herbert, "Zwangsarbeit als Lernprozess. Zur Beschäftigung ausländischer Arbeiter in der westdeutschen Industrie im ersten Weltkrieg," *Archiv für Sozialgeschichte* 14 (1984):285–304; Lothar Elsner, *Ausländische Arbeiter unter dem deutschen Imperialismus: 1900–1985* (Berlin: Dietz, 1988).

[412] Debates over whether this October decree represented a change of course towards an authoritarian policy towards agricultural workers or the continuation of a trend beginning with the introduction of the Karenzzeit in the 1890s can be found in the historiography dating from the 1980s. See Ulrich Herbert, "Zwangsarbeit als Lernprozess," 287–294; Friedrich Zunkel, "Die ausländischen Arbeiter in der deutschen Kriegswirtschaft des Ersten Weltkrieges," in *Entstehung und Wandel der modernen Gesellschaft: Festschrift für Hans Rosenberg zum 65. Geburtstag*, ed. Gerhard Ritter (Berlin: de Gruyter, 1970): 280-311*;* Lothar Elsner, "Liberale Arbeiterpolitik oder Modifizierung der Zwangsarbeiterpolitik? Zur Diskussion und den Erlassen über die Behandlung polnischer Landarbeiter in Deutschland 1916/17," *Jahrbuch für die Geschichte der sozialistischen Länder Europas* 22, no. 2 (1978): 85–100.

labor shortage turned on making agricultural work more attractive, or just as attractive as urban or industrial work in terms of wages and lifestyle.

These compounding difficulties gave German politicians, reformers, and scientists ample cause for alarm. The nation faced the triad of a weak agricultural sector, mounting population pressure, and reduced land. To beat back these ominous trends, renewed interest in settlement schemes surfaced. Recognizing the difficulties that settlement projects had encountered since 1886, a comprehensive program for reform was undertaken.

Three visions of Siedlung: Sering, Kapp, and Oppenheimer

The reform of settlement had its beginnings in a committee formed specially to address the topic of food insecurity under the provisional revolutionary government, the Council of the People's Deputies (Rat der Volksbeauftragten). Through the winter of 1918 and 1919, as waves of violent uprisings spread across the country, the committee met to discuss the prospects for rebuilding the economy through settlement. The group was comprised of members of various political orientations; a short prosopographical interlude studying three distinctive personalities on this committee helps to illuminate the wide range of schemes, hopes, and political ideas that settlement plans captured.

Perhaps the best known was Max Sering, an economist holding a chair at the University of Berlin and expert on settlement. Sering had made his reputation studying the problem of flight from the land in the 1890s, which he described as a "sickness of the social organism."[413] He traced the roots of the problem to the first decade of the century, after the

[413] In the original German: "Sie lässt auf ein tiefes Missbehagen ganzer Volksklassen, auf ein Kranksein des gesellschaftlichen Organismus schliessen." Sering, *Die Innere Kolonisation im östlichen Deutschland* (Leipzig: Duncker & Humblot, 1893), 7.

agrarian reform initiated under Stein and Hardenberg, which had effectively created a landless working class. Sering's view of the origins of the problem determined his approach—in his view, it could only be remedied by at least a partial return to this past condition of a work force tethered to the land.[414]

While Sering was the most prominent expert, other leading voices in agrarian economics and politics participated as well. Wolfgang Kapp, a staunch conservative known for his later involvement in a failed putsch against the Weimar government, was also present.[415] Kapp was also widely praised for his tenure as director of the East Prussian Agricultural Credit Bank (Ostpreussische Generallandschaftsdirektion). Under Kapp's direction, the bank had supported efforts to settle small farmers and instituted public life insurance policies. During the war, he had used his public prominence to become one of the most outspoken critics of Chancellor Bethmann Hollweg and a voice of German war aims, calling for annexations, unrestricted submarine warfare, punitive reparations made from the Entente Powers to Germany, and rejection of the terms of the peace.[416] The blend of conservative, nationalistic and völkisch elements that coursed through the German Fatherland Party (Deutsche Vaterlandspartei) to which he belonged marked his committee work.

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[414] Sering, *Die Innere Kolonisation im östlichen Deutschland*, 11.

[415] Kapp is most well-known not for his role in agricultural policy, but for his infamous part in instigating the Kapp Putsch with the support of Walter von Lüttwitz against the democratically elected Weimar government in March 1920.

[416] Wolfgang Kapp, *Die nationalen Kreise und der Reichskanzler* (Königsberg: Verlag des Heimatboten, 1916).

Across the table was Franz Oppenheimer, a sociologist and economist working as a lecturer (Dozent) at the University in Berlin.[417] Having first studied medicine in Freiburg, his work in a neck and throat clinic in the northern reaches of Berlin convinced him that ailments caused by insalubrious living conditions and backbreaking labor would be better approached not body by body, but through a transformation of the economic system. Slowly, he became less interested in the way diseases of poverty manifested themselves in the human body and more interested in how they proliferated inequitably in the social body. He went on to study political economy at Kiel, also attending the seminars of Adolf Wagner and Gustav Schmoller in Berlin. The issue of the social question motivated his studies; Oppenheimer abhorred the inequalities created by capitalism, but also rejected the extreme views among revolutionary socialists.

Oppenheimer defined his work as an attempt to find a viable escape "from the Scylla of capitalism and Charybdis of Bolshevism."[418] He described himself as a student, but not a disciple, of Marx and his political orientations were broadly of the left.[419] His teachings were heavily influenced by the writings of the American land reformer Henry George, whose work enjoyed great popularity during the nineteenth century. George advocated for the socialization

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[417] Oppenheimer's background and biography are distinctive, as he does not fit neatly in any traditional category of party politics. His interests in settlement extended well beyond Germany, as he was involved in early Zionist settlement schemes in Palestine. He also advised a Zionist project for a Jewish colony in German East Africa (present-day Kenya) based on Theodor Hertzka's "Freiland" principles. I thank Bernhard Gißibl for alerting me to this latter point. For a biography of Oppenheimer, see Claudia Wilms, *Franz Oppenheimer (1864–1943): Liberaler Sozialist, Zionist, Utopist* (Cologne: Böhlau, 2018).

[418] Oppenheimer, *Der Ausweg: Notfragen der Zeit* (Jena: Gustav Fischer, 1919) 3.

[419] Oppenheimer, *Der Ausweg,* 3.

of the land, arguing that the land itself and its products could not be the property of an individual. However, he stopped short of outright nationalization, arguing that the individual had the right to reap the profits from his work, but not the rents of the natural world.[420] Convinced that both capitalism and Bolshevism were fundamentally flawed in their view of modern social development, Oppenheimer returned to the classics of political economy, determined to uncover where economists had gone wrong and why they had been unable to find solutions for the greatest ills of the century.

Oppenheimer considered academic economists to be operating on the wrong terms by taking the system of capitalism for granted.[421] In his view, the basis of modern capitalism was a monopoly system which operated by locking away large swaths of the land (Bodensperre) in large estates.[422] The concept of the Bodensperre was at the heart of his work, as he argued that such an arrangement both diminished the utility value of the land and eliminated the option for upward mobility for those without land. Put differently, land was available, but not to the

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[420] Henry George, *Progress and Poverty: An Inquiry into the Cause of Industrial Depression and of Increase of Want with Increase of Wealth: The Remedy* (New York: Robert Schalkenbach Foundation, [1879] 1935). Oppenheimer tended to trace his intellectual lineage directly back to George and distanced himself from the efforts of pre-war German land reformers *(Bodenreformer)*, especially their leader Adolf Damaschke. Oppenheimer once complained that Damaschke had "denigrated the humanitarian idea introduced by Henry George into a bourgeois tax affair." Oppenheimer, cited in Repp, *Reformers, Critics and the Paths of German Modernity,* 82.

[421] In the last decades of the nineteenth century, the German academic establishment had turned away from the laissez-faire attitudes of Ricardo, Malthus and other members of the classical school. Drawing on the earlier work of Friedrich List, members of the so-called "Socialists of the Lectern" (*Kathedersozialisten*) and the Historical School redefined a field of action for the state. Throughout the decades preceding World War I, these two schools remained locked in debate.

[422] Oppenheimer, "Praktische Ökonomik und Volkswirtschaftspolitik," in *Annalen der Naturphilosophie* (1913): 322

average man.[423] Oppenheimer's ideal, which he elaborated further over the course of his career, was to liberate land from these monopolies to restore open land to the people without going so far as to nationalize it. Instead, it would be owned cooperatively, so that settlers had an incentive to work diligently and conserve resources.[424] The cooperative structure he proposed allowed participants to dispense with the worst parts of the capitalist system while retaining the incentive for individuals to work hard.

Far from being purely theoretical, Oppenheimer attempted to execute his visions of an economically equitable, productive society. His suggestions to the committee involved implemented his idea of an "Anteilswirtschaft" as a complement to older methods of internal colonization. Submitted as an addition to the law, in December 1918, Oppenheimer hoped to improve upon the weaknesses of older internal colonization practices.[425] These were often slow and costly, and tended to target farmers. Oppenheimer foresaw a transformation of the occupational structure (Arbeitsverfassung) that hinged upon not just providing the worker with higher wages, but a path for the "gradual ascent to self-sufficiency."[426] In broad strokes, the plan consisted of arranging contracts between the owners of large estates and their workers so that, in addition to a typical wage and lodging arrangement, workers would

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[423] "Der Kapitalismus ruht als auf seiner letzten Grundlage auf der *Bodensperre*. Und man kann ihm seine Grundlage entziehen, man kann ihnen aus der Welt schaffen, wenn man die Bodensperre beseitigt und das Freiland wiederherstellt." Oppenheimer, *Erlebtes, Erstrebtes, Erreichtes: Lebenserinnerungen* (Düsseldorf: Melzer Verlag, 1964), 144.

[424] "Siedlungsgenossenschaft," *Sozialistische Monatshefte* 10 (1906): 442.

[425] GStAPK VI HA Rep 92 Nachlass Kapp Nr 413: "Antrag Oppenheimer zum Entwurf eines Reichsgesetzes zur Beschaffung von landwirtschaftlichem SIedlungsland" and "Musterstatut einer Anteilswirtschaft,"

[426]GStAPK VI HA Rep 92 Nachlass Kapp Nr 413: Oppenheimer, "Die Agrar-Reform,"2.

receive a portion of the gross profit. The advantage of such an arrangement is that workers would be doubly interested in their own work. They were to receive sufficient living space, as well as a lease on land large enough to support a few pigs and possibly a cow, and also seeds and fertilizer at-cost.[427] Oppenheimer already had experience undertaking such attempts at agricultural settlement in Germany and abroad, which he attempted to leverage in the committee with little success.[428]

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[427]GStAPK VI HA Rep 92 Nachlass Kapp Nr 413: Oppenheimer, "Die Agrar-Reform,".4

[428] His first attempt at establishing a settlement that would live up to the liberating agenda took form in 1905. With a quarter million Marks, he purchased 25,000 morgen of land at Gut Wenigenlupnitz near Eisenach in Thuringia. He reported that, "the problem to which the settlement is the answer consists of determining whether agricultural workers in a profit-sharing scheme actually work better and steward more diligently, so that the net income is then significantly increased." The experiment did not last long: the political clout of the local agrarian party reportedly intimidated the settlement's leadership, and the soil there proved inhospitable to their cultivation efforts. Successive years of bad weather sealed the fate of the community in 1907, when the cooperative had exhausted its funds and a black frost devastated the soil. The failure at Gut Wenigenlupnitz was widely reported upon as a failure of Oppenheimer's utopian visions; he dismissed these derisive remarks, claiming it was not the idea that had failed, but its execution with misguided leadership on inhospitable land. A second attempt was made in 1911 in Palestine, where land near the Tabor mountains was acquired by Theodor Herzl and the Zionist Congress in Basel. The group embraced Oppenheimer's model and decided to "set out to conquer the Holy Land with the only weapon that a nation could win it with: with a plough." Oppenheimer, for his part, greeted the project with skepticism. The settlers proceeded without much knowledge of the land and with a population drawn almost exclusively from the cities, two conditions that augured poorly for its success. Merchawjah, as the settlement came to be called, was a large agricultural area founded on the cooperative model. Though the project had auspicious beginnings, the arrival of war in Palestine intruded upon day-to-day operations and the spread of Marxism inflamed settlers and turned them against the cooperative model. Yet it was neither of these circumstances that brought about its dissolution: instead, the progressive aging of the community and the decision to marry off and have children strained the resources of the fledgling settlement. For more detailed accounts of both projects, see article on Oppenheimer: "Eine landwirtschaftliche Siedlungsgenossenschaft," in *Soziale Praxis: Zentralblatt für Sozialpolitik* 15, no. 33 (1906): 867 and Oppenheimer, *Erinnerungen*, 165-180.

Established agrarian interests quickly deflated any hopes of a radical reorientation in the countryside. The coalition of forces tempered the sweeping changes Oppenheimer envisioned. Despite his attempts at using conciliatory language to soften the image of the plan, it was impossible to overlook the harm the proposed measures would inflict upon large estate owners. Instead, Kapp pursued more moderate aims which preserved profit for estate owners and property. Long convinced of the importance of rural settlement as a bulwark against Polish agitation and socialism in the east, he focused on rural improvement in his district and was a staunch supporter and member of the Association for Rural Welfare and Heimat Protection.[429] During the war and after, he provided a sympathetic ear to the Deutscher Kriegssiedlerbund, an organization founded to support the settlement of veterans and their widows on their own small plots of land through loans as well as educational and advocacy efforts. The organization offered Kapp an honorary chairmanship in March 1918.[430]

Sharing in these conservative ideals and similarly opposed to Oppenheimer's model of cooperative settlement was a radically different vision espoused by Sering. Sering had made his career studying agricultural settlement and work, completing a study trip to the Great Plains of North America in 1882 on behalf of the Prussian Landesökonomiekollegium.[431] The

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[429] For more on Kapp's pre-war engagement with Sohnrey's Deutscher Verein für ländliche Wohlfahrts- und Heimatpflege, see Georg Stöcker, *Agrarideologie und Sozialreform im Deutschen Kaiserreich: Heinrich Sohnrey und der Deutsche Verein für ländliche Wohlfahrts- und Heimatpflege, 1896–1914* (Göttingen: Vandenhoeck & Ruprecht, 2011), 126-127.

[430] Sering was an honorary chair. GStAPK VI HA Rep 92 Nachlass Kapp Nr 414: Letter from Admiral Thomsen to Kapp, (Mar. 25 1918).

[431] Details of the trip appear in Sering's habilitation publication, *Die landwirthschaftliche Konkurrenz Nordamerikas in Gegenwart und Zukunft: Landwirtschaft, Kolonisation und Verkehrswesen in den Vereinigten Staaten und in Britisch-Nordamerika* (Leipzig; Duncker & Humblot, 1887). For an account linking Sering's experiences in North America to his later thought about the so-called "Polonization" of the German East, paving the way for Nazi

government allocated land to settlers along the western frontier, bringing the land under cultivation, extending the reach of the government, and propagating the future of Canada not in its cities, but on the rural frontier. Much of his work in the decades between 1880 and 1914 focused on the establishment of settlements in Prussia's eastern provinces to forestall further spread of the Polish language and culture. These observations informed his program of internal colonization for Germany, which was intended to stem flight from the land and to promote Germanization and economic stability through rural renewal.

At the end of the war, Sering liked to remind his audiences that out of every five Germans, at least three lived in cities and one in a large city.[432] Twin concerns about population and food availability unleashed fears of carrying capacity, as the population had grown out of proportion with domestic agricultural production.[433] The Eastern provinces had been lost, forcing Sering to direct his attention to settlement within the borders of the new Reich. He reconstrued the shrunken borders as land rich in agricultural potential. Though the postwar plans in many ways resembled those he promoted before and during the war, the thrust of the rationale had shifted: instead of earlier rhetoric of damming the "Slavic flood" with nationality policies, Sering's rhetoric foregrounded the boon to food production that settlement could provide. He envisioned the creation of self-sufficient, single family farms to remedy this situation. These small farms provided food for their operators as well as a surplus

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extermination and settler colonialism in the East, see Robert Nelson, "From Manitoba to the Memel: Max Sering, Inner Colonization and the German East," *Social History* 35, no. 4 (Nov. 2010):439-457.

[432] See BArch N 1210-22: Sering, "Beschaffung von Siedlungsland," *Das Neue Reich,* 1, no. 12 (Jun. 8 1919), 3–5 and "Die Ziele des ländlichen Siedlungswerkes," (Jan. 21, 1919), 2.

[433] BArch N 1210-22: Sering, "Die Ziele des ländlichen Siedlungswerkes," (Jan. 21, 1919).

for surrounding areas, thus contributing to a degree of decentralization of commercial life. The small family farm operation proved preferable to larger ones in that it presented an organic community of interests, instead of an "artificial" wage or cooperative system, and it was more "elastic" in adapting to the local climatic and soil variations between different parcels, producing higher yields. Generous state investment in production supplemented by cooperative activities (such as for farm machinery) characterized Sering's vision for recovery. While no enemy of large estate holders, he saw the recovery in founding hundreds of thousands of small, market-oriented family farms to achieve the "necessary doubling of domestic sustenance (Nährwerte)."[434] By thinning out the ranks of cities and settling urban workers on the land, "the worker acquires a spring board from which he can launch himself free from all economic dependencies."[435]

Each man arrived at the consultations with Council of the People's Deputies in winter 1918 bringing his own experiences. Oppenheimer's recent trials with agricultural cooperatives, Kapp's experience financing economically independent, solvent farmers in East Prussia, and Sering's long career advising on settlement projects rubbed up against each other in committee. It is not difficult to imagine the rancorous climate with these three individuals present. Between Oppenheimer and Sering, personal bitterness existed alongside ideological opposition. Despite earlier indications that he was favoring Oppenheimer's appointment as specialist in agricultural issues, leading Social Democrat Philipp Scheidemann in fact named

[434] BArch N 1210-22: Sering, "Die Ziele des ländlichen Siedlungswerkes," (Jan. 21, 1919), 5-6.

[435] BArch N 1210-22: Sering, "Die Ziele des ländlichen Siedlungswerkes," (Jan. 21, 1919), 11.

Sering, who opposed Oppenheimer's settlement cooperatives, to the position.[436] Oppenheimer had hoped to use the opportunity to transform the large concentrations of land and capital found on the estates East of the Elbe into settlement cooperatives. He did not intend to fully dispossess them of their land. Instead, he called for landowners to receive some compensation. To be sure, this proposal represented an attenuated form of the demands of some of the revolutionary councils (Räte), and certainly represented an improvement upon the Bolshevism which both conservatives and liberals had feared, but it was still a radical solution. Eventually, something had to give, and it was Oppenheimer's insistence on legislation that worked to remove the Bodensperre, or monopoly on land, that was dismissed. Within a few sessions over November and December 1918, the Council of People's Deputies decided to pursue Sering's more moderate individual settlement schemes over Oppenheimer's cooperative ones, relegating Oppenheimer to pursue his unfulfilled plans in sub-committee work.[437] As agrarian historian Andreas Dornheim has written, by January 1919 the Settlement Act had become a "Lex Sering."[438]

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[436] Claudia Willms, *Franz Oppenheimer (1864–1943): Liberaler Sozialist, Zionist, Utopist* (Köln: Böhlau, 2018) 215.

[437] Andreas Dornheim, "Arbeiterproduktivgenossenschaft contra Siedlung: Auseinandersetzung zwischen Franz Oppenheimer und Max Sering, 1918/19," in *Agrargenossenschaften in Vergangenheit und Gegenwart,* ed. Ilona Buchsteiner and Siegfried Kuntsche (Rostock: Historisches Institut, 2004), 221. Willms' study draws on Oppenheimer's personal papers in the Central Zionist Archive (CZA) in Jerusalem. She suggests that his plans were also rejected in the subcommittee and was counseled to present his plans to the governments of individual states. Brief des Staatssekretärs des Reichsarbeitsamts an Franz Oppenheimer vom 22.01.1919 In: CZA, A 161, Folder 72, cited in Willms, *Oppenheimer,* 215.

