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The Great Variety of the Living Economy: German Economic Thought and Biological Analogy (1875-1936)

Kuster Marius

UNIL | Université de Lausanne

FACULTÉ DES HAUTES ÉTUDES COMMERCIALES

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Doctorat ès Sciences économiques,
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par

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Dr. François Allisson, expert interne
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Internef - 261
CH-1015 Lausanne

IMPRIMATUR

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Professeure Marianne Schmid Mast, Doyenne

THESIS COMMITTEE

BORIS NIKOLOV

Professor of Finance, Faculty of Business and Economics, University of Lausanne

President of the committee

HARRO MAAS

Professor at the Walras-Pareto Center, Faculty of Social and Political Sciences, University of Lausanne

Thesis supervisor

FRANÇOIS ALLISSON

Senior Lecturer at the Walras-Pareto Center, Faculty of Social and Political Sciences, University of Lausanne

Internal expert

MARCEL BOUMANS

Professor at the Faculty of Law, Economics, and Governance, Utrecht University School of Economics

External expert

HARALD HAGEMANN

Professor Emeritus of Economic Theory, Department of Economics, University of Hohenheim, Stuttgart

External expert

University of Lausanne
Faculty of Business and Economics

PhD in Economics,
subject area History of Economic Thought and Philosophy

I hereby certify that I have examined the doctoral thesis of

Marius Alexander KUSTER

and have found it to meet the requirements for a doctoral thesis.
All revisions that I or committee members
made during the doctoral colloquium
have been addressed to my entire satisfaction.

Signature: ____________________ Date: 24-10-2023

Prof. Harro MAAS
Thesis supervisor

University of Lausanne
Faculty of Business and Economics

PhD in Economics,
subject area History of Economic Thought and Philosophy

I hereby certify that I have examined the doctoral thesis of

Marius Alexander KUSTER

and have found it to meet the requirements for a doctoral thesis.
All revisions that I or committee members
made during the doctoral colloquium
have been addressed to my entire satisfaction.

Signature: F. Allisson Date: 24/10/2023

Dr. François ALLISSON
Internal expert

University of Lausanne
Faculty of Business and Economics

PhD in Economics,
subject area History of Economic Thought and Philosophy

I hereby certify that I have examined the doctoral thesis of

Marius Alexander KUSTER

and have found it to meet the requirements for a doctoral thesis.
All revisions that I or committee members
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have been addressed to my entire satisfaction.

Signature:  Date: 24 October 2023

Prof. Marcel BOUMANS

University of Lausanne
Faculty of Business and Economics

PhD in Economics,
subject area History of Economic Thought and Philosophy

I hereby certify that I have examined the doctoral thesis of

Marius Alexander KUSTER

and have found it to meet the requirements for a doctoral thesis.
All revisions that I or committee members
made during the doctoral colloquium
have been addressed to my entire satisfaction.

Signature: Harald Hagemann Date: 24th October 2023

Prof. Harald HAGEMANN
External expert

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ABSTRACT

This thesis explores the use of biological analogies in the works of three German economists of the late 19th and early 20th centuries. Albert Schäffle (1831-1903), Werner Sombart (1863-1941), and Ernst Wagemann (1884-1956) stand out among their contemporaries for explicitly introducing concepts, images, principles, and theories from biology into their economics. The three economists borrowed the concept of tissues, images of the nervous system and the blood circuit, principles of development, and theories of cell metabolism from popular zoologists, physicians, and neurologists of their time. Their borrowings were heavily criticized by their fellow economists and were largely dismissed as unscientific by historians of economics. This thesis challenges these verdicts and argues for a central epistemological value of biological analogies in the works of the three economists. The main claim of the thesis is that Schäffle, Sombart, and Wagemann introduced biological analogies because they were unable to represent the variety (*Mannigfaltigkeit*) of the economy with the existing theoretical framework. In a world where most economists sought unity in variety, Schäffle, Sombart, and Wagemann were looking for variety in unity. In their pursuit to represent variety in unity, the three economists used biological analogies as tools to create systems, schemas, and networks. With these novel creations, they were able to conserve in their theory the variety of commodities, collectives, firms, and branches and investigate their interplay. By conserving variety, they shaped an alternative or 'conservative' style of thought in economics. This style is missing in neoclassical economic theory but still resonates with recent heterodox approaches.