[438] Dornheim, "Arbeiterproduktivgenossenschaft contra Siedlung," 222.

At their core, these intracommittee debates were more than petty academic fights pitched over long-held grudges. Instead, they represented an important facet of the struggle for the direction of the new republic that was underway. In the immediate aftermath of the war there were crises to be overcome, but there was also a ferment of ideas for political and social regeneration. It was not just in the form of the short-lived Soviet Republics in Bavaria and Bremen, but also in the introduction of women's suffrage and debates about equality and redistributive policies in the National Assembly.[439] Over the fall and winter of 1918–1919, revolutionary activity continued to roil the nation as the population took to the streets to protest shortages, denounce military leadership, and also to demand a more egalitarian and representative government. The departure of the Kaiser and the proclamation of the Republic initiated a springtime of hopes for emancipatory measures. Though many proved too ambitious to survive, there was, at least for a time, a pervasive sense of possibility for rethinking the status quo. With the Kaiser gone and the enormous power of military leadership curtailed, it was possible to think that the various currents of reform over previous decades might take shape within the new state. While many of the most ambitious programs

[439] For example, Finance Minister and Center Party politician Matthias Erzberger's *Reichsnotopfergesetz* of December 31, 1919, introduced a progressive tax to alleviate the financial crisis that the new government found itself facing at the conclusion of the war. This controversial law was reviled on the right and contributed to growing hatred for Erzberger, leading up to his assassination by the radical right-wing terror group Organisation Consult while on holiday in the Schwarzwald in August 1921. Heinrich August Winkler, *Weimar 1918-1933: Die Geschichte der ersten deutschen Demokratie* (Munich: C.H. Beck, 1993), 110. Similarly progressive (though doomed) was the planned expropriation of ruling families sponsored by Socialists and Communists, which was put off and ultimately voted down in a referendum in 1926. For details on the failure of the referendum, see Shelley Baranowski, *The Sanctity of Rural Life: Nobility, Protestantism, and Nazism in Weimar Prussia* (Oxford: Oxford University Press, 1995), 78–81.

were scaled back in the name of compromise, the early Weimar social democratic-liberal consensus did effectively construct one of the most successful social welfare states of its time.

These same vital concerns appeared in debates about settlement. The committee rejected Oppenheimer's vision of cooperative settlements in favor of a more conservative plan advocated by the government stalwart, Sering. The Oppenheimer–Sering conflict offers a microcosm through which we can view the process of transition from Imperial Germany to revolutionary council to Republican government. Through it, we see the initial promise of new ideas whose promise for radical changes was jettisoned from the main body of reform in favor of statist social democracy.[440] The new settlement law was a response to a constrained food supply by attempting to build a long-term and enduring solution to escape from a Malthusian bottleneck at a time of economic and political conjuncture. Its success was predicated upon the use of consensus politics around settlement to cut through a contentious issue.

If, on the one hand, the gestation of the settlement law is instructive for showing the early prevalence of consensus politics and restoration in Weimar, it is also necessary to ask

[440] Axel Schildt's contribution to the landmark edited volume *Die vergessene Revolution* traces the connections between the events and their subsequent narration in establishing a revolutionary trajectory through continuities and ruptures with the old elites of Imperial Germany. See Schildt, "Der lange November- zur Historisierung einer deutschen Revolution," in *Die vergessene Revolution von 1918/19,* ed. Alexander Gallus (Göttingen, Vandenhoeck & Ruprecht, 2010), 235. See also Ulrich Kluge, *Die deutsche Revolution 1918/1919: Staat, Politik und Gesellschaft zwischen Weltkrieg und Kapp-Putsch* (Frankfurt: Suhrkamp, 1985), Reinhard Rürup, *Probleme der Revolution in Deutschland 1918/19* (Wiesbaden: Springer, 1968); for a treatment of the peasant and agricultural worker councils, see Heinrich Muth, "Die Entstehung der Bauern- und Landarbeiterräte im November 1918 und die Politik des Bundes der Landwirte," *Vierteljahrshefte für Zeitgeschichte* 21, no. 1 (1973):1-38.

what was new about it.[441] As Peter Fritzsche and others have pointed out, one of the recent consequences of Weimar historiography has been to help us rethink what is modern or antimodern and to upset neat classifications, lending credence to the notion of Weimar as the laboratory of "classical modernity."[442] Instead of assessing Weimar solely in terms of Germany's failed experiment with social democracy, it is useful to consider the number of alternative paths that opened up. Alongside democracy, reformers tested out other fundamentally modern ideas like gender equality and affordable housing that became enshrined in the Weimar constitution.

While focusing on food provisioning, settlement projects also focused on two auxiliary, yet complementary aims. First, they attempted to transform Germany's demographics and correct the course of urbanization. As was the case with previous generations of settlement plans, Weimar projects had a redistributional task of moving individuals out of densely-packed cities and industrial areas and into sparsely populated rural ones. Redistribution would create a decentralized, more resilient economic structure, but more importantly, officials believed it would raise the birth rate, which had suffered in years

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[441] The Anglophone historiography treating interwar Europe as a period of "restoration" rests upon important contributions by Arno Mayer and Charles Maier, as well as scores of German historians who spoke of the 1918–19 revolution in terms of a "failed" or "aborted" revolution. Mayer, *Politics and Diplomacy of Peacemaking: Containment and Counterrevolution at Versailles*, 1918–1919 (New York: Knopf, 1967); Maier, *Recasting Bourgeois Europe: Stabilization in France, Germany, and Italy in the Decade after World War I* (Princeton: Princeton University Press, 1975); as well as Muth, "Die Entstehung der Bauern- und Landarbeiterräte,"; Winkler, "Die gebremste Revolution," in *Weimar*, 33-67.

[442] Fritzsche is in many ways picking up from where Detlev Peukert left off, expanding on the idea of "classical modernity." Fritzsche, "Did Weimar Fail?" *Journal of Modern History* 68, no. 3 (Sept, 1996): 629-656; Detlev Peukert, *The Weimar Republic: The Crisis of Classical Modernity*, trans. Richard Deveson (New York: Hill & Wang, 1989), 224.

preceding the war and was devastated by wartime casualties. It was widely accepted that families in rural areas had more children. As Sering wrote, "Only through the resettlement of the countryside can we hope to balance out the loss of men that the war bled from our population. If the hope for greater nutritional maneuvering room (Nahrungsspielraum) is fulfilled, the signs of a strong next generation will be the most welcome sign of the re-erection of our nationhood (Volkstum)."[443] The deeply intertwined concerns about food security and population decline are reflected in Sering's reference to enlarged Nahrungsspielraum as a precondition for population growth.[444] Second, agricultural settlement had a social-political goal, to overcome the poverty and unrest in cities by creating opportunity for a new class of independent landholders. It was also highly gendered and reinforced the nuclear family as the ideal unit, allowing a man living with his wife and children to harvest enough food to cover their own needs. The new class of family farmers would counteract concentrations of political power in large-landholding districts, as well as balance out the pull of the cities and the socialist politics found within them. Overall, the law aimed to democratize food and landholding, and, in doing so, to overcome class divisions that proved so incendiary and destructive in the early Weimar years.[445]

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[443] "Allein durch die Wiederbesiedlung des platten Landes ist demnach der Ausgleich der Menschenverluste zu erwarten, welche der Krieg unserer Bevölkerung und physischen Volkskraft zufügt. Verwirklicht sich die Hoffnung auf erweiterten Nahrungsspielraum, so wird ein kraftvoller Nachwuchs das willkommenste Zeichen der Wiederaufrichtung unseres Volkstums sein." Sering, *Verordnung,* 188.

[444] Cf. discussion of *Nahrungsspielraum* at the end of Ch. 3.

[445] Sering, *Verordnung,* 189.

Among these trials for regulating and improving the social organism, one of the most important involved regulating the relationship between city and countryside. Visions of a robust, stable German society were anchored in the countryside; however, these plans were not atavistic and backward looking, instead they offered a view towards the future by hybridizing feats of technological progress with rural life.[446] Projects for remaking the countryside also spoke to existential concerns about how to reconcile the struggle for existence in a time of political and economic conjuncture with the intensifying demands of the social question in demobilized Germany.

The Settlement Law of August 11, 1919

The outcome of the heated discussion over the winter 1918–19 was the Settlement Law of August 11, 1919 (Reichssiedlungsgesetz, henceforth RSG). The law provided a Reich-wide legal framework for settlement schemes while leaving states ample latitude for how they

[446] Another such debate centered around the extension of rural electrification projects, which began during the war but picked up in the aftermath, appearing regularly in discussions about agricultural productivity and national efficicency. See Wolfgang Zängl, *Deutschlands Strom: Die Politik der Elektrifizierung von 1866 bis heute* (Frankfurt: Campus, 1989) and Heinrich Büggeln, *Die Entwicklung der öffentlichen Elektrizitätswirtschaft in Deutschland: Unter besonderer Berücksichtigung der süddeutschen Verhältnisse* (Stuttgart: Kohlhammer, 1930). Elizabeth Jones' study of rural women in Saxony shows the contradictory attitudes of Weimar politicians towards women and their central role in the modernization of agricultural labor. Jones focuses on the tension between women's productive and reproductive roles during this period, so that by the end of the Weimar years, the emphasis fell on their reproductive roles. Jones, *Gender and Rural Modernity: Farm Women and the Politics of Labor in Germany, 1871–1933* (Burlington: Ashgate, 1988). In a recent chapter, she has explored "rural experiments" through internal colonization in Weimar Germany from a transnational perspective. Jones, "Internal Colonization in Weimar Germany: Transnational and Local Approaches to Rural Governance in the 1920s," in *Governing the Rural in Interwar Europe,* eds. Liesbeth van de Grift and Amalia Ribi Forclaz (London: Routledge, 2018) 24–44.

chose to execute such initiatives.[447] As such, the balance between agricultural settlements and urban or suburban housing remained undetermined. In this way, its authors presented it as a potential solution answer cutting across many fronts.

Yet initially it changed very little. The law stipulated the goal of the measures was to establish new settlements and to improve existing small farms by permitting them access to land sufficient for "selbständige Ackernahrung," or "independent units of land sufficient to feed a family."[448] The law provided a basis for settlers to acquire new land, but also acknowledged that many farmers struggled because they did not have sufficient land to nourish themselves and their families. To rectify this situation, it also facilitated the process of acquiring adjacent plots to enlarge existing holdings. "Ackernahrung," as it was written in the original text, was a relatively uncommon term, a compound fusing the word for agricultural land (Acker) with the word for sustenance or nourishment (Nahrung). Its use highlights the priority of subsistence farming as a solution to the years of shortage and crisis while also revealing a productivist view of land as a potential source of food for a family, not as surplus for the market. A sharpened vision of space developed in these years; to an observer looking an empty field, it was an untapped resource for meals to come. A growing number of politicians, economists and agronomists reached for the term Ackernahrung during the 1920s, reflecting the priorities of reestablishing the German economy on an agrarian basis.

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[447] One key provision of the law was the establishment of a first option to buy (*Vorkaufsrecht*), which allowed state administrators first right to purchase or decline to purchase such properties before other buyers. "Reichssiedlungsgesetz," (RSiedlG) from August 11, 1919, § 4

[448] RSiedlG from August 11, 1919, §1.

The logic of establishing a nation of self-sufficient producers was written into the law. In his justification for the draft law from January 1919, Sering described the economic reasons for the new settlement law: "dependable estimates," he wrote, predicted Germany could meet its own food needs within the next twenty years. Tellingly, he wrote in terms of "Nährwerte," or nutritional value, to be wrung from the earth.[449] With careful planning and the use of new technologies, the settlement program would allow German agriculture to double its outputs. He described the shift towards cultivating root vegetables, primarily potatoes and beets, to feed people, while concentrated plants such as clover and lupine could be used efficiently for fodder. Sering's justification illustrates the shift from extensive estimates of land in terms of acreage to a vision of intensive use couched in terms of nutritional potential; it reflects a new style of argument for investment in agricultural projects in Germany.

While the law opened a space for state intervention, it preserved the structures of private property, delineating an effectively reformist approach to settlement as opposed to the more radical measures.[450] The impetus and capital for new settlement attempts would remain with private initiatives, often through the use of a limited liability companies (GmbH) to entice investors. The new law preserved existing protections for private property, but made provisions for dispossession (Enteignung) for certain uses as needed. As a small concession to Oppenheimer and like-minded socialists, it demanded the release of some land from the large

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[449] Max Sering, *Die Verordnung,* 191.

[450] For example, the reformist settlement agenda appears quite conservative when compared with attempted socialization of mineral resources in 1919. "Sozialisierungsgesetz," March 23, 1919 and "Nr. 714, Entwurfung eines Gesetzes, betreffend die Sozialisierung der Elektrizitätswirtschaft," *Verhandlungen der verfassunggebenden Deutschen Nationalversammlung, Anlagen zu den Stenographischen Berichten, Nr. 692 bis 1045*, Band 338 (Berlin: Julius Sittenfeld, 1920).

estate holders in the East. Drawing on the preponderance of evidence collected over past decades on the superior efficiency of small and medium sized farms, the Settlement Law obliged landowners in regions in which estates over 100 hectares amounted to 10 percent of the total area to form public land organizations (Landlieferungsverbände) for distribution of land to settlers.[451] As a result, five million hectares from large estates East of the Elbe were to be made available for settlement.[452] As national legislation, it provided a mostly a suggestive framework inviting further elaboration from state and local authorities; any specific cases required legal supplements and review at these lower levels, where the laws for property transmission and usage were more extensive.[453] It ultimately deferred to state laws, which varied widely.

Because the Settlement Law was so open ended, it spawned further committee work at the national and state levels. Crucially, the regulations that resulted allowed for state authorities to determine what "settlement" in the context of the law meant.[454] Different levels of authorities and interest groups worked to determine how best to execute projects within the new framework. The Ministry of Labor (Reichsarbeitsministerium) held yearly conferences to bring together agronomists, political economists, representatives of agriculture, ministers, and legislators. The first one was held in November 1920 in Berlin, and the following year in May 1921 in Munich. Many of these discussions centered around resolving the scope of the term

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[451] Pursuant to §12 RSiedlG from August 11, 1919.

[452] Dornheim, "Arbeiterproduktivgenossenschaft contra Siedlung," 215-227.

[453] Knut Wolfgang Nörr, *Zwischen den Mühlsteinen: eine Privatrechtsgeschichte der Weimarer Republik* (Tübingen: J.C.B Mohr Paul Siebeck, 1988), 83.

[454] "Ausführungsbestimmungen vom 26. Sept. 1919," *Zentralblatt für das Deutsche Reich* (Sept. 1919), 1143.

"settlement" as outlined in the Settlement Law. Attendees discussed the differences between rural (or alternately agricultural) settlement as opposed to urban settlement. At the Berlin conference, the Ministry of Labor, in cooperation with settlement societies, determined that, "the RSG was intended expressly for the purposes of improving agricultural production."[455] Given the dire state of German agriculture, other priorities, such as efforts to alleviate pressure in the housing stock without an agricultural component, could not be addressed within the framework of the law. However, the Ministry of Labor also demurred in specifying what, exactly, "agricultural settlement" or "independent units of land sufficient to feed a family" meant in precise terms, arguing that it must refrain from any sort of schematization in the face of local diversity.[456]

Still, this pronouncement in Berlin in 1920 did not settle the matter and the theme was taken up again six months later in Munich. The difference between agricultural settlement and settlement to attenuate housing shortage (Wohnsiedlung) remained the primary point of divide: since the RSG left this distinction unclear, it was also interpreted for this purpose. In its execution and state level implementation, the divide surfaced. In Prussia, agricultural settlements were handled by the Ministry for Agriculture, Domains, and Forests, while the purely residential issue was transferred to the Ministry of Welfare.[457] A similar precedent existed in Bavaria. Thus, though the framework law did not specify, in practice the intent of

[455] See BArch N 1210 164: Geheimrat Sala, "Die zweite Reichssiedlungskonferenz in München am 12. 13. Mai 21."

[456] BArch N 1210 164: Ministerialrat Dr. Ponfick, "Die zweite Reichssiedlungskonferenz in München am 12. 13. Mai 21," 59.

[457] BArch N 1210 164: Oberregierungsrat Dr Krause, "Die zweite Reichssiedlungskonferenz in München am 12. 13. Mai 21," 42.

the law was preponderantly for the benefit of agriculture and the two varieties treated separately from one another. However, this did not prevent the proliferation of disagreements that expressed not only different interests, but the different legal contexts in each state through which the framework law was elaborated. In Prussia, the framework law continued to be interpreted as referring strictly to agricultural settlement; an official argued that the term "settlement" was chosen purely out of convenience but that it should have referred to "agricultural settlement" for the sake of precision.[458] But even consensus on this latter point led to a mess of additional questions: did an agricultural settlement definitionally require self-sufficiency (selbständige Ackernahrung)? And how much land precisely would a self-sufficient settlement consist of?

"Settlement" in the sense of the Prussian execution law necessarily meant agricultural settlement focusing on food production for subsistence. Beyond plots for self-sufficient food production, it also applied to settlements where the original plot had been enlarged to meet this need. Yet it also extended to situations in which self-sufficiency remained untenable, but whose "beneficiaries were engaged in pursuing agricultural interests."[459] This could mean that settlers were employed in agriculturally significant industrial work, such as building farm machinery or preserving foods. Despite this work beyond the fields, these individuals were also included under the term "agricultural settlement" by virtue of their essential-- though indirect-- contributions to the food supply.

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[458] See BArch N 1210 164: Oberregierungsrat Dr Krug, "Die zweite Reichssiedlungskonferenz in München am 12. 13. Mai 21," 12.

[459] See BArch N 1210 164: Oberregierungsrat Dr Krug, "Die zweite Reichssiedlungskonferenz in München am 12. 13. Mai 21," 15.

Concerns about food security came to outweigh concerns about social policy that had so often colored discussions of settlement in the prewar years. Though social policy remained an important component, the thrust of attention, funds, and ambitions focused on increasing Germany's agricultural productivity by extending land ownership to a greater number of Germans. The efforts of administrators within the Ministry of Labor and state-level bureaucracies to disentangle the social from the agricultural goals bear witness to the way that food security concerns carried the day.

Parallel to these conferences, the RSG initiated a flurry of research into living and landholding conditions. Shortly after the enactment of the law in August 1919, a Permanent Council for Rural Settlement (Ständiger Ausschuss für das ländliche Siedlungswesen) was founded to consult on related issues and problems that arose from its implementation. This committee was placed under the leadership of Sering. However, it soon became apparent that the committee could not fulfil the scale of the task entrusted to it–members advocated for a research institution to meet these needs. In early 1921 the Reichstag approved funding and the Research Institute for Agricultural and Settlement Projects (Forschungsinstitut für Agrar-und Siedlungswesen) in Berlin was founded.[460] The institute brought together leading policy makers and researchers in its curatorium. Almost immediately, it began investigating the world market for agricultural products. The institute played an important role as a clearing house for information about global trade and a robust sign of the role of food security in interwar German politics. Under Sering's leadership in Berlin, it became a world leader in understanding the effects of land use and trade policy while pursuing complementary projects

[460] See BArch R 4801 1379: Dr. Geib, "Das Deutsche Forschungsinstitut für Agrar- und Siedlungswesen: Entstehung, Aufgaben und Bedeutung."

on land tenure within Germany.[461] These included an ambitious research agenda spread out over seven branches investigating the dependencies of city and countryside, the role of farmers in revitalizing the power of the population (Volkskraft), the ideal size of farm operations, and the question of autarky and raw material independence, among others.[462] The promotion of settlement on a scientific basis enforced the conviction of Sering and his associates: only by enabling small self-sufficient farmers, redeeming underutilized land and intensifying food production could Germany hope to recover. A vision of decentralized production served as a hedge against the worst trends of the global food system. Throughout the 1920s, the institute's structure modeled these tenets through its research at seven satellite stations in addition to the headquarters in Berlin, drawing on a network of specialists distinguished by their breadth and range of publications. In a bid to save the institute from closure in 1934 after it ran afoul of the Nazi regime, the curatorium assembled a bibliography of all the works published, as well as a list of ongoing research projects, for presentation to the Interior Ministry in the hopes of securing further funding. The bibliography attests to the salience of settlement issues and the way their research cut across disciplinary divides. Prominent academics including Constantin von Dietze, Hans-Jürgen Seraphim, and Fritz Beckmann led branches and published on diverse subjects ranging from "Agricultural Markets and Productivity," "Regional Studies: Situation and Development of Markets and Production Zones," "Farm Size," "The Question of the Agricultural Worker," "Credit and

[461] In April 1926 the Institute began cooperating in its work with the Committee on the Investigation of Production and Sales Conditions of German Economy.

[462] BArch R 4901 1379: Letter from Max Sering to Dr. Frick (Feb. 20 1934).

Debt," to "Lease Terms."[463] These specialists and their wide-ranging projects rendered the invisible lines of production, property rights, and global commodity chains visible.[464]

Scaling settlement: Allotment gardens, veterans' settlements, and land redemption

The issue of scale proved essential. Woven into the Settlement Law was the expectation that a German economic recovery would consist of a constellation of agricultural settlements operating at different scales. The smallest would supply the diets of working, urban people, while larger ones would create surplus for those engaged in other sectors. The interaction of these different scales would provide the key to success and act as a safeguard against economic crisis. Should a small farmer have a disastrous season, he or she could rely on others for supplementary produce. Should the national economy falter through the shocks of trade or war, small producers could switch their products to compensate. To achieve food

[463] For a complete list, see BArch R 4901 1379.

[464] The Institute ran into difficulties after the Nazi seizure of power in 1933, as Sering faced funding cuts as a result of suspicion from and disagreements with key figures in the regime. The change of course was heralded by an announcement in 1934 that the yearly budget of the Reichsministerum für Ernährung and Landwirtschaft made no provisions for the Institute. This decision was couched as one based on the turn towards "practical" work of settlement as opposed to the "academic" pursuits of the Institute; and a transfer of such work to the newly founded Reichsnährstand, which integrated all personnel engaged in food and forestry. Internally, the curatorium recognized this power play as punishment for failed to "correspond to National Socialist Ideas." See BArch R 4901 1379: "Niederschrift der Verhandlungen in der Sitzung des Kuratoriums des Deutschen Forschungsinstituts für Agrar- und Siedlungswesen am 20. Dezember, 1934," and Letter from Staatssekretär Herbert Backe to Sering," (Jan. 27, 1934). For a full account of the way that Sering's institute failed to integrate to the new regime and its eventual dissolution, see Irene Stoehr, "Von Max Sering zu Konrad Meyer– ein 'machtergreifender' Generationswechsel in der Agrar- und Siedlungswissenschaft," in *Autarkie und Ostexpansion. Pflanzenzucht und Agrarforschung in Nationalsozialismus,* ed. Susanne Heim (Göttingen: Vandenhoeck & Ruprecht, 2002), 57–90.

security, Germany needed to become a nation of settlements of different sizes to maximize the agricultural potential, and flexibility, of the land.

The framework of the law accommodated these different scales of settlement, the underlying belief that a healthy mix of settlements of different sizes was optimal guided the legislation's architects. At the smallest scale, the law facilitated the establishment of Schrebergärten, or leased garden allotments that had become popular in the 1880s.[465] Named after Moritz Schreber, an orthopedic doctor in Leipzig, the small allotments were originally intended to provide a venue for city children to exercise and experience nature.[466] They also provided an opportunity for urban families to cultivate fruit and vegetables, generally intended for their own consumption, and became an important source of food used to supplement rations during wartime. After the war, they became extremely popular as a means of security in uncertain times. To meet demand, many cities, including Berlin, Leipzig, and Frankfurt, facilitated the dispensation of tracts of land inside and immediately outside the city to garden associations.

Across Germany, associations for disabled servicemen sprang up, as a means of compensating them for their service and attempting grant them a degree of stability. Since many of these veterans had little experience with gardening, the Committee for the Care of

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[465] BArch 8034 II 364: Dr. Burchhard, *Führer durch die neue Siedlungsgesetzgebung* (Halle: Otto Thiele, 1920).

[466] The memory of Moritz Schreber was later celebrated by the Nazis, who referred to him as a pioneer of the "back to the land" movement, adding their own "blood and soil" gloss on Schreber's advocacy for fresh air, exercise, and experiences in nature. See the work of Alfons Ritter, which was commissioned by the Reichsbund der Kleingärtner und Kleinsiedler Deutschlands e.V. Ritter, *Schreber: Künder und Streiter für wahre Volkserziehung. Ein Weckruf für uns alle* (Erfurt: Verlag Ohlenroth, 1936).

Disabled Servicemen (Reichsausschuss für Kriegsbeschädigtenfürsorge) advised introducing a "trial colony" for new settlers. In the trial colony, participants could elect to have a home with a garden, or just a garden plot that they could visit and tend from their homes nearby.[467] These settlement arrangements not only provided the opportunity for injured servicemen to grow their own sustenance, but also encouraged pleasant work in the outdoors that might prove salutary for mind and body. These plans stalled during the war, but under the aegis of the Settlement Law, plans for the trial colony and others for veterans quickly materialized as part of the regenerative national agenda.

At the other end of the settlement spectrum were large areas to be brought under new cultivation.[468] Largescale land redemption projects captured the imagination of Weimar technocrats, as they promised to transform "wastelands" (Ödländer) into agricultural bounty. While the expansion of access to small gardens could fortify German diets, large strides towards food independence would be made by carrying out redemption projects on previously unused lands. As Sering wrote,

> There is only one large way to counterbalance these losses: the cultivation of fertile reserves which Germany possesses in her wastelands and especially in her nitrogen-rich moors […] Privy Councillor Fleischer estimates that the area of moors and heaths suitable for redemption in Germany amounts to 3.5 million hectares, on which 8 million doppelzentner of meat could be produced annually. Today the technology for transforming moor and health into fertile agricultural land, into the highest quality pastures and meadows, is foolproof.[469]

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[467] BArch R 8034 II 361: "Kleingarten für Kriegsbeschädigte: Probekolonien," *Berliner Tageblatt* (Nov. 1 1917).

[468] In the original German: "Von welcher Seite man auch das Problem der Nahrungsverselbständigung unseres Landes betrachtet, es ist nicht anders als auf dem Wege der Innenkolonisation zu lösen," Sering, *Verordnung,* 203.

[469] BArch N 1210 82: Sering, "Deutschlands Versorgung mit Nahrungsmitteln," [no date, likely 1917/18].

The fulcrum of the new settlement law was the availability of 200 million hectares of land for the purpose of inner colonization, intended for settling 200,000–300,000 families.[470] Yet the existence of these areas and the technology for improvements alone did not automatically render them a resource. They had to be "activated", or in other words made valuable to officials and the public using certain rhetorical strategies. Drawing on the language of nutrition and food security, Weimar proponents of moorland cultivation mobilized a coalition to support their projects. The architects of these projects recognized that this type of work would take a generation to be realized, yet it was essential to begin the process to hasten Germany's recovery and long-term self-reliance.

The existence of wastelands, or land unfit for cultivation and especially moorland, had long vexed German administrators.[471] There was a long tradition of viewing these areas with trepidation. The mistrust of unsolid ground made its way into folklore and poems; they were often depicted as haunted or populated by criminals and beggars.[472] They were difficult to traverse and sparsely populated, and they remained literal backwaters into the twentieth

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[470] RSiedlG from August 11, 1919. For more details, see BArch R 8034 II 364: especially Burchhard, *Führer durch die neue Siedlungsgesetzgebung* (Halle: Otto Thiele, 1920), 18.

[471] Some of these lands were owned by state governments (Domäne), others were part of private estates.

[472] In Annette von Droste-Hülshoff's 1842 ballad "Der Knabe im Moor," a young boy runs through the dark, otherworldly landscape of the moors and sees apparitions, experiencing relief only when he emerges. "O schaurig ist's über Moor zu gehen!" read the first and last lines of the poem. A memo (published between 1876 and 1878) describes how in the first decades of the century the moors were mostly populated by thieves and beggars. See GStAPK I. HA Rep. 164 G Nr. 32: "Man sprach nicht mit den Kolonisten, gewährte ihnen auf Reisen kein Quartier und vermied überhaupt jeden Verkehr." Eiles. Das Gifhorner Moor, seine Ausbeutung und seine national-öconomische Bedeutung (Gifhorn: H. Schluze-schen Buchdruckerei und Buchhandlung), 19.

century. One politician borrowed language from the arts and exclaimed that the experience of gazing upon these areas on a map elicited a horror vacui, or a fear of emptiness.[473] On the one hand, his remark reflected the discomfort with the lack of knowledge about these territories. The notion of a dark interior at home was jarring in an age of accelerated transportation and communication. And then there was the issue of utility: large swaths of unproductive land lay in the immediate vicinity of some of Germany's largest cities, mocking any claims to rational land use.

Despite pleas to prioritize the redemption of these areas and the existence of technology for redemption, projects of land redemption and internal colonization proceeded fitfully.[474] In part this was a result of the vast sums needed to finance a war on nature; but perhaps more compelling was the fact that Germany had access to cheap and plentiful food by way of trade. In the postwar years, the language of redemption and food security took on new urgency. The imposition of new post-Versailles borders deprived the nation of agricultural surplus areas, while four and a half hard years of unsteady and infrequent access to food rendered the population sympathetic to bold plans towards agricultural self-sufficiency. Therefore, undertaking a large project such as their redemption and settlement presented a viable path to legitimize the state and resolve an economic crisis.

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[473] Friedrich Ernst von Schwerin, "Die Förderung der inneren Kolonisation in der Provinz Brandenburg, insbesondere durch Ausdehnung der Tätigkeit der 'Landgesellschaft Eigene Scholle' auf den Bezirk Potsdam," in *Schriften zur Förderung der inneren Kolonisation*, *Sonderabdruck aus dem Archiv für innere Kolonisation*, 3, no. 10 (1911), 6.

[474] Throughout the nineteenth century, attempts were made to tame these unruly areas. In April of 1876, a conference was convened to establish a Central Moor Commission as an advisory body in all matters related to the moorlands and their improvement, as well as to serve as a hub for the collection, assessment, and promotion of relevant regulations. *Preußens landwirtschaftliche Verwaltung in den Jahren 1875, 1876 u. 1877* (Berlin: Verlag von Wiegendt, Hempen und Paren, 1878), 219.

These plans were the topic of discussion at the 1919 Agricultural Week, an annual gathering and celebration of German agriculture and technology which brought wealthy estate owners to Berlin. There, the Association for the Support of Moor Cultivation (Verein zur Förderung der Moorkultur) sponsored a presentation on "Moor Cultivation and People's Nutrition." A representative from Prussian Ministry for Agriculture, Joseph Wesener, alongside Dr. Tacke of the Experimental Moor Research Station in Bremen, outlined the possibility for further developing the agricultural potential of these areas. Plans for model vegetables gardens on moorland had already received sponsorship from the Ministry of the Interior, while experiments with fertilizers for cabbage and potato cultivation were discussed alongside the recent success cultivating hemp. The lively environment of the Agricultural Week lent itself to discussions about Germany's agrarian future; this discussion was followed in quick succession by another, where the question of settlement was hotly debated. The group recognized the dearth of small homes following the war since for several years nothing new had been built. To remedy this, the group supported erection of "half rural" settlements (halbländliche Siedlungen), where, "a considerable section of the urban population can be transformed into small agricultural producers that quite probably can cover their own needs and may well be able to harvest a surplus for sale."[475] The activities of associations such as the Association for the Cultivation of the Moors and the Association for Rural Welfare and Heimat (Verein für ländliche Wohlfahrtspflege und Heimatpflege) speak to the civic interest in cultivation alongside the ministerial and political interests.

[475] BArch R 8034 II 361: "Die Landwirtschaftswoche," *Berliner Tageblatt* (Feb 20, 1919).

Meanwhile, in the newly reorganized Ministry of Food and Agriculture (Ministerium für Ernährung und Landwirtschaft), the redemption and settlement of moorlands became a priority.[476] As the Weimar government attempted to forestall future crises, "filling in" German territory by taming the land and populating it with small-holding farmers to counterbalance the magnetism of the large city seemed an attractive proposition. Funding for a statistical survey of Germany's moors and wastelands was approved in 1922.[477]

As Germans came to terms with their role in a globalized and complex web of dependencies, raw materials and specifically food, as the most basic and immediate of such needs, gained an outsized role in the economic and political imagination. To effect a transformation in understanding moors as wastelands to natural resources was not just a question of their existence or technological capability. Learning to value these "wastelands" entailed a process of quantification, and tapping into present and future concerns about food scarcity and population growth. Thus, the moorlands had to be saturated with cultural meaning as well as economic potential before being brought under cultivation.

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[476] After World War I, the Kriegsernährungsamt was renamed the Reichsernährungsamt on November 19, 1918. On March 21, 1919, the National Assembly in Weimar erected the Reichsernährungsministerium, which absorbed the existing Reichsernährungamt. Following the restructuring of the government after the Kapp Putsch, on March 30, 1920 by decree of President Ebert a separate ministry was carved out of the Reichswirtschaftsministerium to handle agricultural affairs, which was to be called the Reichsministerium für Ernährung und Landwirtschaft. There was a large degree of continuity of personnel between these successor organizations. Heinz Haushofer and Hans Joachim Recke, *50 Jahre Reichsernährungsministerium–Bundesernährungsministerium* (Regensburg: Mittelbayrische Druck- und Verlagsgesellschaft, 1969) 7–13.

[477] BArch R 3601 1680: Reichministerium des Innern an Reichsminister für Ernährung und Landwirtschaft, (Mar. 13, 1922)

Food, land, and people

The Reich Settlement Law of 1919 conferred explicit recognition to the geographical dimension of food security. Settling remaining German land promised to raise agricultural productivity while also evenly distributing the population, in effect hedging against the vulnerabilities of an import-dependent system. The minds behind the legislation supported not just a self-sufficient nation, but one built on a model of decentralized production. While pursuing a moderate course that allowed for the preservation of large estates, the law privileged small holders.

Yet for this project of re-agrarizing Germany to succeed, it required productive power. In the years following the war, labor was in short supply. The foreign workers who were forced to remain were permitted to leave, and prisoners of war who had carried out important agricultural work during the fighting returned home. German farms were left short-handed. Previous experience with internal colonization projects had demonstrated that not just anyone could be entrusted with agricultural work. The settlement issue was a question of land distribution, but it was also a matter of bringing the right people with adequate training onto the land. The differing assumptions about settlement also shine light onto the way that Weimar economists and politicians thought about human capital as well.

For his part, Sering had become convinced even before the war that urban or industrial workers could not simply be transferred onto the land to found successful agricultural operations. The question became, how to attract and train "good" settler material? In addition to the necessary capital and loans, this was another central challenge of settlement. One solution which caught Sering's attention through the course of the negotiations about the Settlement Law was the possibility of introducing a civil service component for young men to

replace universal compulsory military service, which was banned by the terms of the peace.[478] As demobilization gave way to stabilization, the work of young men could prove invaluable to economic recovery. If properly implemented, the benefits of a mandatory labor service might extend far beyond the work itself and also provide the foundation for a robust generation of farmers.

In a memo written between February 1919 and March 1920, Sering outlined this plan and passed along his suggestions to the Minister of Defense, Gustav Noske.[479] Instead of transplanting urban workers into the countryside, the labor service would help workers become accustomed to agricultural work, preparing them both mentally and physically for later settlement. In his letter, he highlighted how the strict upbringing in the countryside and the rigorous physical demands would serve as a good replacement for universal conscription. If the military had once been the "school of the fatherland," now this duty would fall to farms. Compulsory service had once served to inculcate a sense of national belonging in young men and brought them into contact with companions beyond their immediate communities. These horizontal bonds, which had once served to break down regional particularism could now also dismantle the mental divide between city and countryside. Even in the case that participants opted not to remain in agricultural work, the time would still be worthwhile as it served to

[478] This was a key component of demobilizing and reducing the size of the German military (Article 173). "Treaty of Peace with Germany (Treaty of Versailles)," concluded Jun. 28 1919, *Treaties and other international agreements of the United States of America, 1776-1949,* no. 2, https://www.loc.gov/law/help/us-treaties/bevans/m- ust000002-0043.pdf.

[479] BArch N 1210 48: Letter, Sering to Noske (undated).

forge stronger ties between urban workers and rural inhabitants.[480] The memo provided an outline for reconstruing manpower from military strength to agricultural productive power. Of course, it would not have escaped either man that the countryside was the traditional reservoir of Germany's military recruits, credited with supplying a steady stream of able bodied and pliant young men once the treaty expired.

The labor service would help compensate for the shortfall of 500,000 Polish workers who had departed from Germany at the close of the conflict. In Sering's view, it was impossible to sustain the current situation, in which 60% of the German nation lived in cities. With the absence of the merchant fleet and the destruction of German companies abroad as a result of the debt, Germany's demand for consumer goods would need to be dramatically scaled back. Mounting population pressure in urban areas would only exacerbate these needs and heap pressure upon the trade balance.

Recognizing that the move directly from city to countryside was neither desirable, nor likely to succeed for all in the long term, Sering argued for measures such as the temporary national service which would render the boundaries between city and countryside more fluid. He noted that cities might find some relief (Auflockerung) if settlements surrounded by gardens large enough to sustain a household (200-100 square meters) could be created. These settlements would thrive when settlers were fully employed and received training in gardening and farming. Training could be undertaken more systematically and not as a smattering of courses, but as a more comprehensive education. He cited the settler training

[480] For a classic interpretation of the educational and civilizing effect of military service (albeit on French national identity), see Eugen Weber, *Peasants into Frenchmen*: *The Modernization of Rural France, 1870–1914* (Stanford: Stanford University Press, [1976], 1999), 292-303.

facility at Eden as a model (see chapter 2). Some work to this effect had begun in scattered outposts, such as at a school for settlement targeting adults in Havelberg in Brandenburg by a settlement association, one in Allenstein (East Prussia) organized by the Organization for War Wounded (Organisation für Kriegsverletzte) and another near Bonn by the local agricultural chamber (Landwirtschaftskammer). Other figures, including the Bavarian peasant politician Georg Heim, shared Sering's enthusiasm for integrating agricultural education into national duty by advocating for rural apprenticeships building upon existing institutions.[481]

In Berlin, the city transformed its 420 morgen estate at Struveshof into a boy's school, training the youths in the practical matters of managing an estate and preparing them for positions as stall masters, dairy farmers, or breeders. Sering had high praise for the work at Struveshof.[482] Plans to take urban orphans—whose numbers swelled after the war-- to be raised and educated in agriculture were totally in line with Sering's vision for a re-agrarized future.[483] Where schools or institutes were unavailable, city orphans could also be distributed to respectable farming families. In their diverse permutations, all of these plans involved redistributing the German population to rural areas and equipping them with the training to

[481] Heim advocated for agricultural apprenticeships during the school years so that graduates did not emerge as undernourished, undertrained "takers" (*Nehmer*) but were able to add value to farms right away. BArch N 1210 48: Letter Georg Heim to Sering, (Jul. 10, 1919).

[482] BArch N 1210 48: Letter, Sering to Noske (undated).

[483] See also Heim's suggestion for sending orphans to the countryside. BArch 1210 48: Letter Georg Heim to Sering (Jul. 10, 1919). For a look at orphans and adoption policy in Weimar and Nazi Germany, see Michelle Mouton, "Rescuing Children and Policing Families: Adoption Policy in Weimar and Nazi Germany," *Central European History,* 38, no.4 (2005):545–571; and Elizabeth Harvey, *Youth and the Welfare State in Weimar Germany* (Oxford: Clarendon Press, 1993).

work in agriculture. While a degree of realism tempered many of these considerations, recognizing that it would be impossible to direct and permanently resettle individuals, promoters hoped that even temporary stints would reshape Germany from a land of consumers to one of producers and effective stewards of the land. Settlement schemes aimed not just to increase agricultural output, but also to settle Germans closer to their food and thus canalize social pressures.