RÉSUMÉ

Cette thèse explore l'utilisation des analogies biologiques dans les travaux de trois économistes allemands de la fin du 19e siècle et du début du 20e siècle. Albert Schäffle (1831-1903), Werner Sombart (1863-1941) et Ernst Wagemann (1884-1956) se distinguent de leurs contemporains par l'introduction explicite de concepts, d'images, de principes et de théories de la biologie dans leurs travaux économiques. Les trois économistes ont adopté le concept de tissus, les images du système nerveux et du circuit sanguin, les principes du développement et les théories du métabolisme cellulaire en s'inspirant des zoologistes, médecins et neurologues les plus populaires de leur époque. Ces emprunts ont été fortement critiqués par leurs collègues et ont été largement rejetés comme non scientifiques par les historiens de la pensée économique. Cette thèse conteste ces verdicts et démontre la valeur épistémologique centrale des analogies biologiques dans les travaux des trois économistes. L'argument principal de la thèse est que Schäffle, Sombart et Wagemann ont introduit des analogies biologiques parce qu'ils n'étaient pas en mesure de représenter la variété (*Mannigfaltigkeit*) de l'économie avec le cadre théorique existant. Dans un monde où la plupart des économistes recherchaient *l'unité dans la variété*, Schäffle, Sombart et Wagemann recherchaient *la variété dans l'unité*. Dans leur quête pour représenter *la variété dans l'unité*, les trois économistes ont utilisé des analogies biologiques comme outils pour créer des systèmes, des schémas et des réseaux. Grâce à ces nouvelles créations, ils ont pu conserver dans leur théorie la variété des marchandises, des collectifs, des entreprises et des branches et étudier leur interaction. En conservant la variété, ils ont façonné un style de pensée alternatif ou « conservateur » en économie. Ce style est absent de la théorie économique néoclassique mais trouve encore un écho dans les approches hétérodoxes récentes.

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INTRODUCTION

In 1875, the Austrian-German economist Albert Schäffle (1831-1903) presented his new approach to the study of the economy and society through an "extensive reference to biological analogies" (Schäffle, 1875, p. VIII). In his book *The Structure and Life of the Social Body* (1875), Schäffle suggested to think about society as an assembly of five tissues, similar to the classification of tissues of the human body by the German physiologist Rudolf Virchow (1821-1902). From the German experimental psychologist Gustav Theodor Fechner (1801-1887), Schäffle learned about the cells, ganglia, nerve fibers, stimuli, and thresholds in the human nervous system. In Schäffle's eyes, thinking about social psychology with the very terms, images, and theories by Fechner or Virchow would bring about new insights into how economic actors communicated and influenced each other.

Fast forward twenty-five years, when the German economist Werner Sombart (1863-1941) similarly proposed to study biology to understand the development of German industry. In several articles and in his ground-breaking *Modern Capitalism* (1902), Sombart argued that firms were like organisms that formed through the principle of differentiation and integration. Sombart learned about this principle through his reading of the German biologist Ernst Haeckel (1834-1919) who claimed that in the course of natural evolution, organisms divided their labor within themselves (differentiation), but as a result, became more interconnected and interdependent (integration). Depending on their level of differentiation and integration, Haeckel classified the natural world into different species. Sombart claimed that also in a modern economy, firms came in various species (*Arten*), or types (*Formen*) that showed different degrees of differentiation and integration. Sombart argued that these various types of firms could be dominated by either a handicraft, capitalist, or socialist spirit. Based on the preponderance of any of these spirits, and the dominance of certain types of firms, Sombart claimed to be able to pin down the character of the whole economic system.

Another twenty-five years later, the German economist and statistician Ernst Wagemann (1884-1956) claimed that viewing the economy as a living organism was the most fitting approach to the study of business cycles. Wagemann was initially inspired by popular books on human anatomy and claimed that the monetary circuit was akin to the human blood circuit. Both possessed two circuits that interconnected at one central organ, and both were in constant movement. A little later, Wagemann deepened his knowledge of biological organisms through his reading of the German neovitalist Hans Driesch (1867-1941) who opposed a mechanistic-deterministic understanding of nature. Driesch maintained that within organisms, causes and effects could never be adequately separated and that organisms should preferably be studied by examining the functions of their smallest units, the metabolic processes of the cells. Wagemann took over Driesch's convictions in what he defined as the "organic-biological principle" in business cycle research. In order to forecast the economy, Wagemann wanted to know more about the branch-specific inputs and outputs of businesses—the metabolisms of the economic cells.