Conclusion

The conclusion of the war did not bring an end to the difficulties Germans faced in securing food. Recognizing the dire shortage of foodstuffs, as well as the politically incendiary character of hunger, authorities began planning how to provision the nation in both the short and long term. Longer term visions of food security necessarily involved a re-agrarization of the nation. The mindset that framed these discussions was profoundly shaped by the wartime experience of scarcity and malnutrition, but also by postwar territorial losses. Politicians and economists promoted settlement schemes as a means of intensifying domestic agricultural production and liberating the nation from its immediate postwar economic difficulties. The Reich Settlement Law of August 1919 represented the culmination of these efforts and reveals the centrality of food, population, and land in the first years of the new republic. Tracing the debates that led to the promulgation of the law reveals how ambitions to correct the course of a maldistributed population fused with the immediate goal of increasing domestic agricultural production. The promotion of settlement projects signaled a departure from the "global division of labor" that had dominated economic thinking for decades. In its place, politicians and academics placed their hopes in the combination of scientific research and assiduous work to reinvigorate the nation through decentralized domestic production.

CHAPTER FIVE

Postwar Reckonings: Nutrition and the Private Household, 1918–1923

In the summer of 1918, as German forces in the west faltered and the end of the war seemed near, Henriette Fürth arrived for a business trip in Holland accompanied by her husband. Fürth, a tireless advocate for those in need in her home of Frankfurt, was sent on behalf of the City Magistrate. The trip was oriented around official business, but it carried the additional bonus that they would visit their children who had been living abroad during the war. As the pair arrived to embrace their children, they were met with appalled faces: Fürth and her husband had each lost an estimated forty pounds over the war years and appeared fragile. "They handled us like raw eggs," she recalled, and only after restricting themselves to light meals in the first days did the two permit themselves to indulge in heartier fare.[484] It was not uncommon, Fürth recounted in her memoirs, for Germans who had arrived in Holland from their blockaded homeland to become ill after giving themselves over to the rich foods available there. The transition from scarcity to plenty overwhelmed the body, and it was such an unfamiliar and understudied phenomenon that many hardly knew better.[485]

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[484] Fürth, *Streifzüge durch das Land eines Lebens*: *Autobiographie einer deutsch-jüdischen Soziologin, Sozialpolitikerin und Frauenrechtlerin (1861–1938)* ed. Monika Graulich, Claudius Härpfer, Gerhard Wagner (Wiesbaden: Kommission für die Geschichte der Juden in Hessen, 2010), 184.

[485] Despite the German experience of hunger under the blockade, the focus among historians of science has remained overwhelmingly on colonial lands as generative areas for acquiring new nutritional knowledge. In a landmark article, Michael Worboys argued that the problem of malnutrition was "discovered" during the interwar period by British scientists who were initially concerned with livestock failures in South Africa and the Kenyan highlands, and then turned to human health (also under the League of Nations in Tanganyika). While this may

In recalling the impression she made upon her children, Fürth summoned a surprising role reversal: while in the final days of the war her children might have been shocked by its effects on their parents, who were nearing sixty, the health toll of the conflict would only reveals its true dimensions years later through the damage to children.[486] Though Germans of all ages suffered greatly under the blockade, it was often young children who exhibited the most striking symptoms of deprivation and malnutrition. Yet as conspicuous as these visible signs of scarcity appeared, they gestured to deeper medical problems stemming from subjection to the wartime economy. Fürth and her husband were lucky: "Those who did not have it as a good as we did during those difficult times, in which there was not even substantial food to be had for the neediest among us, were left with serious and long-lasting damage," she reported.[487] These were often children in urban areas who suffered doubly from curtailed rations, which not only made them lethargic, but also impeded them from reaching key developmental milestones. The war and blockade contributed to a reorientation in the

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hold true for British Empire, certainly the blockade experience of the Germans defies such a characterization. Worboys, "The Discovery of Colonial Malnutrition Between the Wars." David Arnold has argued that nutritional science comes out a longer tradition of colonial medicine in his study of India. Arnold, "The 'Discovery' of malnutrition and Diet in Colonial India." On the activities of the League of Nations in advancing nutritional science in Tanganyika, see Marilyn Little, "Imperialism, Colonialism and the New Science of Nutrition: The Tanganyika Experience, 1925–1945," *Social Science of Medicine* 32, no. 1 (1991): 11-14. More recently, Dana Simmons has argued that the two world wars created the conditions for studying the science of starvation in Europe. Simmons, "Starvation Science from Colonies to Metropole," in *Food and Globalization: Consumption, Markets, and Politics in the Modern World,* ed. Alexander Nützenadel and Frank Trentmann (Oxford, New York: Berg, 2008):178–191.

[486] Mary Elisabeth Cox has studied how the blockade impacted children's health outcomes based on data sets for Dresden. Cox, "Hunger Games: Or How the Allied Blockade in the First World War Deprived German Children of Nutrition, and Allied Food Aid Subsequently Saved Them," *Economic History Review* 68, no. 2 (2015): 600–631.

[487] Fürth *Streifzüge,* 184

science of nutrition away from a previous emphasis on working, productive men and towards a new focus on women (especially new mothers) and children. Increasingly, nutrition and physiology turned from an auxiliary science of production, investigating food as an input for work, to one of reproduction, ensuring both the quantitative and qualitative regeneration of the nation. In short, as advocates for women's rights and welfare would later argue, wartime shortages spurred a shift in understanding women's work and the household as a site of productive labor,

Fürth spent 1914–1918 vigorously involved in Frankfurt's war welfare activities, including a long stint in the city's Office for Food (Lebensmittelamt). Despite increasingly interventionist government policies vis-à-vis food production and distribution, she witnessed on a near daily basis the failure to guarantee a basic quantity of nutritional food to all people. She later recalled her own advocacy efforts, often intervening to obtain additional meal tickets for expectant mothers. The War Food Office's system of regulation operated with blunt and stringent categories of need; the work of individuals like Fürth helped to fine tune official policy and render it a slightly more sensitive instrument. After the war, she remained active in Social Democratic politics, running a failed bid for election to the Weimar National Assembly and then beginning her tenure as a member of the Frankfurt city council. Through her continued service on the city council's finance, health, and food and nutrition committees, Fürth dedicated her career to developing a welfare system in which the neediest would not be abandoned. Yet while during the war she had been able to travel to Holland and (at least briefly) access a rich and varied diet, for others the long-awaited transition to peace and plenty was slow to come. Fürth's memories of the war demonstrate the difficulty of setting

minimum standards for nutrition for a population and highlight the uneven treatment of different groups before official food policy.

After so many years of shortage, the term "existence minimum" (Existenzminimum) commanded attention in political circles and the press. The question of what was required to sustain life, and beyond that, not just to sustain it at a bare minimum but to promote recovery and growth, echoed during the early years of the Weimar Republic.[488] It was a matter on which seemingly everyone had an opinion. In different associations and public meetings, the term provoked lively debates. Though the concept of an "existence minimum" also encapsulated the spheres of housing, clothing and wages, food remained an issue of primary concern, joining memories of wartime to those of the postwar period.

The new government had guaranteed a basic minimum of provisioning to its citizens. The Weimar Constitution, as well as the laws that followed, reflected a commitment to providing the means for basic subsistence. Article 151 of the new constitution outlined a commitment to supporting an organization of economic life that would "ensure a humane existence for all," while the Socialization Law of March 23, 1919 reflected a commitment to the necessary maintenance of all Germans, even if they were unable to find work.[489] Though

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[488] As Dana Simmons has argued for France, the politics of need were central to the rise of the European welfare state. Simmons, *Vital Minimum,* 1–12.

[489] Article 151 of the Weimar Constitution outlined: "Die Ordnung des Wirtschaftslebens muß den Grundsätzen der Gerechtigkeit mit dem Ziele der Gewährleistung eines menschenwürdigen Daseins für alle entsprechen." "Die Verfassung des Deutschen Reichs vom 11. August 1919." *Weimarer Verfassung, Reichs-Gesetzblatt* 152 (Aug. 14, 1919): 1383–1418. In response to massive unemployment, Article 1 of the Socialization Law specified: "Jedem Deutschen soll die Möglichkeit gegeben werden, durch wirtschaftliche Arbeit seinen Unterhalt zu erwerben. Soweit ihm Arbeitsgelegenheit nicht nachgewiesen warden kann, wird für seinen notwendigen Unterhalt gesorgt." "Sozialisierungsgesetz vom 23. März 1919," *Reichs-Gesetzblatt* 68 (Mar. 231919), 341–342.

these guarantees were enshrined in law and often repeated by politicians, they remained in abstract language and awaited further elaboration and execution. Nevertheless, they enforced a basic understanding of the state's duty to ensure a certain standard of living. Promoting the idea went beyond gestural politics; instead the question of an existence minimum was at the heart of the new social democratic republic, setting the terms-- and indeed limits—of the new social welfare state.[490]

The problem was that despite the extension of generous promises in social welfare, the political and economic foundations of the new government were shaky at best. To the millions of injured, widowed, orphaned, expelled, and war-weary on the home front, the provision of a basic maintenance offered a means of compensation for sacrifice and renewal of allegiance to a new government. The "existence minimum" operated as a central concept in the Weimar Republic.[491] Through it, the rights and duties of state and citizen emerged and found their place within a bureaucratic apparatus. Yet there was little consensus on what this baseline level of security meant in practice between the workers, employers, housewives, physiologists, and politicians whom it concerned. More troubling, especially in the realm of food provisioning, was the tension between the guaranteed existence minimum as a basic right and the reemergence of a global market for agricultural commodities.

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[490] For prominent examples see Steinmetz, *Regulating the Social*; David F. Crew, *Germans on Welfare: From Weimar to Hitler* (New York, Oxford: Oxford University Press, 1998); Young-Sun Hong, *Welfare, Modernity, and the Weimar State, 1919–1933* (Princeton: Princeton University Press, 1998).

[491] See Reinhart Koselleck, "Begriffsgeschichte and Social History," in *Futures Past: On the Semantics of Historical Time,* trans. Keith Tribe (New York: Columbia University Press), 75–93.

This chapter explores the contested meanings of the concept of existence minimum in the aftermath of World War I through the hyperinflation crisis until stabilization in 1923, with a particular focus on debates over securing an adequate food supply. While other material concerns, such as the need for fuel, clothing, and shelter, also commanded attention, the issue of food loomed especially large in both contemporary debates and popular memory of these years. Food was a necessity and quickly came to take up an increasingly large share of German expenditures.[492] Not only did food remain an existential issue for many Germans, but it also proved to be an intractable challenge to political authority. Stabilizing the food situation ranked among the most pressing challenges for the National Assembly and the new Weimar government. As we will see, because the food situation was shaped by many diverse factors, a solution remained evasive. Two factors played an especially decisive role in debates over postwar food provisioning. First, defeated Germany remained at the mercy of victorious powers and their designs for the international agricultural market. Second, determinations of how best to nourish a population after years of deficiency presented a challenge to extant expertise. The state of malnutrition in postwar Germany was unique because it sat astride normal distinctions in the study of individual bodies versus collective populations, as well as

[492] An informal estimate from 1922 posited that half of the total consumption in Germany was on food, see Kurt Hintze and Walter Kruse, *Sparsame Ernährung: Nach Erhebungen im Krieg und Frieden* (Dresden: Verlag des Deutschen Hygiene-Museums, 1922), 3. In 1920, Robert Kuczynski estimated that it cost 6-7x as much for the average German to purchase enough food to be satiated as before the war. His monthly calculations of the *Existenzminimum* contributed greatly to the debate in parliament as well as in popular circles.

involving both short-term acute and long-term effects, all taking place at a scale that had never before been studied.[493]

The blockade cast a long shadow over German health outcomes by transmitting effects to young and unborn generations and eroding confidence in the government and threatening social collapse. Martin Geyer and others have shown that as the market economy with integrated international trade in staples expanded during the latter half of the nineteenth century, questions of subsistence became transformed into questions of income.[494] World War I presented a caesura in this logic of integration: especially in Germany, the issue of people's nutrition (Volksernährung) in the face of shortages across class lines became prevalent from the winter of 1915/16 onwards. In this respect, as Geyer writes, "the experience of need was socially unbound."[495] This experience continued largely unabated after the war. The blockade was upheld for eight months after the signing of the Armistice and measures of the wartime state-controlled economy remained in place until late 1922, when grain was finally permitted on the free market.[496] While important differences existed in the way that people of different

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[493] Simmons, "Starvation Science from Colonies to Metropole," in *Food and Globalization: Consumption, Markets, and Politics in the Modern World,* ed. Alexander Nützenadel and Frank Trentmann (Oxford, New York: Berg, 2008):178–191.

[494] Martin Geyer, "Teuerungsprotest und Teuerungsunruhe 1914–1923: Selbsthilfegesellschaft und Geldentwertung," in *Der Kampf um das tägliche Brot: Nahrungsmangel, Versorgungspolitik und Protest, 1770–1990,* eds. Manfred Gailus and Heinrich Volkmann (Berlin: Springer, 1990), 320.

[495](My emphasis) Geyer, "Teuerungsprotest," 320

[496] The controlled economy for foodstuffs was slowly dismantled beginning in 1919. Eggs, vegetables and fruit were the first products to be freed from restrictions in 1919, as a result of the continued failures of distribution which led to widespread spoilage, see *Verhandlungen der verfassunggebenden Deutschen Nationalversammlung* 326 (24. Sitzung, Mar. 10 & 26, 1919): 657, 824; most restrictions on potatoes were removed in September 1920. Grain was the last item to be released to the free market, see Carl-Ludwig Holtfrerich, *Die deutsche*

means confronted scarcity, it remained the case that for those dependent on salaries or pensions to support themselves, the food situation in 1920, and especially 1923, remained hardly better than in 1918.[497] This important continuity of experience made the issue of food provisioning especially politically incendiary.

War and Peace: Between Consumers and Citizens

While Germany's leaders promised that the end of the war would bring both a victory and the end of hunger, both became increasingly untenable as the summer of 1918 changed to autumn. The expected windfall of grain deliveries from the Ukraine following Brest-Litovsk in March 1918 never materialized; and an ill-fated economic union between Germany and Austria that had been arranged in the summer of 1918 seemed an especially risky gamble from the German side.[498] Tensions on the home front intensified in the fall of 1918 as shortages became more acute and defeat was all but assured. The mutiny of North German sailors against a suicide mission beginning on October 29 provided the spark to wider protests for peace and bread across the Empire. In an appeal to the people, the War Food Office wrote on November 5, 1918,

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Inflation 1914–1923: Ursachen und Folgen in internationaler Perspektive (Berlin, New York: de Gruyter, 1980), 89.

[497] Fürth recalls in Frankfurt, in early 1920 the prices for bread and potatoes were five to ten times that of the prewar years. Fürth, *Streifzüge*, 201.

[498] The agreement between Germany and Austria arranged during the summer of 1918 by the Hauptquartier without the consent of the Reichstag was a losing proposition for both sides, as neither could rely on surplus enough to support itself, let alone its neighbor. See *Verhandlungen des Reichstags* 313 (185 Sitzung, Jul. 6, 1918): 5898.

> Among the most important tasks we face is the reconstruction of our economy so that soldiers and sailors returning from the front have the opportunity to secure their own existence, for them and their families […] with the conclusion of the peace, an improvement in the food situation, as in all other living conditions is to be expected.[499]

Such bromides did little to assure the population. The process of forming revolutionary soldiers' and workers' councils channeled the anti-war sentiment and demands for relief into political structures. Even after the fighting ceased, an improvement in the food situation was slow to come. While the armistice inaugurated a relaxing of restrictions on navigation and trade with other nations, it worsened the food situation in Germany. The blockade remained in place, the harvest rotted in the fields, and military stores were partly wasted during the retreat. To further aggravate matters, returning troops arrived as hungry mouths to feed. These circumstances also complicated the ability to take stock of what food supplies remained, as did the thriving black market, which was naturally absent from official statistics. In light of the convergence of disastrous international and domestic circumstance, it is hardly surprising that consumers voiced their discontent. The bleak and unrelenting food situation in the last days of the war gave way to consumer protests which joined with those of frustrated sailors, soldiers, and workers across Germany over the winter of 1918/19.[500] The country erupted in a series of armed conflicts, street fights, workers' soviets and general strikes in December and January. The restoration of partial order in mid-January 1919 hardly spelled the end of difficulties.

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[499] See B Arch R 8843 37: "Nach Friedensschluss," in *Tagesbericht der Nachrichtenabteilung des Kriegsernährungsamts*, no. 260 (Nov. 5, 1918).

[500] Belinda Davis has described the food rioting at the end of the war in Berlin: Davis, *Home Fires Burning,* esp. 219–236.

At international conferences, parliamentary meetings, and academic conferences, Germany's leading politicians and their advisors debated how best to provide the people with adequate food. Two fronts emerged. On the one hand, political leadership as well as ordinary citizens demanded some measure of immediate relief from the shortages. The blockade had transformed food provisioning from an issue of domestic policy into one that cut across neat divides between domestic and international affairs. As Alice Weinreb has recently observed, the calls for international food aid to Germany constituted a recognition of food as a form of political control and population management that had been normalized by the war.[501] To German citizens, it seemed self-evident that they, as non-combatants on the home front, should be granted a degree of clemency from the Allied Powers. As the peace negotiations dragged out, it became clear that this was not to be so. Article XXVI of the Armistice, signed on November 11, 1918, gestured vaguely to the provisioning of food during this transitional period without making any ironclad commitment. It also stipulated that maintenance of the blockade was a necessary precondition for the peace. The question of German aid was subordinated to that of non-belligerent countries, such as Belgium and Poland. As the extension of the Armistice was negotiated in January 1919, the issue of German relief resurfaced. Here, the Allied powers demanded that a condition for the importation of food to Germany was the surrender of German mercantile shipping vessels.[502] Yet the German

[501] Weinreb, *Modern Hungers*, 29. It was also an expression of humanitarian solidarity carried out not just through inter-state aid, but through See Daniel Maul, "American Quakers, the Emergence of International Humanitarianism, and the Foundation of the American Friends Service Committee, 1890–1920," in *Dilemmas of Humanitarian Aid in the Twentieth Century,* ed. Johannes Paulmann (London: Oxford University Press, 2016), 63–90.

[502] "In order to secure the provisioning of Germany and of the rest of Europe, the German Government shall take all necessary steps to place the German fleet, for the duration of the armistice, under the control and the flags of the allied powers and the United States…" Article

government hesitated in turning over these ships. In spite of shortages and revolutionary upheaval, the grim determination of the government to hold onto its last potential means of negotiating favorable terms for the peace kept the population living under untenable conditions.

On the other hand, concerns over the longer-term shape of economic relationships competed with attempts to resolve the acute shortages. For many, a return to pre-war status quo of overwhelming reliance on foreign imports was undesirable. While the influx of foreign products to supply relief appeared necessary as a temporary measure to prop up the German people, it was accompanied by great anxiety about restoring the trade relationships that had contributed to Germany's wartime vulnerability. Agrarian estate holders and representatives of rural districts retained the opinion that a viable long-term solution should support farmers and landowners with the aim of establishing food sovereignty. These individuals and interest groups advocated against international trade and imports, which they argued suppressed agricultural productivity and immiserated farmers. If the old rhyme, "If the farmer has money, the whole world does" (Hat der Bauer Geld, hat's die ganze Welt), characterized the agrarian view, positioning the countryside as the origins of national wealth, consumers—especially those in urban areas—felt increasingly suspicious and hostile towards German farmers. A modified version of the saying appeared alongside a cartoon in 1920, which depicted two well-dressed and idle farmers in a field: "If the farmer wants money, the whole world is made to pay" (Will der Bauer Geld, zahlt die ganze Welt), read the caption.[503] The antagonism

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VIII, "Conventions Prolonging the Armistice with Germany: January 16, 1919," *The American Journal of International Law,* 13 no. 4 (Supplement Official Documents) (Oct. 1919): 392.

[503] *Simplicissmus*, 25, no. 51 (Mar. 16, 1921) 681

between agrarian and urban/industrial interests represented yet another fault line in postwar society. While it was generally agreed that agricultural sector should be supported so that it might recover from wartime deprivations, the transformations and improvements necessary to guarantee self-sufficient harvests would take years. In a sense, the early trials of the provisional government, the National Assembly and the Weimar parliament revolved around rehashing turn-of-the century debates about whether Germany should pursue a course as an agricultural or industrial state.[504]

Already in the transitional period, renewed dependencies gave rise to outrage. Postwar distribution schemes illustrated the intricate dance of worldwide commodity trading. While the gradual reintegration of commodities markets in the aftermath of the war was greeted enthusiastically in most countries, in Germany, as a result of its heavy debt and restrictions, it became a constant target of outrage.[505] British deliveries from Canada and Australia were

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[504] Günther Mai has argued that the interwar period witnessed "de-agrarization" in much of Europe and especially Germany. In this view, "de-agrarization" refers to not only the decline of the agricultural sector vis-à-vis industry or services, but also the decline of the political power of the elites and agrarian mentalities and values. The "Agrar- oder Industriestaat" debate was revived in the 1920s by prominent conservatives, as well as agricultural scientists such as Friedrich Aereboe und August Skalweit. Overall Mai sees from 1924 a tense compromise of "agrarian politics in an industrial state" set in. See Mai, "Die Agrarische Transition: Agrarische Gesellschaften in Europa und die Herausforderungen der industriellen Moderne im 19. und 20. Jahrhundert," *Geschichte und Gesellschaft* 33, no. 4 (Dec. 2007): 471-514, especially 482-484; Heinrich Becker, *Handlungsspielräume der Agrarpolitik in der Weimarer Republik zwischen 1923 und 1929* (Stuttgart: Steiner, 1990): 44-51.

[505] A differentiated picture of the fate of globalization in the interwar period emerges in Christof Dejung, "Deglobalisierung? Oder Enteuropäisierung des Globalen? Überlegungen zur Entwicklung der Weltwirtschaft in der Zwischenkriegszeit," in *Aufbruch ins postkoloniale Zeitalter: Globalisierung und die außereuropäische Welt in den 1920er und 1930er Jahren*, eds. Sönke Kunkel und Christoph Meyer (Frankfurt, New York: Campus, 2012), 37-61. For a closer study of market disintegration from 1929 onwards based on data from the *International Yearbook of Agricultural Statistics* published by the International Institute of Agriculture in Rome, see William Hynes, David S. Jacks, Kevin H. O'Rourke, "Commodity Market

brought to Germany, skimmed off of Britain's surplus. A brisk business in re-exportation flourished as global trade resumed. France delivered to Germany red wine and colonial products in the form of 555,000 tons of palm kernels and 6,000 tons of pork and other fats.[506] Deliveries depressed prices for domestic goods, resulting in some controversy. In the fall of 1920, a promised delivery of 1,000 cows from German-American farmers in Texas became held up by a spat between the Minister of Food Andreas Hermes (March 1920–March 1922), who demanded fodder to support domestic production, and the Red Cross, which arranged the cow delivery, putting Hermes at odds with cabinet members from his own party.[507] Complaints from farmers mounted that they were being robbed of a chance of recovery by predatorial international practices.[508]

On the payment side, Germany paid its debts through both cash and in-kind payments. Perhaps most well-known are the demands for reparations in coal and iron, both of which were badly needed at home. Yet the terms of Versailles also dictated German deliveries of animals to its former enemies: advance deliveries of a total of 140,000 milk cows, 120,000

Disintegration in the Interwar Period," National Bureau of Economic Research, Working paper 14767 (March 2009).

[506] Under the Brussels agreement concluded on March 14, 1919, Germany paid France in commodities while paying the US in gold. Frank M. Surface and Raymond L. Bland, *American Food in the World War and Reconstruction Period: Operations of the Organizations Under the Direction of Herbert Hoover, 1914 to 1924* (Palo Alto: Stanford University Press, 1931), 64, 189–200.

[507] The cows finally arrived in Bremen in February 1921. See BArch Berlin 8034 II 7899: "Die ersten Kühe unterwegs, auch Futtermittel kommen mit!" *Montagspost* (Sept. 13, 1920); "Die verhinderte Milchkühe-Einfuhr: Mißtrauensvotum gegen das Ernährungsminister," *Freiheit* (Sept. 11, 1920); "Der Dank für die Milchkühe," *Berliner Volkszeitung* (Feb. 9, 1921).

[508] South German viticulturalists suffered under the forced import of Alsatian wines. See *Reichstag Verhandlungen* 348 (87 Sitzung, Mar. 17, 1921): 3092.

sheep, 10,000 goats and 15,000 sows, among other animals, to Belgium and France were required over the course of three monthly installments.[509] German leaders perceived the delivery of milk cows as particularly galling. As Secretary of the Food Office Emanuel Wurm (November 1918 to February 1919) spoke before the National Assembly in November 1919, he denounced the Allied demand for the milk cow delivery as an unspeakable evil: how could Germany be expected to deliver cows "while in Dortmund, there [were] undernourished children who could not walk in dire need of milk?" he asked.[510] In-kind payments also served as the currency for supplementary one-time purchases from neutral countries: May 1919 saw the purchase of wheat and linseed from Argentina, and lard and potatoes from Holland. These one-time purchases were financed with the sale of German ships in neutral ports, or the surrender of German securities.[511] Truly it was a seller's market.

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[509] Already in January 1919, under the terms of the extension of the Armistice Germany (Trèves) was forced to supply agricultural equipment to the International Armistice Commission. This was perceived as an especially cruel blow again under the terms of Versailles, as the treaty stipulated that the above deliveries were non-negotiable and were to take place irrespective of the conclusions of the Commission which was to take into account Germany's own maintenance. See "Part VIII: Reparations" "Treaty of Peace with Germany (Treaty of Versailles)," concluded Jun. 28 1919, *Treaties and other international agreements of the United States of America, 1776-1949,* no. 2, https://www.loc.gov/law/help/us-treaties/bevans/m-ust000002-0043.pdf; and Article III, "Conventions Prolonging the Armistice with Germany: January 16, 1919," *The American Journal of International Law,* 13 no. 4 (Supplement Official Documents) (Oct. 1919): 389.

[510] See the speech of Emanuel Wurm, *Verhandlungen der verfassunggebenden Deutschen Nationalversammlung* 33 (120 Sitzung, Nov. 27 1919): 3796.

[511] Surface and Bland, *American Food,* 189-195. It was exactly this sort of payment in kind that that prompted French occupation of western Germany's major industrial zone and site of expansive coal reserves in the Ruhr area after Germany failed to make scheduled deliveries in January 1923. Sally Marks, "The Myths of Reparations," *Central European History*, 11, no. 3 (September 1978): 231-255.

While the German public showed indignation at their treatment at the peace conferences, criticism was not restricted to foreign actors. Wasteful and predatorial practices, such as leaving shipments to sit in harbor or "ripen" for speculation were also rampant among German importers. A telling example is the story of the Salted Herring Purchasing Company (Salzherings-Einkaufsgesellschaft). Salted herring was not widely beloved by the population; instead it promised to provide "a last resort for our growling stomachs. Since everything else had failed, a salted herring tail could still be found somewhere."[512] The company purchased Norwegian herring for sale to the German population, purporting to provide necessary and shelf stable fats.[513] Instead, it initiated a scandal. The company purchased old, lower quality herring from Norway, while preventing the import of fresher, fatter ones from Holland. In light of the acute fat shortage, this was a particularly offensive maneuver. As illustrated in a Simplicissimus cartoon from June 1920, a Poseidon-like figure pulls the bountiful catch from the sea, exclaiming, "This year the poor Germans should eat their fill!" Two inset panels illustrate a family at dinner, where the mother chides her children not to eat too quickly, since the herring cost three marks. Meanwhile, in the adjacent panel, three corpulent speculators sit around a white table cloth with champagne as one comments, "Hail the government—they allowed us to earn a 900% dividend!"[514] (Figure 11). To add insult to injury, the company earned 900% off the backs of German consumers, which was distributed among the investors,

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[512] In the original German: "…die letzte Zuflucht unserer knurrenden Mägen. Da alles versagte: ein gesalzener Heringsschwanz ließ sich immer noch irgendwo auftreiben." "O du gesegneter Salzhering!" *Der Wahre Jacob* 37, no. 884 (Jun. 18, 1920):10004.

[513] Robert Tern, *Die deutsche Seefischerei in ihrer volkswirtschaftlichen Bedeutung unter besonderer Berücksichtigung der Fischabfallverwertung* (Berlin: Julius Spring, 1924), 60-63.

[514] Wilhelm Schulz, "Heringsimporteure," *Simplicissimus* 25, no. 12 (Jun. 16, 1920): 180.

and not returned to the Reich, despite its role in financing and enabling the purchase.[515] The failure of such schemes to deliver quality products to the population at an affordable price aroused a deep cynicism towards the new government. Mismanagement of the food situation, of which the herring example is representative, further degraded confidence in the republic's leadership.

The intense pressure to solve a number of compounding crises, including the food shortage, challenged the Social Democratic leadership in the early years of the republic. Financial crisis and rampant inflation, persistent street violence, attempted coups, general strikes, and finally the French occupation of the Ruhr in January 1923 as a result of the failure to make reparations payments dealt blow after blow to confidence in Social Democratic politics. With seven chancellors serving between February 1919 and November 1923, cabinet positions also proved volatile and short-term. The position of Minister for Food and Nutrition also experienced rapid turnover in this period: from February 1919 to October 1923, six individuals filled the role in the newly constituted ministry.[516] The democratic government struggled to achieve stability in these early years and suffered from waning confidence in its abilities to resolve key problems, such as food shortage.

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[515] Comment from Abgeordneter Hammer, *Verhandlungen des Reichstags* 346 (40 Sitzung, Dec. 1, 1920): 1419.

[516] The following individuals served as the Reichsminister für Ernährung (and after reorganization in 1920, Reichsminister für Ernährung und Landwirtschaft): Robert Schmidt (February 13, 1919–March 26, 1920); Andreas Hermes (March 23, 1920–March 10, 1922); Anton Fehr (March 31, 1922– November 21, 1922); Karl Müller (November 22, 1922 – November 25, 1922); and finally, Hans Luther (December 1, 1922 to October 4, 1923). For the official institutional history, see Heinz Haushofer and Hans Joachim Recke, *50 Jahre Reichsernährungsministerium-Bundesernährungsministerium* (Regensburg: Mittelbayerische Druck- und Verlagsgesellschaft, 1969).

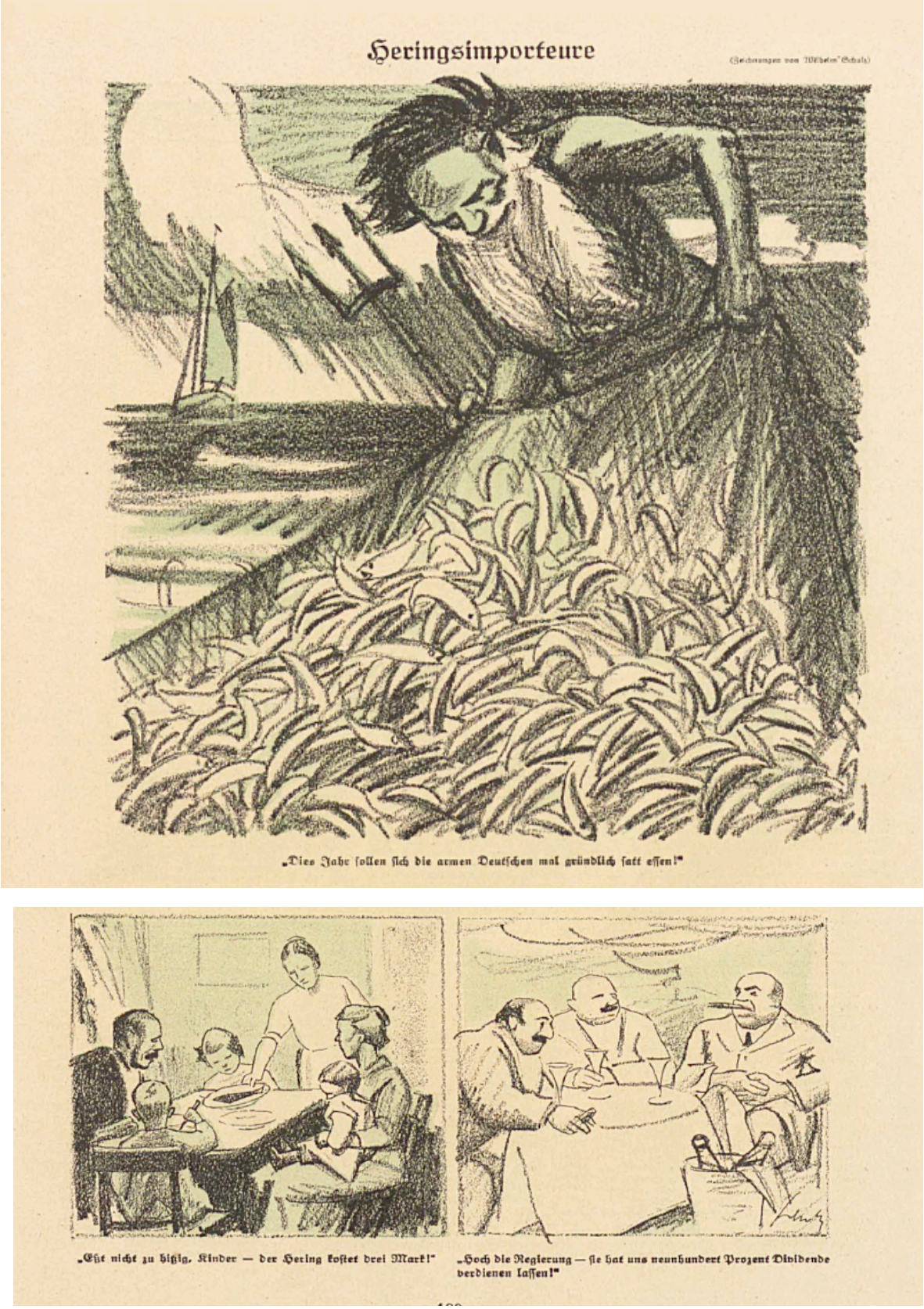

Figure 11 Herring importers." *Simplicissimus* 25, no. 12 (Jun. 16, 1920): 180.

Postwar reckonings

The compounding crises in the early years of the Weimar Republic fostered an appetite for statistics. In order to engineer solutions to the economic and social disorder of the Weimar Republic, politicians and academics required accurate data on a variety of dimensions of modern life, ranging from prices for consumer goods and wages to demographics. Such surveys became a priority for observing the layers of the crisis and laid the foundations for the assertion of social control by strictly regulating averages and access.[517] Statistical portraits from the community, state, and national level were not only essential to elaborating effective social policy, but they also performed work on the international stage during peace negotiations. They became a tool for demonstrating Germany's misery and impoverishment with the hope of negotiating a more favorable settlement. Once the issue was resolved in favor of a punitive peace at Versailles, statistics became an index of German grievances that took on a life of their own in the popular press by documenting suffering and feeding resentment. Alongside mortality statistics, which demonstrated the depth of the food crisis, the measurement of the calorie took on increasing importance. It provided a standardized measure for dietary needs, making scarcity intelligible for an international audience, while allowing for the assembly of feeding plans towards recovery.[518]

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[517] Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning,* trans. Camille Naish (Cambridge: Harvard University Press, 2002).

[518] Martin Geyer has argued that late nineteenth-century advocates for both the metric system and the gold standard belonged to the same ideology of liberal internationalism and social and economic progress before WWI. See Geyer, "One Language for the World: The Metric System, International Coinage, Gold Standard, and the Rise of Internationalism, 1850–1900," in *The Mechanics of Internationalism,* eds. Martin Geyer and Johannes Paulmann (Oxford and New York: Oxford University Press, 2001), 55–92.

The continuation of the blockade into early 1919 muddied the distinction between war and peace. Widespread reports of insufficient rations, unsuitable surrogate foods, and failures of distribution appeared frequently in the daily and weekly press during the war. Wartime exigencies had, according to reporters, reduced life in Germany to a bare minimum. However, among the population it was widely expected that these shortages would cease as the conflict ended. The press tended to present the blockade as a continuation of the wartime violence that explicitly targeted civilians, long after the armistice and to the detriment of innocent civilians. Already in December 1918, concerns about the German food situation and the Allies' lack of responsiveness prompted the Berlin Medical Society to host a conference on the "Starving of Germany."[519] Leading scientists and medical doctors congregated to give papers on the deleterious effects of the blockade, which was implemented "with the outspoken aim of injuring the life and health of the civil population, women, children and defenceless people."[520]

The accumulation of stories of suffering and dearth may have been poignant to those who sympathized, but what about the other combatants to whom Germany appealed for aid? For many pushing for a punitive peace, this narrative of German victimhood on the home front proved unsatisfactory– they were still belligerents and saddled with war guilt. To add to this psychological dimension, reports in the foreign press often emphasized how the situation in Germany was not so dire. These reports gestured to a crisis of representation that had in fact been helped along by German wartime policies. Throughout the war, strict censorship led

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[519] *The Starving of Germany: Papers read at Extraordinary Meeting of United Medical Societies held at Headquarters of Berlin Medical Society, Berlin, December 18th, 1918* (Berlin: L. Schumacher, 1919).

[520] *The Starving of Germany*, 3.

the German press to repeatedly announce that Germans were in the best health and that widespread dramatic weight loss, which was impossible to ignore, was salutary.[521] Foreign journalists who claimed to have studied Germany's food situation insisted that things were not so bad and that one could still obtain anything that one needed. As Minister of Food Robert Schmidt (February 1919– March 1920) complained in the winter of 1919,

> That is correct, in so far as these men staying in the first-class hotels in almost all cities could obtain almost anything that one could obtain in peace time. But for what price? He who doesn't have to concern himself with the price of things gets by rather easily today […] These journalists must go out to the peripheries of the large cities, to the workers' families to see what they cook and eat. And if they see that every family has a hen in its pot, then I'll gladly admit that the controlled economy (Zwangswirtschaft) was totally senseless and unnecessary. But I doubt it. […] Unfortunately, the hunger is worse than the reports from outside make it out to be.[522]

Since foreign correspondents could be an inconvenience, and German self-pity failed to drum up necessary support, the situation demanded another mode for representing the realities of life during and after war.[523] To mediate between the subjectivity of German civilians and the deafness—or in some cases, callousness—of the foreign press, a different medium for the message proved more useful. Food and nutritional statistics played a particularly important role in communicating need to both domestic and international publics.

German nutritionists and medical doctors cast the postwar food shortages not just as a problem of supply, but as a problem of knowledge. If only the situation in Germany could be properly appraised and communicated, it could be righted. This was no simple task, as the

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[521] *The Starving of Germany,* 4.

[522] See discussion by Reichsernährungsminister Schmidt, *Verhandlungen der verfassunggebenden Deutschen Nationalversammlung* 326 (24 Sitzung, Mar. 10, 1919): 628.

[523] Gerald Feldman, *Great Disorder,* 103.

issue of food provisioning had largely been neglected in the preceding decades. First, there was no groundwork for transparent statistics of production and consumption. Critics attacked the economic statistics published before and during the war for their inaccuracy and visions of false hope. Indeed, political economists tended to blame the difficulties of wartime food provisioning on the unreliability of prewar agricultural statistics, their raw material for producing estimates. Adolf von Batocki, the first president of the War Food Office, made this complaint public as he assumed office in 1916.[524] Wartime assessments did not present an improvement—these tended to reinforce the view of Germany's ability to hold out, generating a great degree of mistrust. As one paper complained, "Some referred to the harvest statistics from before the war as fraudulent documents, and then during the war we were forced to rely on these documents more than ever. This only proved how unreliable they were and how little one could depend on them. But when compared to those statistics that the authorities presented us with during the war, those prewar ones were the exemplar of precision."[525] The bad reputation of prewar agricultural statistics for painting an overly rosy picture of the food supply had only contributed to German misery during the war. In its aftermath, it became critical that these statistics reflect the opposite tendency: that of the immiserated population, brought to their knees by the unjust blockade.