What was the purpose of these biological concepts, images, principles, and theories in economics? If we believe most historians of economics, such biological analogies did not serve any purpose other than unnecessarily complicating and blurring economic problems, or to act as romanticist ornaments and catchwords in favor of nationalist and Social Darwinist aspirations.[1] Three of the towering figures in the historiography of economics, John Kells Ingram (1823-1907), Joseph Alois Schumpeter (1883-1950), and Karl Pribram (1877-1973) condemned biological analogies as theoretical dead ends. As early as 1885, the English economist John Kells Ingram reflected on economists' borrowings from biology and concluded that Schäffle and other "inductive", or "historical" economists were prone to "assuming an unscientific character". They not only occupied themselves too exclusively with statistical studies and with the details of "particular provinces of economic life", but also failed to understand that "all science implies abstraction, seeking, as it does, for unity in variety". Schäffle, for example, carried his biological analogies "to an undue degree of detail and elaboration" instead of finding the common laws that governed all economic phenomena (Ingram, 1885, p. 394).

For the Austrian economist Joseph Alois Schumpeter (1954, p. 788) Schäffle's "analogy with biological organisms" was an "obvious puerility" and his aim to "deriving 'practical' results from a few functional relations between a few economic aggregates" was a "deplorable practice". Schumpeter's (1954, pp. 792, 818) assessment of Sombart was less trenchant. Accordingly, Sombart's theory that encompassed "[a]ll factors operative in the totality of the economic process" was "*quite all right*". Yet, of Sombart's recourse to biology, Schumpeter was only struck by the "warring infantilism" of Sombart's "significant use of the element of race" in *The Jews and Modern Capitalism* (1911/1951). Overall, argued Schumpeter (1954, p. 788), the application of the results of

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[1] I refer to the economists' borrowings from botany, zoology, anatomy, physiology, medicine, histology, and neurology as biological analogies. As historian of biology Ernst Mayr (1904-2005) emphasized, especially in the 19th and early 20th century, biology was a "diversified science" without strict disciplinary boundaries. Mayr (1998, p. 123) thus advanced the idea of different "biological disciplines" like neurobiology, botany, and medicine that relate to "everything that concerns living organisms".

biological research to social phenomena was "infested by ideological bias and by dilettantism to an extent that surpasses anything that even we economists are accustomed to".[2]

The Austrian economist Karl Pribram took up Schumpeter's dismissive verdicts about biological analogies and exacerbated them, possibly due to his suffering under the National Socialist regime.[3] During the rise of National Socialism, economists like Sombart and Wagemann thrived and Schäffle's biological analogies experienced a revival through fascist and nationalist economists like Othmar Spann (1878-1950), Walter Weddigen (1895-1978), and Georg Weippert (1899-1965). Pribram created the category of "Organismic Economics" under which he classified the members of the German Historical School and economists that made use of biological analogies. According to Pribram (1983, pp. 372–391), these economists were "antitheoretical", used "mystical slogans" and "prepared the soil […] for the subsequent acceptance of the National Socialist creed". Pribram accused Wagemann, for example, to follow "an ambitious organismic scheme" in which he used biological analogies "to justify various frequently used political watchwords coined in support of nationalistic aspirations".

The verdicts by Ingram, Schumpeter, and Pribram, combined with a firm belief in the need for mathematical, or theoretical 'rigor' in economics, colored most subsequent treatment of biological analogies in economics by 20th-century historians and economists. In consequence, Schäffle, Sombart and Wagemann have been accused of engaging in a "romantic rebellion against logic and empiricism" (Mises, 1931, p. 293), purposely writing "paradoxes" (Mises, 1978/2013, p. 71), being a "failure" (Hutter, 1994), "spoiling classical economics" (Kruse, 1959, p. 104), conducting a mere "opposition science" (Barkai, 1988; Krohn, 1981), having only "normative character" (Schefold, 1988, pp. 246–247), being "rather confusing than enlightening" (Rieter, 1992, p. 65) and "being stuck" (Brandt, 1993, p. 52). Overall, economists' recourse to biology was a sign of backwardness and confusion. It is likely that for this reason Schäffle, Sombart, and Wagemann are missing in recent handbooks on the history of economic thought (Faccarello & Kurz, 2016) and are usually assigned the role of 'outsiders' (Hutter, 1994; Kulla, 1996; Köster, 2011).