These "facts" of the hunger blockade had already begun to take on a life of their own during the war. Max Rubner reflected on the harvest statistics at the conference of the Berlin

[524] Batocki, "Einführung zur Kriegswirtschaft," in *Beiträge zur Kriegswirtschaft* 1, no.1 (1916): 1.

[525] BArch R 3601 475: "Wirtschaftsvernunft und Wirtschaftsmoral. Ein Kapitel zur Ernährungspolitik," *Frankfurter-Zeitung* (Mar. 31, 1918).

Medical Society in December 1918: "We all know why this was done, though, as we now realize, it has also done us harm. By putting all sorts of obstacles in the way of accurate information the Government actually succeeded in keeping the medical profession in ignorance of what was happening in the country."[526] This lack of transparency in the press and official communiqués became a severe handicap. Beginning in 1917, states began issuing confidential reports on health conditions which were then reported to the Imperial Health Office. Following the end of the fighting, the priorities of medical professionals, who had once complied with the requirements of censorship, shifted from an attempt to sugarcoat the harsh reality of the war to struggling to convey the destitution, starvation, and need of the population. As previously mentioned (see chapter 3), the outbreak of war unleashed a scramble to calculate the longevity of Germany's food supply. Nutritionists and physiologists like Rubner and Nathan Zuntz played an instrumental role in translating the entirety of the population in all its diversity into statistical guidelines and recommended minimum daily values. Such work was not just valuable in wartime—it was also indispensable to the project of taking stock of the damage afterwards. Postwar assessments focused on malnourishment and provided important reminders of the devastation from the moment they were made. They were more than documentary evidence for posterity. They also served as diagnostics by providing an important tool for understanding the body and assisting in recovery. These wartime post-mortems became important tools of the new social politics.

During the war, medical doctors made adjustments to the category of "normal" subjects to facilitate their appraisals of the population's health. Wartime surveys of diet and

[526] *The Starving of Germany,* 4.

health were kept secret so as to preserve morale. On January 25, 1918, L. Kuttner, the director of Rudolf Virchow hospital in Berlin, delivered a report to the committee for Public Nutrition (Beirat für Volksernährung). In it, he observed that the ration was deficient in protein when measured against Voit's standard of 118 grams per day. This in itself, Kuttner wrote, was no problem, as many studies attested to the ability of individuals to make do with less protein. However, now the intake of fats had also been reduced to a minimum. This too was not a problem, as long as a necessary intake of carbohydrates was available. Drawing on a metabolic study in Munich, it was clear that "normal weights" for participants had to be set around 60 kg, instead of the usual 70 kg, for men under 50. In the last two years, men in larger cities (like Munich, where the study in question was carried out) had experienced a loss in weight of about 10%. New experiments had to take this into account.[527] The widespread weight loss among residents of cities and industrial centers invited the question of how this chronic undernourishment had impacted the health of the population overall. Should these conditions persist, serious damage to muscles and potential for physical work (körperliche Leistungsfähigkeit), as well as greater susceptibility to diseases could be expected. In order to protect the population from those consequences, it was necessary, according to Kuttner, to weigh people regularly.[528] Those who showed a continuing tendency to lose weight would be entitled to supplementary food in order to ensure their overall health. An adequate daily ration would contain 2,100 calories and 60 grams of protein, with a greater allowance of 2,500-

[527] See BArch R 3601 475: L. Kuttner, "Ueber den Einfluss der Kriegsernährung auf den Gesundheitszustand der Bevölkerung, Referat erstattet in der Sitzung des Beirats für Volksernährung am 25. Jan. 1918."

[528] See BArch R 3601 475: Kuttner, 4

3,000 calories for those engaged in hard manual labor. While it was clear that the limited quantity and different composition of food had had an effect on the population's health, it was difficult to know to what extent the war food provisioning led to a greater incidence of sickness, since this was difficult to isolate from other war effects, like lack of heat due to coal shortages, or more crowding in prisons and other psychological factors which have an impact on health.

The difficulty of policing standards during the war also contributed to the danger of foodborne illness. Many veterinarians were called into service for the war, and stall hands were also in scarce supply, endangering the health of the remaining animal population. The situation for animal products was especially precarious as meat and milk inspection was neglected due to personnel shortages. A single precautionary measure was taken by the Food Office by adding "Milk is to be immediately boiled at home" to milk ration cards.[529] Furthermore, higher incidents of typhus were linked to the prominence of mussels and oysters in the diet.[530] Thus, it was not only outright starvation that threatened German civilians, but also foodborne illnesses that would have been avoidable in peace time.

On the whole, those who were already weak and isolated from supplementary food sources tended to suffer the most. The elderly proved particularly vulnerable, and an increasing mortality rate for those above 50 demonstrated this trend. The increased mortality only set in in December 1916. After this point, it increased gradually before peaking in the winter of 1916/17. Additionally, in those segments of the population who tended to be

[529] See BArch R 3601 475: Kuttner, 7.

[530] See BArch R 3601 475: Kuttner, 11.

isolated from the countryside as well as the marketplace, the effects were difficult. This included asylums, prisons, and convalescent homes.[531] The mortality rate provided a useful guide, since many of the deaths by hunger or associated diseases were not recorded with a specific cause. On the other hand, many of these cases would not have proven fatal with adequate nutrition. As one scientist said, "With characteristic German thoroughness we are now investigating the influence of the war on the health outcomes and mortality of the population. We will discuss this question in academic and parliamentary circles, as well as in the public."[532] Thus questions about food provisioning and health became matters of politics, for the public, as well as the province of scientists.

As medical specialists frequently noted, mortality was not the only measure for determining the influences of the war and war diets on health.[533] Clinical portraits of diseases, as well as productivity measures, could complete the picture. In particular, school aged children had been affected by the shortages, as they had restricted access to milk. Undernourishment in adults from the blockade resulted in considerable weight loss, in children it took on even greater importance. Physiologists and pathologists divided children into two groups: infants (Säuglinge) and "later childhood," or school-aged children. Infant

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[531] Dr. F. Kraus, Charité, Report, *The Starving of Germany*, 8 and BArch R 3601 475: Weber Referat, "Einfluss der Kriegsernährung auf den Gesundheitszustand der Bevölkerung," 4.

[532] In the original German: "Mit echt deutscher Gründlichkeit beschäftigen wir uns zur Zeit mit dem Einfluss des Krieges auf den Gesundheitszustand und die Sterblichkeit der Bevölkerung, wir erörtern diese Frage in wissenschaftlichen und parlamentarischen Kreisen sowie in der Oeffentlichkeit." BArch R 3601/ 475: Weber Referat, "Einfluss der Kriegsernährung auf den Gesundheitszustand der Bevölkerung," 5.

[533] BArch R 3601475: Weber Referat, "Einfluss der Kriegsernährung auf den Gesundheitszustand der Bevölkerung," 8.

nutrition had been well-studied over the nineteenth century, however the later period of childhood remained relatively neglected. German children experienced diminished growth and often life-long changes: according to the estimates of one pediatrician, children during the war were on average 3–5 centimeters smaller than children of a similar age before the war.[534] The symptoms of stunted growth and other signs of stalled development were especially pronounced among workers' children. This prompted the suggestion that children be sent to the countryside, where food was more readily available.

The discourse around German suffering frequently focused on the malnutrition of children. Across the political spectrum, consensus existed that recovery required social politics to restore the nation to robust health and population growth. It is easy to see why the food supply, and the issue of nutrition, acted as a key determinant in shaping the future. The metaphor of the national body (Volkskörper) became especially potent during the Weimar years, taking on a literal meaning as the individual body became signifier of the Volkskörper.[535] It was not extremely generous social policy, but calculated need that dictated that the provision of adequate nutrition be taken quite seriously. In particular, infants and children came to be the center of national recovery.

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[534] Eugen Schlesinger, a doctor in Strasbourg, had collected exhaustive data on the relationship between weight and height in children. Schlesinger, "Wachstum, Gewicht und Konstitution der Kinder und der heranwachsenden Jugend während des Krieges," *Zeitschrift für Kinderheilkunde* 22 (1919):79–123. See also Ernst Cassel, "Die Folgen der Unterernährung im allgemeinen bei Kindern," *Zeitschrift für ärztliche Fortbildung* 17, no. 8 (Apr. 15, 1920): 213–221, esp. 218.

[535] Cornelie Usborne traces the way that the state of the nation was medicalized by doctors attempting to redress demographic decline and eugenic aptitude through her focus on handling matters related to maternity, sexuality, contraception, and abortion. Usborne, *The Politics of the Body in Weimar Germany: Women's Reproductive Rights and Duties* (London: Palgrave Macmillan, 1992).

Measuring the degree of malnourishment among children proved difficult. While doctors calculated the quantity of food needed to sustain an adult based on weight and work, this method proved useless for younger children. Babies and children required a much greater quantity of food in proportion to their weight to help sustain their growth and allow them to reach developmental milestones. As a result of the constant growth, it was also true that the interchangeability of macronutrients—carbohydrates for protein or fats—did not hold true. Growing bodies required more protein and fat. Thus, children presented specific feeding-related challenges. The commitment to demographic growth, and a renewed commitment to children's welfare, remained constant across the political spectrum.[536]

The population had thinned: the death rate on the home front exceeded that of the prewar years by 40% in 1919 through a combination of malnutrition and medical ailments. Ongoing studies of mortality and its causes continued into the 1920s, demonstrating the continued impact of blockade and then inflation in human terms. In particular, the death rate registered as extremely high, even after the close of fighting. The 1919 volume of the Statistisches Jahrbuch für das deutsche Reich published the death rate for the year, as compared with that of the years from 1903–1913.[537] The official document was picked up and recapitulated in the popular press, shaping the narrative of suffering through its circulation.[538] The figures were widely commented upon elsewhere. In March of 1920, it was reported in Frankfurt am Main that deaths were so frequent that funerals went on all day long, and one

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[536] Edward Ross Dickinson, *The Politics of German Child Welfare from the Empire to the Federal Republic* (Cambridge: Harvard University Press, 1996), 139–169.

[537] *Statistisches Jahrbuch für das deutsche Reich* 1919 (1920): 494–499.

[538] See files in BArch 3601 475.

women reported she had to wait a week before she was able to bury her brother-in-law.[539] Over the four years of conflict, and certainly in its aftermath with the relaxing of censorship laws, statistics became not just an indispensable tool for government planning, but an object of public interest. The "popular" quantification served several functions, but perhaps the most significant was the way that it conveyed a narrative of suffering and victimhood. Statistical data not only provided illustration to the German people of their own extraordinary sacrifices, but also appealed to an international audience, relaying the full dimensions of misery caused by the blockade and prolonged by the peace.

Germans communicated the pathos of hunger in their cities not just through anecdotes and numbers, but also through film. The use of medical films as teaching tools and beacons of public awareness spread during the war. In 1919, director Hans Cürlis produced a film for UFA with the help of the Imperial Health Office documenting the consequences of the blockade on health.[540] In just under an hour, the film presented three parts: "the blockade and shortages," "the blockade and the sicknesses it produced," and "the blockade and children." In particular, it demonstrated the use of innovative and thoroughly modern visual strategies. Employing a mix of text, images, maps and animated infographics, the film conveyed the staggering toll of deprivation to a lay audience. Juxtaposing data, such as calories consumed according to rationed quantities, and famished faces, cultivated a sense of victimhood and injustice. For example, as one graph depicting the body weight of an adult male from 1914–

[539] Anna Ruth Fry, *A Quaker Adventure: The Story of Nine Years' Relief and Reconstruction* (New York: Frank Maurice, 1927), 310.

[540] *Die Wirkung der Hungerblockade auf die Volksgesundheit* (1919–1921). Ufa. Bundesarchiv Censor (Mar. 31, 1921).

1920 precipitously dropped from 115 kg in 1914 to reach its nadir of just under 70 kg in 1920, the film cuts to the image of a sagging belly.

It also documented the deformities produced by malnutrition by providing close ups of human bodies measured against normal, healthy development. The high incidences of edema, scrofula, tuberculosis, and rickets were brought to life in clips from children's clinics, in which children were systematically measured and compared before the camera. Infants appeared sprawled out on a blanket on a clinic lawn, only to be lifted individually by a nurse to demonstrate the deformities of their legs. In one particularly striking scene, a two-and-a-half-year-old healthy boy nourished with Dutch milk appears alone. The film then cuts to a slide explaining "…and this is how his malnourished comrades look at home." A seven-year-old girl with bow-legs and an eight-year-old boy join him, both smaller in size. The trio gaze at the camera innocently, providing living evidence of the significant damage wrought by the blockade.[541] The advantage of film as a medium was that it could capture stalled developmental progress and jittery movements of those children plagued by rickets. Weaving together objective statistical material, infographic, text prompts, and striking footage from real life, the film's producers crafted a narrative of the blockade as cruel and criminal.[542] In doing so, it provided an effective testament of the blockade as a weapon.

Diagnosing the medical effects of the blockade formed one part of the task of assessing the damage after 1919. While studies observing the effects of malnutrition among

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[541] *Die Wirkung der Hungerblockade auf die Volksgesundheit,* 51:08.

[542] In the original: "Die Blockade verhinderte völkerrechtswidrig gegen die Abmachungen der Londoner Erklärung von 1909, daß jene überhaupt nicht zur Kriegskonterbande gehörigen Waren und Lebensmittel nach Deutschland eingeführt warden konnten." *Die Wirkung der Hungerblockade auf die Volksgesundheit,* 2:25.

entire populations were doubtlessly important, redressing these deficiencies became a priority for nutritionists and medical specialists. It also became a priority for concerned politicians, who witnessed fellow citizens, constituents, and workers wasting away. Armed with research conducted before the war, they set out to investigate a new problem: that of a malnourished, primarily urban population within Europe which was still restricted in its access to global markets. Along with politicians and policymakers, scientists struggled to articulate what the future of Volksernährung might look like. Constructing this vision involved drawing heavily on the statistical surveys and budgets mentioned above. Indeed, to speak of the Volkskörper as a whole, one needed to produce an aggregate picture. The use of the calorie as a metric for food's value became increasingly popular among specialists, as well as in lay circles during this time. As a baseline value, it permitted—even encouraged—substitutions of different groups of food, allowing cooks to follow the injunctions of buying domestic products and relentlessly economizing.

Max Rubner, for one, was dismayed with the directions nutritional studies continued to take. Writing in 1920, he complained that the very idea of Volksernährung continued to be misunderstood. The circumstances of food production were "far more complicated than parliamentary slogans would lead one to believe." He aimed to sketch the problem "in its full political and national-economic context, while at the same time considering the particularities of Volksernährung itself, which is the major mistake of today's authors who attempt to speak about the problem."[543] He complained that such misguided authors tended to mistake the

[543] Max Rubner, "Die kommende Friedensernährung," *Zeitschrift für ärztliche Fortbildung* 17 (1920): 6, first part appeared in *Zeitschrift für ärztliche Fortbildung* 17, no. 10 & 11 (May 15, 1920): 273–279.

habits of small eating communities for the interests of the whole, leading them to paint a deceptive picture of the whole: "To pursue Volksernährung is to learn the needs of an entire people (Volk)."[544] These fractured interest groups failed to offer a complete picture of what the population needed. In doing so, they continued to handicap recovery.

Rubner boldly asserted his own concept of Volksernährung and its foundations. To do so, he conceptualized the population and its needs as a literal mass of people heaped upon one another. In a somewhat puzzling attempt to estimate the full scale of the necessary recovery, he explained:

> Thus, it is clear that we need the reconstruction, especially of all the organs, that have suffered. This is a huge task; when one thinks that per capita the population weighs 49 kilos, then an entire nation of 70 million people weights 3,400,000 tons. If it is lost 15% of its mass, that is 514,000 tons, of which according to my estimates 58% is organ mass—298,000 tons and 42% fat is 218,900 tons. The loss goes quickly, but the reconstruction slowly.[545]

Essentially, he undertook to explain that though a return to prewar weights was unnecessary, it was nonetheless crucial to regain some mass in order to recover health. While some progress had been made since the lifting of the blockade, Rubner condemned the Allies for the prolonged blockade, slow resumption of trade, and thoughtless policy which provided fat but continued to deliver too little protein and not enough fodder, which would have greatly improved the situation of meat and dairy provisioning. He noted that the suggested aid organization for Central Europe, an idea floated by the interallied economic commission led by Herbert Hoover, failed to materialize and "in place of a naval blockade, they implemented

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[544] Max Rubner, "Die kommende Friedensernährung," *Zeitschrift für ärztliche Fortbildung* 17 (1920): 1–33, first part appeared in *Zeitschrift für ärztliche Fortbildung* 17, no. 10 & 11 (May 15, 1920): 273–279.

[545] The 49 kg per capita average weight is calculated for *all* age groups, not just adults. Rubner, "Die kommende Friedensernährung," 3, 12.

a foreign currency blockade, in which one can recognize the intention and disastrous effects without being able to call this a method of violence."[546] Under these circumstances, the food situation worsened. Rubner criticized the blockade as "singular in the history of human torture and a strong warning example of what was to come […] The method of artificial death by starvation was totally new."[547] In sum, food provisioning in the spring of 1920 remained insufficient for a "bodily reconstruction of the nation."[548]

But even the first picture of the nation as a heap of bodies gave only a rudimentary view of Germany's food needs. Rubner went on to sketch out how demographic trends of flight from the land had transformed the possibilities for self-sufficiency. Many economists claimed to show that agricultural self-sufficiency was entirely possible, supporting their conclusion with the evidence that even with a declining agricultural work force, output had increased over the past half century. Rubner remained skeptical. The calculations, which purported to demonstrate the path to self-sufficiency, also tended to do so by a small margin. Rubner added, "one cannot come out by the skin of one's teeth in a free market, since this fluctuates, and in emergencies the damages and shortages are borne by the consumers. In order for 'free feeding' (freie Ernährung) to be reestablished, one needs a degree of safety to be established through stockpiling that can balance out changing demand."[549] In his view, the

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[546] Rubner, "Die kommende Friedensernährung," 11.

[547] Rubner, "Die kommende Friedensernährung," 5.

[548] Rubner, "Die kommende Friedensernährung," 3. Interestingly, in considering the fate of Germany as an open or closed state, Rubner appealed towards a reestablishment of old continental ties: "Die Orientierung nach dem Osten ist viel wichtiger und aussichtsreicher. Der Osten hat Material, das es exportieren muß, weil er über andre Mittel zur Hebung seiner eigenen Staatsfinanzen gar nicht verfügt." Rubner, "Die kommende Friedensernährung," 11.

[549] Rubner, "Die kommmende Friedensernährung," 8.

responsibility of the government was to insulate against fluctuations. However, this tempered view of the future of self-sufficiency, at least in the short term, was not shared by all. During the war, official opinion held that Germans had adapted to the reduced diet and that it was perhaps healthier than the culture of excess that had preceded it.

In the immediate aftermath, the full dimensions of the health effects of the blockade became clearer. Moved by the plight of starving Europeans, congressional appropriations for American aid agencies and donations from the people contributed towards the provisioning of food in Europe. Early experiences securing deliveries and safe transport for food aid to Belgium beginning in 1914 paved the way for later efforts. The Committee for the Relief of Belgium, led by Herbert Hoover, operated as a neutral organization distributing private donations overseas. Hoover was soon called to administer the US Food Administration, which focused on distributing food reserves during the war. Hoover pursued donations and distribution tirelessly, arguing that by feeding Europe's starving, the foundations for future stability (and economic opportunity) could be laid.[550] The American Relief Administration (ARA) was founded in February 1919 by an act of Congress. One report from the Rockefeller Foundation praised Hoover's work at the ARA, writing that "it represents the maximum of self-help on the part of the countries concerned" and recommending an additional one-time gift of $1,000,000.[551] With the signing of the Treaty of Versailles, the work of the ARA as foreseen at its founding was completed. Yet given the abject poverty and hunger, Hoover suggested the organization continue operations and it was privatized, operating under the

[550] Rockefeller Archive Center (RAC) RF 100 386 Box 77 Folder 727: "Suggested Memorandum in Connection with Gift to the American Relief Administration" (undated)

[551] See RAC RF 100 386 Box 77 Folder 727.

name of the European Children's Fund until 1924.[552] The end of the blockade saw 1.3 million tons of foodstuffs enter Germany, alongside additional food provided by the American Friends Service Committee (AFCS), which was organized with the support of the ARA.

Food aid programs targeted young children, informed by the logic that they represented a group among whom the greatest impact could be made in nursing the population as a whole back to health. This was also a deliberate strategy to win loyalty among children and parents, as well as to solicit donations to support the work in the US. Images of starving European children engendered great sympathy, facilitating the process of collecting donations.[553] The early experiences of providing school meals in Belgium informed later efforts to ensure adequate feeding. Especially in belligerent countries, feeding children also presented an opportunity to win over sympathy in a younger generation and ideally pave the way for future stability. The American public viewed providing aid to children as "an opportunity to demonstrate their genuine interested in the welfare of children who are the victims of a catastrophe for which they can in no wise be held responsible." Food aid thus represented an investment in safeguarding lives in both Allied and former enemy countries.[554]

In order to reach children, the European Children's Fund proceeded with three steps. First, they set about registering children in cooperation with local school teachers; second, a

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[552] Surface and Bland, *American Food,* 73.

[553] Hoover wishes to help American people visualize the sum of effort, Pershing, lane give a dinner at which the 350,000 starving and diseased children will be present in spirit as "invisible guests" – the menu typical of what America is giving undernourished children in Europe. See RAC RF 100 386 Box 77 Folder 727: Letter, Herbert Hoover to Dr. George Vincent, (Dec. 16, 1920).

[554] RAC RF 100 386 Box 77 Folder 727.

local committee conducted an investigation; and third, the children underwent a physical examination by a local physician. The physician conducted these examinations at regular intervals to monitor the progress of the children, and once a child had been properly fed he or she was removed from the list to ensure resources were made available for another. In Germany, much of this effort was administered by the American Friends Service Committee, and many fondly recalled the "Quäkerspeisung" (Quaker feeding) after the war. These meals were served in public kitchens to ensure that they went to their intended recipients and consisted of calorically rich, unperishable foods.[555] In total, the AFCS program fed between 2 and 2.5 million children.

The Quaker activites also popularized the calorie as a measure of food value. Since the basis of the Quäkerspeisung effort was set by a German medical advisory board, including Gustav Tugendreich and Max Rubner, the work of physiologists in using the calorie as a unit of measuring adequate food intake became widely known and recognized through the distribution of meals. The program assumed that the daily caloric need for a child of ten years was 1700 calories.[556] The offering provided an additional meal program to nurse undernourished children back to health when food at home was insufficient. The guidelines specified that an additional meal should amount to about 400 calories, while a replacement

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[555] Gustav Tugendreich, "Einige Lehren der Quäkerspeisung," *Deutsche medizinische Wochenschrift* 47, no. 52 (Dec. 29, 1921) 1587–1589 and Tugendreich, "Die ärztlichen Grundlagen für die Durchführung des Werkes," *Zeitschrift für Schulgesundheitspflege* 35, no. 7 (1922): 181–196; as well as Caroline Norment, "Die Idee der Quäkerhilfe unter besonderer Berücksichtigung Deutschlands," *Zeitschrift für Schulgesundheitspflege* 35, no. 7 (1922): 181–196 and additional contributions to the special issue of *Zeitschrift für Schulgesundheitspflege* entitled "Kinderspeisung in Deutschland."

[556] Tugendreich, "Die ärztlichen Grundlagen für die Durchführung des Werkes," *Zeitschrift für Schulgesundheitspflege* 35, no. 7 (1922): 182.

would be 800. The medical advisory committee worked together with experienced cooks to create the menus, and the guidelines were published by the American Children's Relief Fund in October 1921. The book, which was not sold commercially, recommended adding a roll to each meal to increase calorie content without adding too much volume. By moving eating out of the home and into public spaces, the relief program embedded a new set of concerns and measures relevant chiefly for German children into the distribution and administration of food aid.[557] Their health received priority in the reconstruction of the nation, and the calorie became a preeminent tool in this process.

The early 1920's witnessed a flourishing of literature dealing with the demands of nutrition. As previously mentioned, this literature played an important role in taking stock of the situation and conceiving of a viable future. However, opinions on the direction of this future of food varied greatly. Many took the view that the great disruption caused by the war heralded a total reorientation of the German diet: while wartime shortages had been unhealthy, the fact that a major caesura had taken place was beneficial. Particularly in vegetarian circles, this view became widespread.[558] Even in mainstream communities, such as the Hygienic Institute at the University of Leipzig, the view of a nutritional caesura became popular. Two of the institute's leading figures, Walter Kruse und Kurt Hintze, both professors

[557] Similarly, for the trajectory of the calorie in post WWII American aid, see Nick Cullather, "The Foreign Policy of the Calorie," *American Historical Review* 11, no. 2(Apr. 2007): 337–364.

[558] See BArch R 1210 81 2: For example, Carl Oppenheimer, "Notwendige Annäherung an den Vegetarismus," *Vossische Zeitung* (Dec. 1914):409–411 or the general praise for legumes, long advocated for by vegetarians.

of hygiene, characterized the war as "fertilizing the science of nutrition in many ways."[559] From a purely scientific perspective, they continued, "the hunger blockade presented an experiment whose scale was previously unknown to illuminate the effects of years-long, sustained malnourishment in the national body."[560] As regrettable as the experience was, the "experiment" had provided key lessons about health and diet.

The understandings of food in terms of its chemical components helped to reinforce the message that it was safe, even healthy, to consume less food. Mainstream nutritionists and public health officials repudiated much of the pre-war wisdom. In particular, the issue of Voit's minimum protein value was resolved in favor of a drastic reduction.[561] It was widely recognized that prewar recommendations had been inflated, and the justification for this inflation rested upon an idea of "security" that would provide a buffer for unpredictable shortages.[562] The previous valuation of protein, for which consumers were willing to pay a higher price, needed to be supplanted by a consideration of its calories. In place of an emphasis on protein, the daily caloric intake became the favored dietary measure. Using household budgets from several cities collected during the war, nutritionists and physiologists

[559] Hintze and Kruse published their study *Sparsame Ernährung* in 1922. *Sparsame Ernährung*, 5. However a preliminary report appeared in the *Münchener medizinischer Wochenschrift* 67, no. 16 (Apr. 16, 1920) 446–454.

[560] Hintze and Kruse, *Sparsame Ernährung*, 5.

[561] Hintze and Kruse, *Sparsame Ernährung*, 106. For prewar debates about reducing Voit's protein minimum, see Treitel, "How Vegetarians, Naturopaths, Scientists, and Physicians Unmade the Protein Standard in Modern Germany," 52-73.

[562] Hintze and Kruse, *Sparsame Ernährung*, 5.

like Hintze and Kruse published this information alongside recommendations for cost-reducing, nutritious diets.

Foods came to be reappraised by their price in relation to their caloric content. This measure of cost per calorie came to dominate the hygienic literature in the early 1920s. As Hintze und Kruse explained in their assessment, "Consideration of our economic situation leads us to reduce the cost of our food as much as possible; consideration of our freedom leads us to strive to make ourselves independent of imports. In doing so, the fare should fully meet health needs and also satisfy well-grounded claims of our tastes, so that we are not fully robbed of our Genussmittel."[563] The work of overcoming old preferences, such as those for meat and beer, two substances that were among the most expensive when judged by the cost per calorie metric, could be done through education and upbringing (Aufklärung und Erziehung).

In particular, the emphasis on calories enabled the work of shrewd substitutions. For Kruse and Hintze, the most difficult to replace domestically were fats. However, they wrote "The ideal would be for the Fatherland to make itself just as independent from foreign imports in fat provisioning as it once did for sugar production," referencing the ingenious work of breeding and cultivating the sugar beets in the previous century.[564] By comparing three different classes of diets based on past surveys: "cheapest fare," based on those of weavers in Zittau; "frugal fare," based on the budgets of Leipzig workers during the war; and "previous usual fare," that of the pre-war average taken by averaging workers' families in Hamburg

[563] Hintze and Kruse, *Sparsame Ernährung*, 114-115.

[564] Hintze and Kruse, *Sparsame Ernährung*, 126.

with German metalworkers, the authors assert that the three types were equal in their nourishing value, but had different levels of enjoyment and different prices. In order to decide which is best, a view towards the national economic situation, rather than the income of the families, needed to be kept in view.[565] In the future then, an ideal diet would approximate that of the group of Leipzig workers during the war, with some allowances made for more preferable foods such as meat and dairy. The authors assured readers of their accuracy based on the minimum cost of living (Existenzminimum) published by the National Statistical Office and various cities, which approached the diet of the second group, "frugal fare."[566] They counseled that Germans could not afford a return to prewar diets, which included ludicrously large quantities of meat, milk, beer, butter and white bread.[567] Instead, households had to be brought to awareness about their role in the national economy.

However, the problem of a reformed diet was not so clear cut. Four and a half years of rationing had also introduced a host of new food habits, including the spread of meat consumption through meat ration cards beyond the borders of where it was customary, the replacement of beer with milk, and the general acquisition of the habit of using bread spreads

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[565] Hintze and Kruse, *Sparsame Ernährung*, 117.

[566] In November 1919, frustrated by the lack of progress in finance reform, statistician Robert Kuczynski began publishing his opinions in a new outlet, *Finanzpolitische Korrespondenz*. From its initially small circle of subscribers, Kuczynski's publication attracted great interest beginning February 1920 by publishing his monthly calculations of the "existence minimum," (*Existenzminimum*) based around prices for food, since food tended to the be the largest expense for impoverished Germans. The metric took on a life of its own and was widely used as the basis of other calculations, as in Hintze and Kruse's study, or in wage contracts and arbitration awards. See Kuczynski, *Das Existenzminimum und verwandte Fragen* (Berlin: Verlag Hans Robert Engelmann, 1921).

[567] Lübstorf, "Preis und Kosten der Lebenshaltung in Leipzig," *Mitteilungen des statistischen Amtes der Stadt Leipzig*, 1-3 1920–1921; Kruse and Hintze, *Sparsame Ernährung*, 117.

(either fat or marmalade), which had not been widely practiced before the war. In a sense, the war had also contributed towards a standardization of German food preferences. While the work of Hintze, Kruse, and others focused on food consumption across occupational and regional lines, a true picture of national food need required a different approach. Max Rubner pursued such a panoramic view: to truly understand the basis of Volksernährung and uncover universal laws of nutrition, he counseled, one had to scale up beyond the level of idiosyncratic groups defined by occupation.[568] Instead of small groups of people, one had to be more ambitious and turn towards larger populations. This approach informed his view of heaping the whole nation onto a scale to arrive at the 49 kg per person estimate. But even more useful than national-level level statistics were international statistics, which enabled him to conclude that "the consumption of entire nations is not considerably differentiated, and that in itself there are neither especially luxurious nor especially impoverished nations, but that all strive in their diets towards a universal average, which, per capita is 85 grams of protein, 67 grams of fat, and 2876 calories."[569] To arrive at these values, food could be freely chosen, and indeed the diversity of different national eating habits was a testament to the manifold ways of securing these quantities of nutrients. He continued, "If one examines the different forms of national diets, the idea suggests itself that it is all a game with numbers and to see this or that food group as superfluous. They are interchangeable among each other, that we can see clearly. Yet

[568] On the spread of these bad habits, Rubner, "Die kommende Friedensernährung," 29-32. Here he mentions that the before the war, fat consumption in Germany was much lower than in England and America, but the wartime habit of spreading a little fat on bad bread had also become habit in southern Germany, a region in which the cuisine had previously been low in fat. He also noted that such changes were not particularly damaging when price policy worked to check this habit and prevent excesses.

[569] Rubner, "Die kommende Friedensernährung," 13-14.

in spite of this one should not believe that the composition is totally arbitrary."[570] Rubner pushed for the adoption of a true Ernährungspolitik: in place of half-hearted commitments to doling out delivery contracts to favor certain interest groups and electorates, he advocated for systematic attempt to address the food needs of the entire nation. However, he warned that any attempts to influence eating habits through propaganda were likely to fail, since every man held the opinion that he was best informed over his own food needs. In order to see improvement in feeding, his only concrete recommendation was to extend the education of women in nutrition and homemaking.[571]

Like Rubner, Kruse and Hintze, many postwar cookbooks advocated for a frugal way of life. The recommendations generally followed the same pattern: first, they asked housewives to favor domestically produced products; second, they asked that women be as frugal as possible in their purchases; and finally, they demanded a resolute commitment to minimizing waste.[572] The calorie became an especially useful metric for enforcing these lessons, enabling substitutions and assuaging fears that a more restricted diet led to undernourishment. Substitutions would need to be made in order to adapt to the new circumstances, however these were in no way to be viewed as sacrifices, since they allowed for a standard of living well in excess of the minimum. Furthermore, the frugal lifestyle was to be enhanced by additional work undertaken at home. This included the tending of home gardens or Schrebergärten, as well as the preserving of homemade jams and pickles. Though

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[570] Rubner, "Die kommender Friedensernährung," 28.

[571] Rubner, "Die kommender Friedensernährung," 32.

[572] See also Hedwig Heyl, *Kleines Kriegskochbuch* (Berlin: Habel, 1914), 1-5; Henriette Fürth, *Kleines Kriegskochbuch: Ein Ratgeber für sparsames Kochen* (Frankfurt: Englert & Schlosser, 1915).

these measures may have reduced household expenditure, they placed additional burdens on women who engaged in these activities. Here again we encounter the thread of covert austerity undergirding plans for economic recovery.

NEM and the problems of the calorie

While the calorie gained traction as a useful measure for food, it was not without its problems. Chief among these was that it was impractical. It was also abstract: as a measure of energy, it lacked specific reference to anything recognizable out in the world, nor did it reflect the body's nutritive to digestion processes. Especially for young children, who were among the most seriously affected by the blockade, the specific macro-nutritional composition of their diets was consequential. The difficulty of monitoring and feeding children was an issue of great concern during, and particularly after the war. In Vienna, where hunger in the final months of the war had been severe, the issue attracted the attention of a pediatrician named Clemens von Pirquet. Pirquet, who had practiced and taught medicine in Vienna, Königsberg, Berlin, and Breslau, saw the fate of many children and conducted experiments monitoring normal and deviant growth patterns from his position at the University of Vienna's Children's Clinic. In order to improve the health outcomes of malnourished children, he devised a new system for measuring the nutrients of food that was intended to replace the calorie, and was at once more intuitive and concrete for users.

The NEM, as it was called, stood for the nutrition unit of milk (Nahrungs-Einheit-Milch). It was a food unit representing the equivalent to the nutritive, combustible value of

one gram of average human milk.[573] As Pirquet explained in his exhaustive manual outlining the system, it approximated both average human milk and cow milk. While mammal milk varied greatly in its fat content, it was remarkably stable in the relation of protein to milk-sugars. Justifying this decision to base the system on averages rather than precise values, Pirquet wrote "nevertheless we are entitled to take a certain theoretical average as a standard, just as we use the horsepower as a standard for our machines, disregarding the fact that every individual horse has a different power."[574] In this system, precision was not the cardinal virtue, but rather utility.

Pirquet identified several issues in feeding stemming from the use of the calorie as a standard measurement. While a calorie—defined as the amount of heat needed to raise the temperature of one gram of water one degree Celsius—was an obvious measure to a physicist in a laboratory with proper equipment, it was nearly impossible to measure within a living being. This difficulty had been raised by Voit and Rubner decades earlier as they painstakingly examined excretions to arrive to understand metabolism. As Pirquet pointed out, "the fact is, that every one of the greater schools of physiology has its own definition, and, therefore, arrives at a different caloric value for the food-stuffs of ordinary use."[575] Even under laboratory conditions, or strictly controlled experiment among institutional populations, the natural variation in the calorie content among the same foods complicated results and thus also recommendations.

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[573] Pirquet, *An Outline of the Pirquet System of Nutrition*, (Philadelphia: W.B. Saunders Company, 1922), 23.

[574] Pirquet, *Outline*, 23.

[575] Pirquet, *Outline*, 24.

Furthermore, Pirquet argued, the calorie was not a suitable unit for assessing the nourishing properties of food. Taking the example of coal, he highlighted how the substance had a rich caloric value, but lacked any food value. The matter was further complicated by foods such as leafy greens, which had little caloric value and might actually lead to weight loss because the work of chewing and digesting the substance far outweighed its caloric value. These complicating factors led agriculturalists to pass over the caloric system and adopt different units suited to their own purposes. Pirquet drew inspiration from systems such as the Kellner starch unit that were widely used in animal husbandry. The Kellner system hinged on comparing the amount of fat produced by a given foodstuff when compared to fat produced by the same quantity of starch. The principle, of having a unit oriented around its effect on the body, was the same within the system he proposed, except instead of an orientation towards fattening, it was towards nourishment. Pirquet reported that it was simply intuitive that the basis should be milk, since it is the first food for humans and contains the important macronutrients as well as vitamins.[576] Out of these considerations, the NEM was born.

The NEM feeding system rested upon measurements taken by measuring the sitting height of a child, known as the Pelidisi formula, to determine necessary intake per day. The most extensive experiments were carried out among nursing babies.[577] The system departed from previous recommendations by recommending a much higher energy value for infants in a more concentrated form. However, it also proved remarkably successful in nursing older

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[576] Pirquet, *Outline*, 25.

[577] Pirquet observed that infantile scurvy, a rare appearance before the war, became frequent during and after. He hypothesized that this was an indirect effect of Austria being cut off from its coal regions, in turn preventing farmers from producing artificial ice to cool milk. Instead, milk was heated or treated to preserve it, which destroyed vitamins. Pirquet, *Outline*, 44.

children back to health. In the Vienna children's clinic, this was facilitated by dividing children into nutritional classes based on their sitting height and nutritional requirements. The children were seated at a table according to their class. The food was distributed in "hektonem" portions; this way it was easy to enforce a policy of a clean plate. Pirquet also commented that this was an exceptionally efficient and economical distributional system, as upon its introduction the man who rented the right to collect garbage wished to sue the clinic for his losses.[578]

An additional feature of the system, besides its minimal waste, was that it did not involve "rich" feedings. The logic here was twofold: first, it was practical to attempt nourishment with a minimum expense in a country that remained so poor. Only 10% of the NEM system diet was comprised of meat, but the balanced composition that the system ensured promoted weight gain. Second, it was undesirable to accept children into the clinic, feed them up, only to release them back home where they would no longer have access to these foods. Worse still, they might experience a diminished appetite when faced with the normal fare of gruel, potatoes, and vegetables that characterized the average diet. Sliding into lethargy, the child would in no time be readmitted to the clinic as underweight. Pirquet cited the hundreds of children who were taken to Switzerland or Holland after the war for several weeks of feeding and recovery. These children tended to fare even worse after their return than those who remained at home on a simple and regular diet, learning to eat everything that was set in from of them.