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[2] Schumpeter only changed his attitude towards biological analogies with respect to the term "evolution". In his *Theory of Economic Development*, Schumpeter (1934/1949, p. 58) pointed to the "extra-scientific mysticism" and "dilettantism" of the "'evolutionary' ideas" in economics. However, in his *Business Cycles*, Schumpeter (1939, pp. 106-108) endorsed the term evolution and explained how the "economic system generates evolution" due to enterprises' "struggles for a share of profit" within the "living organism" (Schumpeter, 1939, pp. 106-108). On Schumpeter's changing attitude towards the concept of evolution, see Hagemann (2008, pp. 228-229).

[3] In the 1930s, Pribram was evicted from the University of Frankfurt and had to emigrate to the United States. See Hammerstein (1989, p. 242), and Chaloupek (1999).

I believe that these dismissive verdicts by historians of economics resulted from three lines of reasoning. First, the three economists are usually assigned to the "German Historical School" under the lead of German economist Gustav Schmoller (1838-1917), who is notorious for his empirical and anti-theoretical stance. Like Schmoller, Schäffle, Sombart, and Wagemann were alleged to predominantly concern themselves with collecting detailed and historical phenomena, while at the same time dismissing classical theory and opposing marginalist economics. Since the *Methodenstreit,* Schmoller and anyone close to his teachings have been depicted as naïve Baconian inductivists who despised theory.[4] Hence, starting from the premise that Schäffle, Sombart, and Wagemann were anti-theoretical collectors of empirical details, most historians concluded that the economists' borrowings from biology could not be anything but ornamental. If historians had attributed any scientific value to biological analogies, for example in their role of theory-building, the premise would be rendered invalid.

Second, several dismissive verdicts about the three economists bear the mark of a progressivist narrative of science in which biological analogies are considered outdated, romanticist, or emotive. Proponents of the logical positivists of the 1930s like Otto Neurath (1882-1945) ridiculed explicit biological analogies as absurdities and believed that "real sciences" (*Realwissenschaften*) should be reduced to physics, mathematics, and possibly formal logic (Neurath, 1931/1981, p. 501).[5] Similar stances can be found in more recent diagnoses of the economics discipline of the late 19th century and

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[4] In the famous *Methodenstreit* between Austrian economist Carl Menger and Gustav Schmoller, Menger (1883) accused the members of the Historical School of being too obsessed with empirical studies. For Menger (1883, pp. 35–36), it was an "error" (*Irrthum*) to think that economists could establish "exact laws" through inductive inference. Instead, Menger (1883, p. 77) promoted an "exact method" that reduced economic phenomena to the "fundamental forces […] and desires of human nature". Menger's accusations were taken over numerous times by 20th-century economists and historians like Lifschitz (1905, 1914), Schumpeter (1914), Kruse (1959, p. 180), Roll (1992, p. 281). On the *Methodenstreit*, see Tribe (1995, pp. 66–94) and Backhaus and Hansen (2000). More recently, several historians (Grimmer-Solem, 2003; McAdam, Kolev & Dekker, 2018; Herold, 2019) have pointed out that German historical economists possessed a stronger theoretical foundation than the 20th century historians and economists attributed to them. Yet, these studies do not examine the role of biological analogies in German economic thought.

[5] In their "scientific conception of the world" (*Wissenschaftliche Weltauffassung*), logical positivists of the Vienna Circle like Moritz Schlick, Rudolf Carnap, and Otto Neurath had stringent views about what can be considered apt methods in science, including economics (Verein Ernst Mach, 1929). They advanced the view that the only meaningful statements were those that are either empirically verifiable (synthetic propositions) or grounded in formal logic and mathematics (analytic propositions). Especially for Carnap and Neurath, the reduction, or axiomatization of all sciences to physics was the final goal. With such convictions biological analogies were deemed emotive, because they did not fit the deductive reasoning of formal logic and mathematics, or they were seen as rather accidental inputs that allowed the discovery of new theories (Boumans & Davis, 2016, pp. 12–13).

early 20th-century. If economists used biological analogies and shied away from mathematical reductionism, they were "romanticists" (Wissler, 1954, p. 15), "philistine" (Rieter, 1992, p. 63), "out of touch with the world" (Rieter, 2002, p. 134), "well on the way to irrelevance" (Kurz, 1989, p. 14), or used biology as a "tactic in the defense of the scientific status of economics" (Mirowski, 1989, p. 265).

Third, many verdicts about Schäffle, Sombart, and Wagemann were fueled by the notion that evoking biology in the social sciences was akin to Social Darwinism and National Socialism. Most prominently, U.S. historian Daniel Gasman (1933-2012) propagated the idea that a direct line could be drawn from Haeckel's biology to the Nazi's racism and anti-Semitism (Gasman, 1971/2004). Thus, for many historians, it sufficed to emphasize the evolutionary or biological analogies in the works of Schäffle, Sombart, and Wagemann to discredit them as serious scientists.[6] In many forms, the three economists were considered predecessors of, or adherents to National Socialist ideology and thus condemned as irrational adversaries of Enlightenment rationalism.

When I began writing this thesis, I embraced these three lines of arguments not only due to the overwhelming negative evaluations of biological analogies in the abovementioned literature but also because of the evidence I found in the three economists' biographies and writings. Schäffle, who first caught my eye because of his dense use of biological analogies, was a Social-Darwinist and opposed an egalitarian democratic society. Sombart, who drew my attention due to his reference to Haeckel, was an anti-Semite and sympathized with fascism. Wagemann, who widely promoted his "organic-biological principle", collaborated with the Nazi regime and was vital for the planning of the Second World War. All three also highlighted the importance of empirical studies and believed that most economic theory was too reductionist and mathematical.

However, while examining more closely how the three economists used biological analogies, I encountered three clues that let me doubt the historians' dismissive verdicts. The first piece of evidence that speaks against the historians' conclusions is the high degree of commitment to biological analogies by the three economists. Commitment meant that the three economists sought out explicit images, theories, and principles from biologists and adapted them to specific claims about the workings of the economy. Commitment also meant that the economists stuck to the biological analogies over time and reworked them into ideas that built the foundations for new theories. If

[6] Johach (2008, p. 343), for example, embedded Schäffle's biological analogies in her analysis of anti-Semitic propaganda. Lüdemann (2004, p. 149) described Schäffle as a "pre-fascist racial hygienist" alongside Otto Ammon, and Wilhelm Schallmayer, without going into more details. On Sombart and Wagemann as forerunners of National Socialist ideology, see Krause (1962) and Pribram (1983).

Schäffle, Sombart, and Wagemann merely wanted to express their political views or disguise a lack of content, why would they invest much time in adapting and modifying biological analogies and go to great lengths to defend their use?

A second clue is afforded by the three economists' peers, many of whom were state scientists, sociologists, and economists who reflected on the use of biological analogies in the social sciences. Their contemporaries like Gustav Schmoller, Franz Xaver von Neumann-Spallart (1837-1888), Carl Menger (1840-1921), Othmar Spann (1878-1950), and others, agreed that one could depict the state, society, or economy as some sort of organism. However, almost uniformly, they concluded that explicit comparisons to biological organisms should be avoided. Hence, Schäffle, Sombart, and Wagemann went against the current by invoking biological analogies time and again and were unique in their level of explicitness. Even after biological analogies had been discredited in the social sciences at the turn of the century, Sombart and Wagemann continued to use biologists' insights alongside new methods in empirical research and econometrics. Why would they expose themselves to harsh criticism from their peers when they could have continued to use existing theories or carry on gathering facts without referring to biological concepts, images, and principles?

The third and last piece of evidence that undermines the conviction that biological analogies had no scientific value is the three economists' careers and proficiency in theoretical economics. Schäffle was a renowned economist and respected editor at the very time when he introduced explicit biological analogies in his economics. Sombart was at an early stage of his steep career and widely recognized as a prolific Marxist when he began to borrow biological principles. Wagemann stood at the forefront of statistical research when he argued that the economy should be viewed as a living organism. All three were internationally renowned economists and not outsiders in their respective fields of study. They were able to deal with the existing reductionist and, to some degree, mathematical economic theories of their time. Why would they endanger their status by the supposedly mindless practice of drawing analogies to biology when they could have further advanced the existing economic theory?