The question facing Central European doctors was whether the damage of a prolonged period of childhood malnutrition could be reversed. Any farmer worth his salt knew that a

[578] Pirquet, *Outline*, 52.

long period of food scarcity affected growth in young animals, so that they remained stunted throughout their lives. However, as Pirquet and others pointed out, human children had an advantage: their period of growth for humans lasted much longer, and therefore one to two years of scarcity could be made up through ample feeding. This compensatory logic also informed the charitable work undertaken by the Interallied Relief Commission and other benevolent organizations. In Austria, as well as in Germany, feeding programs began for children under the umbrella of the American Relief Administration. Pirquet was charged with designing the Austrian program, which allowed him a unique opportunity to observe the effects of feeding on a population of hundreds of thousands of undernourished children. His system proved valuable for organizing mass feeding and allocations of child-feeding supplies were made on the basis of the NEM unit to simplify operations.[579]

Austria was among the largest beneficiaries of food aid from the American Relief Administration and associated aid agencies. Like Germany, Austria was burdened with much of the war debt and hamstrung by restricted resources. As a new country carved out of the formerly expansive Habsburg Empire, it had the distinct disadvantage of being cut to unite the large metropolis of Vienna with a swath of largely mountainous, unproductive farm land. Much of its former agriculturally productive hinterland lay in severed territory in Hungary. Furthermore, according to the wording of US congressional appropriations, funds could not be used for Austria because of its enemy status.[580] A complicated dance ensued, spearheaded by Hoover, to negotiate an American loan to England, France and Italy in order to finance

[579] Surface and Bland, *American Food*, 158.

[580] Surface and Bland, *American Food*, 154.

deliveries of food to Austria. Provisions purchased with American money lasted through the spring of 1920, at which point a new survey of children's nutrition was undertaken. The results were dismal: 78% of children under 15 in Austria were undernourished, while 96% of Vienna's children met these conditions.[581] An expanded plan for child feeding was undertaken with a three-year timeframe, sponsored by the European Children's Fund. The program implemented strict controls at feeding stations to ensure only those in need received meals; still the numbers were staggering. Pirquet devised a gatekeeping system for the program. Using his Pelidisi formula, which determined the sitting height and the weight of the child, officials determined eligibility. As the American reports determined, "This method, which eliminated all personal opinion and all local influence, proved extremely simple and satisfactory."[582] The NEM system, executed in accordance with Pirquet's principles, provided the structure upon which children's relief aid was carried out in Austria.

The NEM was treated as a curiosity outside of Austria, despite high American praises for Pirquet's successful outcomes there. The short career of the NEM can tell us much about the postwar nutritional crisis. First, the unit successfully reflected the needs of children who represented the most urgently attended to demographic group after the war. Second, in Pirquet's rationale for employing the NEM over the calorie, we can see how difficult it was to popularize such an abstract measure. In order to ensure that women were providing their families, and above all their children with nutrition, it was crucial that they be able to use a

[581] Surface and Bland, *American Food*, 158.

[582] Surface and Bland, *American Food*, 158.

simple and straightforward unit that appeared more intuitive than the calorie. Pirquet's system valued utility in the household over accordance with scientific convention.

Recovery in the household

The household became, by default, the primary site for postwar recovery. If, as Adam Tooze has written, "The Weimar welfare state and labor administration embodied radical, technocratic schemes for social rationalization," these plans were largely unrealized in the realm of private consumption.[583] The tendency towards technocratic plans and bureaucratic centralization were underpinned by shifting the burden of responsibility onto individual private households and exalting austerity. It became increasingly apparent that the general contours of political economy could not afford to ignore the household as a unit of both production and consumption.[584] In place of a considered restructuring of the economy, the early Weimar years saw emergency efforts to stem the worst of the crisis of chronic shortage and later inflation. The empowered wartime bureaucracy of the food administration was dismantled as a means of manufactural consensus. However, the ambitious social welfare state that remained tended to shy away from interventions into feeding programs, preferring to slowly demobilize the command economy and return to the free market.

While official policy supported increased agricultural and industrial production and growth in wages, the allocation of resources remained strained. Rather than remedy this

[583] Tooze, *Statistics*, 77.

[584] Judith Coffin, "A 'Standard' of Living European Perspectives on Class and Consumption in the Early Twentieth Century" *International Labor and Working-Class History,* 55 (April 1999), 21.

through the elaboration of feeding programs or kitchens, which women experts like Henriette Fürth endorsed, the emphasis fell on the restraint of private consumption.[585] In particular, the figure of the German housewife, who had been lionized by wartime propaganda as "combating the English starvation plan with the cooking spoon," was expected to continue to strive to maintain her household with as little waste and reliance on foreign imports as possible.[586] Thus, instead of seeing private consumption as an effect largely determined by national level policy decisions, officials promoted a view of the household as determining the nation's needs through appealing to virtue and custom. National recovery required a combination of more work and self-discipline, both of which were expected of women. This was a version of economic citizenship that built off of the bourgeois value of thrift espoused in Imperial Germany, elevating it to national duty. By running a parsimonious household, women could both provide for their families and assist in the national recovery effort.

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[585] While resistance to mass feeding programs and public kitchens was well documented, many social reformers and home economics professionals, such as Fürth, saw these measures as the only viable solution for the nation if women were still needed to work outside of the home. For resistance to public kitchens, see Fürth, *Streifzüge,* 179-180 and Davis, *Homefires Burning,* 130–150. Fürth nonetheless supported the introduction of such measures while acknowledging that the cultural change to make them widely used and valued might take some time. Fürth, "Gemeinwirtschaftliche Förderung der Haushaltung und der Lebenskraft," in *Schriften der Gesellschaft für Soziale Reform* 69, 9 (1919)1–46, especially 18–26.

[586] See for example the official notices of the War Food Office, BArch 3101 533:: "In keiner Zeit hat sich die Bedeutung einer guten hauswirtschaftlichen Ausbildung so gezeigt als im Krieg— So wie unsere Männer zur Verteidigung des Vaterlandes gegen den feindlichen Angriff die Kriegswaffen ergreifen mußten, so haben unsere Frauen im Kamp gegen den englischen Aushungerungsplan mit dem Kochlöffel zu kämpfen." *Mitteilungen aus dem Kriegsernährungsamt* (Sept 13 1916). For more on the policy of "covert austerity" during the Third Reich, see Avraham Barkai, and Helen Reagin following him, Barkai, *Nazi Economics: Ideology, Theory, and Policy,* trans. by Ruth Hadass-Vashitz (New Haven: Yale University Press, 1990), 233 and Reagin, "*Marktordnung* and Autarkic Housekeeping: Housewives and Private Consumption under the Four-Year Plan, 1926–1939," *German History* 19, no. 2 (April 2001): 162–184.

Political leadership and woman home economists espoused a strategy for integrating the household as an essential part of the national economy. Women, newly empowered in Weimar democracy as citizens with full voting rights, became increasingly vocal in bringing domestic matters to the national political stage. For women who had been drawn into economic life and the workplace by the war, the importance of women's work outside the household became apparent. Their signal contribution to the war effort, taking over hard factory jobs in munitions factories, has received much attention from historians.[587] However, the traditional sphere of women's work— household and care jobs— also became increasingly professionalized. In fact, it can be argued that the work of administering to the "social" fell squarely upon the shoulders of German women.

"The domestic economy (Hauswirtschaft) was treated as the Cinderella of the general economy," observed Henriette Fürth in 1919. "No one would have thought to set domestic work on the same plane as productive work in workshops or factories when in reality it should be placed above such work."[588] While the duty of a woman as mother and caretaker was exalted after the war, her status as the de facto head of household and expenses became the focus of education efforts and analyses of the "hard facts"— i.e. numbers. The strategy involved examining the significance of numbers for the household itself. The domestic economy presented the single economic form that did not produce for the market, but

[587] For the classic account of the changes the war wrought on women at work and at home, see Ute Daniel, *Arbeiterfrauen in der Kriegsgesellschaft: Beruf, Familie und Politik im Ersten Weltkrieg* (Göttingen: Vandenhoeck & Ruprecht, 1986).

[588] Fürth, "Gemeinwirtschaftliche Förderung der Haushaltung und der Lebenskraft," in *Schriften der Gesellschaft für Soziale Reform* 69, 9 (1919), 2.

immediately for humans by covering their needs and raising them.[589] In mainstream economics, indicators tended to be based on production figures. Debates raged about whether Germany was in a position to produce enough food for its own market, how much remained to be imported, and whether industry had recovered from the transition from war to peace. These problems were discussed not just in specialist journals, but in popular and trade papers. While experiences varied widely by class and location, these productive indicators promoted the idea of the nation, of a national interest and national well-being. However, they displayed an overwhelming tendency to appraise goods and activities in relation to their utility to the market. In order to fully describe economic activity, a thorough accounting for consumption needed to be inserted. On this point, leaders of the home economics movement such as Fürth and Alice Salomon, a parliamentarian and founder of women's home economics schools, attempted to assert their own importance.

Between 1919 and 1923, a more comprehensive notion of the national economy developed, one that parliamentarians, scientists, and educators tended to politicize. Alice Salomon defended the importance of the household in this overall notion of the economy: "We consider food, clothing, and shelter to be necessities for life (Existenzbedürfnisse) […] The entire economy is oriented towards meeting these needs for the entire population."[590] Within such a broadly conceived notion of the economy, women played an indispensable role. In order to elaborate the programs of the social welfare state, the core project of Weimar's

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[589] Gertrude Hübinger, *Die Hauswirtschaft der Nachkriegszeit in Zahlen (Die Hauswirtschaft im Lichte der Statistik)* (Langensalza, Berlin, Leipzig: Beltz, 1931), 6.

[590] Salomon, *Die deutsche Volksgemeinschaft: Wirtschaft, Staat, soziales Leben* (Wiesbaden: Springer, [1922] 1926), 17-18.

governing Social Democratic coalition, women's work needed to be recognized and valued. As Salomon wrote, "whereas 100 years ago the legal state (Rechtsstaat) was the creation of men, the fate of the social welfare state rests in the hands of women."[591] In the wake of the destruction of both the economic value and human life wrought by the war, the ambitious program for reform and expansion was necessary.

Maintaining an orderly and rational household was the first line of defense, "since the household economy is tied into the national one in thousands of ways."[592] As Salomon saw it, the demands of postwar life had resulted in the "incorporation (Eingliederung) of the household as a cell in the entire organism (Gesamtorganismus) of economic life."[593] Thus, the health of an individual household was closely bound up with the health and wellbeing of the whole. Rationalizing the household required a specific set of skills that could, and should be taught, according to reformers. Chief among these was the duty to minimize reliance on foreign wares. As an indebted nation, Germany could hardly afford this. A woman made choices that directly impacted demand and therefore, according to estimates of Professor Willy Wygodzinski of Bonn, she laid out 60% of the spending for private use in the name of food, clothing and heating. In large part, this education was administrative in nature.

Pleas for a more frugal lifestyle involved mastering rational nutrition and retraining women to be attentive consumers. These educational efforts were not the target of state initiatives, but rather rested on literature popularized through women's magazines and

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[591] Salomon, *Die deutsche Volksgemeinschaft,* 149.

[592] Salomon, *Die deutsche Volksgemeinschaft*, 163.

[593] Salomon, *Die deutsche Volksgemeinschaft,* 163.

specialized courses and academies, such as those offered by the schools Salomon founded before the war and continued to operate. Food provisioning and preparation provided a key arena for these developments. Basic nutritional science was taught, alongside proper measures for budgeting. "In any case, the feeding of a larger population on limited territory without dependencies on the world economy will not be possible without radical transformation of lifestyles," wrote Salomon.[594] The growing esteem for women's work and management bound the idea of the household, previously thought of as too parochial and divorced from the whole, to wider world events. On the one hand, Weimar notions of household and family presented a reinforcement of the idea of separate spheres: women were encouraged to take to traditionally feminine types of work with renewed vigor. Yet it was also the case that these spheres were no longer separate, as the household was held up as the backbone of Germany's economic recovery. In running it appropriately, a woman fulfilled her patriotic duty as a citizen.

Conclusion

The literature on housekeeping and budgeting directed at women in the early Weimar years reflected a bid for control in an increasingly disordered atmosphere. The Republic lurched from crisis to crisis, and national level politics struggled to resolve food shortages well after the end of the blockade. The existence minimum and generous social provisions which had been promised at its beginning seemed far out of reach. Even under Social Democratic leadership, the government declined to act on distributional schemes after the contested legacy of wartime rationing programs. Experts deployed nutritional science to survey the damage that the war had wrought on German civilians, and in particular children,

[594] Salomon, *Die deutsche Volksgemeinschaft*, 173.

pathologizing hunger and its manifestations. The rise in prominence of the calorie as a unit for measuring nutritional value can be traced back to this period of malnutrition and feeding programs, as a way of quantifying nutritional deficiencies. As a unit, it became an important tool in ensuring recovery. Allied food relief programs in Germany and Austria increased contact between children and caretakers and scientific feeding, thus diffusing knowledge about systems of measurement (like the calorie and the NEM) into the modern kitchen.

Simultaneously, the feeding programs and the persistent state of malnutrition demonstrated the gap between a technocratic welfare state and its sphere of action. This gap led to the encouragement– and in part, necessity of– instituting "covert" austerity measures at the household level. This austerity was born of necessity, but also became folded into a new definition of economic citizenship promoted by both national and home economists. This praise for the household, and in particular for the woman as a frugal administrator, demonstrated the far-reach of the Verwissenschaftlichung at the beginning of the interwar period: not only were women expected to be the stewards of their families, balancing new nutritional knowledge about meal composition with budgetary concerns, but housework increasingly professionalized through instruction in courses or women's academies. As the larger, national situation looked increasingly irredeemable, culminating in inflation and invasion of the Ruhr in 1923, the home became the front lines for reform and recovery.

CONCLUSION

Just as the German economy ground to a halt with the French Occupation of the Rhine in 1923, an article on the academic blind spot towards food policy appeared in the Jahrbuch für Nationalökonomie und Statistik. The author, Ernst Grünfeld, occupied the Chair for Economics at the University of Halle. He wrote:

> Just as the experience of the past few years and the difficulties of food provisioning has revived interest, so it was also in earlier times: as long as famines and food concerns inflamed tempers, food policy was provided for. In fact, what sciences offer on this account is less interesting than the silence that sets in as soon as concerns about daily bread recede into memory. […] Before the war we were all spared such concerns. How good we had it back then becomes clear in the general reference works. Der große Meyer (1904) knew nothing of key words such as food policy (Ernährungspolitik), aside from a few remarks about grain trade and tariffs […] We only saw economic literature on food policy accompanying shortages and problems. […] Here German science is still in children's shoes.[595]

The observation reveals a certain amnesia towards matters of nutritional policy until a crisis demanded a sharpened focus. In the absence of acute pressures, under the normal status quo of adequate provisioning, food policy received little attention from economists and was considered unworthy as a topic of serious study.

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[595] Ernst Grünfeld, "Die Stellung der Ernährungspolitik in der volkswirtschaftspolitischen Literatur," in *Jahrbuch für Nationalökonomie und Statistik* (1923): 270–275. Indeed, food crises within Europe were portrayed as firmly belonging to the past: the entry for "famine" (*Hungersnot*) from *Meyer's* 1902 edition read, supposedly originated "crop failures, originating through drought, an excess of rainfall, insect plagues, plant diseases and, in the past, under more limited economic and transportation conditions, these conditions easily became devastating." *Meyers Grosse Konversations-Lexikon*, "Hungersnot" vol. 21 (1902), 656-657.

It is tempting to agree with Grünfeld, and more broadly with the characterization of food concerns as a province of only the most impoverished or marginal populations.[596] Indeed, as Alice Weinreb has pointed out in the case of the Federal Republic of Germany, the ability to not think about food was at the heart of West Germany's self-conception as a postwar, affluent, consumerist society.[597] In short, it was the ultimate privilege to able to forget about food, and the increasingly complex webs of science, technology, trade and transport, that brought it to the table.

Yet this view of food security as a non-issue in Imperial Germany does not reflect the way in which fears of food scarcity roiled below the surface under stable, and even propitious, conditions. Developments in nutritional science were used to express discursive anxiety about economic development and national standing, even during the "fat years." While it is true that between 1871 and 1914 Germany did not experience a famine, it faced the challenge of finding a place within a globalizing economy. The tendency to view diet as a sign of civilizational progress meant that the success, or failure, of the nation was read into its nutritional status. Thus, nutrition provided tools not only for understanding minimums, but also for measuring economic success and national prestige. During these years, the academic study of nutritional science garnered increasing attention from medical professionals, social reformers, and government officials alike. It promised to provide useful knowledge and standard units for optimizing relations between individual, national, and global economies.

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[596] Deane Curtin, "Food/Body/Person," in *Cooking, Eating, Thinking: Transformative Philosophies of Food*, eds. Deane W. Curtin and Lisa M. Heldke (Bloomington: Indiana University Press, 1992), 4.

[597] Weinreb, "Matters of Taste: The Politics of Food and Hunger in Divided Germany," (University of Michigan: PhD Diss, 2009), 5-6.

The aim of the dissertation has been to explore how concepts from nutritional science– such as protein minimums or caloric values– became mobilized in thinking about food security. It spans a period of supposed affluence into one of great need. Politically, it sits astride Germany's transformation from monarchy to republic, accelerated by a catastrophic world war, domestic revolution, and economic crisis. Geographically, it witnessed the shifting of borders from a global empire with extensive territories in eastern Europe to a shrunken republic. Along with these developments, it also saw a fundamental demographic shift. The bulk of Germany society, which had remained rural and agrarian throughout the nineteenth century in spite of a slow-motion process of urbanization, shifted between 1871 and 1910. In 1871, 64% of the population lived on the land in communities of under 2000 inhabitants, while only 5% lived in cities; by 1910 40% lived on the land, 21.3% were urban dwellers and 27.4% lived in mid-sized towns of 5000-100,000 inhabitants.[598] After World War I, this urban-rural divide was more pronounced, with population growth in urban areas set amidst a hollowed out countryside. This fundamental shift in the population sparked concerns about food provisioning, prompting studies of the relation between the health of the individual body and the nation.

As we have seen, the debates over minimum protein values and a right to meat served to delegitimize the government. In Wilhelmine Germany, consumers and their advocates in the Social Democratic Party attacked ruling interests by using these indicators to unmask the distributional problems of the state. Tariffs and sanitary protections, they charged, targeted the most vulnerable and failed to resist changes in the global economy. During World War I,

[598] Hans-Ulrich Wehler, *The German Empire, 1871-1918,* trans. Kim Traynor (Dover: Berg Publishers, [1973] 1985), 39-41.

resourceful schemes of food substitution were implemented, both officially and commercially, to encourage domestic production. The encouragement of substitution schemes was enabled by a large and centralized wartime food bureaucracy, the War Food Office (Kriegsernährungsamt). However, in the immediate aftermath of the conflict, its responsibilities were scaled back. In place of state-led reforms or provisioning schemes like communal kitchens, the burden fell on private households, and especially women under a program of "covert austerity." Under the circumstances, this was felt to be the best path towards economic self-sufficiency.

In part, this was because the experience of the war and rationing had taught that it was in light of the numerous variations that determine food need, it was best dealt with at home. But it was not just the war that taught this lesson; as the critique and exchange between Life Reformers has shown. Food and diet were complicated matters. They were, and are, not merely a problem in need of a biological answer—they are also eminently socially and culturally conditioned. Thus, questions of what one should eat attracted experts from a variety of backgrounds—physiologists, chemists, biologists, anthropologists, and economists all mustered to the cause of determining what an ideal diet should look like.

As useful as nutritional knowledge was as a tool of organization and management, it rarely provided straightforward answers that suited large bureaucracies. The conclusions of practitioners about minimum and aggregate needs were contested, as they employed different methods or pursued different goals. Over the period covered in this study, nutritional science became increasingly valued for the ability to calculate aggregates and estimate within the larger national economy. Nonetheless, at the individual level of what one should eat, it remained rife with controversy. Nutritional science, for all of its utility, remained a territory

where there was little consensus, just as there continues to be little consensus today. Comparing our knowledge of celestial bodies with that of human nutrition, Martin Rees once observed, "There is a real sense in which dietetics is harder than cosmology."[599] This characterization, highlighting the complexity of a matter so close and quotidian, holds no less true for its disciplinary beginnings.

[599] Rees quoted in Shapin, "Expertise, Common Sense, and the Atkins Diet," in *Public Science in Liberal Democracy, Jene Porter and Peter Phillips*, eds. (Toronto: University of Toronto Press, 2007), 175.

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