In this thesis, I will follow these clues with three Ws: when, why, and what? In a first step, I will pinpoint *whe*n the three economists began to borrow explicitly from biology. In a second step, I will reconstruct *why* the economists introduced biological analogies and stayed committed to them. In the third and last step, I aim to show whether biological analogies were constructive, that is, *what* new ideas and theories they helped to construct. I will locate and contextualize five cases in which the economists introduced explicit biological analogies. Schäffle introduced the tissue and the nervous system analogy in 1875. Sombart began to use the principle of differentiation and integration in 1899.

Wagemann borrowed the human blood circuit analogy in 1927, began to study the metabolism of businesses in 1928, and formed new ideas from it until his work lost its relevance in 1936.

I will argue that the three economists introduced biological analogies *when* they stood at theoretical impasses. I aim to show that these impasses emerged because Schäffle, Sombart, and Wagemann came to realize that the economy was more manifold (*mannigfaltig*) than what economic theory suggested. I will reveal that in each case, the economists were confronted with empirical evidence that made them believe that the economy was a "great variety" (*Mannigfaltigkeit)*. Yet, existing economic theory was not up to the task of reflecting this variety. Schäffle believed, for example, that German economist Friedrich Hermann's (1795-1868) classification of economic commodities was too reductionist. Likewise, Schäffle thought that the subjective theory of value that he adhered to in his earlier writings could not take into account the great variety of "public goods" (streets, theatres, libraries) and "symbolic goods" (letters, telegraphs, literature). Schäffle had witnessed first-hand in Vienna and other vibrant European cities how manifold trade and its means of communication had become. Yet, he complained, nobody paid attention to this variety, because political economists and statisticians were obsessed with regularities, or with the theory of value.

Sombart, widely considered the most prolific Marx scholar of the late 19th century, became critical of Marx's theory of industrial development. Marx had claimed that with the development of capitalism, small handicrafts were replaced by manufactures, and finally by mechanized industry with the effect that only large-scale industry prevailed. However, the latest empirical survey into the types of German businesses had shown to Sombart that despite rapid industrialization in the last decades of the 19th century, handicraft and manufactures continued to flourish. For Sombart, Marx's linear and law-like path of industrial development seemed outdated. The survey showed Sombart that all three types of firms, handicraft, manufacture, and factory, could co-exist in different organizational forms allowing a "great variety" of firms to live on in the high stage of capitalism. A new theory had to be found with which such variety could be explained.

Wagemann, who founded the Berlin institute for business cycle research (*Institut für Konjunkturforschung, IfK*) in 1925, was fascinated by U.S. economic researchers like Irving Fisher (1867-1947) and Warren Milton Persons (1878-1937). Wagemann began to apply their novel statistical methods to German data, but quickly realized that their economic models and "barometers" failed to explain and forecast the course of the economy. Wagemann arrived at the conclusion that these models were too reductionist because they focused on only one driving factor, or cause, of economic movements and reduced ups and downs of the economy to only a few dominant statistics. Instead, he wanted to pay attention to the "great variety" of different branches and their interconnections. To this end, he collected and processed large quantities of statistics, but encountered difficulties in trying to use them for his forecasts because he lacked an ordering principle.

At these impasses, going back to the classicals or applying new marginalist theories was out of the question. In Schäffle's reading, for example, Smith followed an "atomistic approach" that had to be avoided. Ricardo was too "generalizing" in his labor theory of value and too abstract in his rent theory.[7] Marginalist and mathematical economics that started to gain prominence in the last quarter of the 19th century were of no help either. Within these new currents, the contrast between theory and the variety of economic phenomena was only further exacerbated, which might explain why Schäffle and Sombart made only little mention of them.[8]

Instead, collecting and processing detailed statistical data seemed to be a promising way to take variety into account. As we will see, Schäffle and Sombart made ample use of the ever-growing collection of statistics of the German Reich. Wagemann, as the head of the German Statistical Office (*Statistisches Reichsamt*), also initiated the collection of more detailed statistics of even the smallest branches. However, processing time series along the lines of prominent statisticians like Adolphe Quetelet (1796-1874), or Ernst Engel (1821-1896), had its limitations. These statisticians hoped to find general regularities and even social laws in numerical facts. Their aim was to extract the common from a variety: the typical effect of income on the share of food expenses (Engel), or they constructed "averages" like the "homme moyen" (Quetelet). For Schäffle, Sombart, and Wagemann such studies were promising and useful, but could not help them to reflect, or conserve variety.

The three economists' teachers, Wilhelm Roscher (1817-1894) and the aforementioned Schmoller, could not help either, even though they presented their own research programs as alternatives to

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[7] On Smith and his atomistic approach, see Schäffle (1873a, p. 14), on Ricardo being too generalizing, see Schäffle (1878b, p. 476), on the rent theory being too one-sided, see Schäffle (1873b, pp. 467–468).

[8] These newer currents can be viewed as exacerbating reductionism, because marginalists hoped to explain the 'whole' as a result of individual actions, while mathematical economists isolated laws and quantified monocausal relationships. Schäffle and Sombart barely mentioned the marginalists Carl Menger, William Stanley Jevons, Léon Walras, or their followers Friedrich von Wieser, Eugen von Böhm-Bawerk, Knut Wicksell. Similarly, mathematical economists like Francis Ysidro Edgeworth, Irving Fisher and partly Alfred Marshall were just casually discarded, but not really confronted. Schäffle's and Sombart's lack of interaction with these reductionist economists is also owed to the latter's insignificance in the German economics discipline of the late 19th and early 20th century. Only in the 1910s, mathematical economists started to become noticed and came out of the fringes of economic research. This might explain why only Wagemann directly challenged mathematical economists. He questioned mathematical models that expressed economic relationships (quantity theory, demand functions) and criticized statistical techniques (correlation and regression analysis) that became more dominant in the early 20th century.

"abstract" economics. Schäffle's teacher Roscher (1864, pp. 39, 45) promoted a "historical-physiological method" that repudiated the "elaboration of ideals" and the "expression of economic laws in algebraic formula". His interest lay in comparing different peoples (*Völker*) both geographically, and historically. Yet, Roscher's final goal was to "summarize as a developmental law that which was common to the diverse development of peoples" (Tribe, 1995, p. 69). In other words, Roscher aimed to extract the common from a variety. Sombart's and Wagemann's teacher Schmoller went in a somewhat different direction. Whilst Schmoller also relied on historical research, his "historical method" shifted the focus from general developmental laws to concrete economic phenomena. Schmoller sponsored countless detailed studies on branches, regions, commodities, and their respective historical developments. Taking this collection of in-depth studies as "building blocks" (*Bausteine*), Schmoller (1894, p. 545) hoped to eventually arrive at an "economic theory".

One can argue that Sombart and Wagemann, but even Schäffle, followed Schmoller's historical method in their early writings. Schäffle's (1856) essay on the guilds, Sombart's (1888) study on the Roman Campagna, and Wagemann's (1913) investigation of Chile's monetary system are concrete and detailed inquiries into unique historical phenomena. However, these early writings were commissioned by their mentors and do not reflect their ambitions in economic research in later years.[9] Like many of their contemporaries, Schäffle, Sombart, and Wagemann thought that Schmoller's historical method lost itself in too many details and concentrated too much on the collection of economic facts. Hence, I will argue that the three economists not only reached a theoretical, but also a methodological impasse when they were confronted with economic variety. Existing theory was inadequate, further reductionism to mathematics did not help, extracting economic regularities and laws from statistics eliminated variety, and collecting more empirical observations was not sufficient.

We will see that Schäffle, Sombart, and Wagemann wanted to go beyond describing variety when reaching their respective impasses. They searched for principles, theoretical constructions, schemas, and images that reflected, and gave form to variety in their minds. It is at these points in time that they began introducing biological analogies. I thus came to believe that the reason *why* Schäffle,

[9] To depict Schäffle's early work as following Schmoller's historical method does not fit chronologically. Schäffle was motivated by his mentor Johann Georg von Cotta (1796-1863) to write his early essays on economic issues some years before Schmoller gained prominence in German economics. Yet, Schäffle's essay on the guilds had a similar structure as Sombart's dissertation on the Roman Campagna and Wagemann's second dissertation (*Habilitationsschrift*) about the Chilean economy that were both supervised by Schmoller. They all contained an analysis of the status quo of a unique and local economic phenomenon, inquired into its historical development and finally suggested how to improve the situation by economic intervention or social policy.

Sombart, and Wagemann used biological analogies was that the concepts, images, and principles of biologists enabled them to conserve variety.

With the image of tissues, Schäffle could mentally visualize five layers of society to which he assigned the variety of different commodities, symbolic goods, labor, and the means of production. Schäffle hoped to gain insight into "social pathologies" that resulted from disproportional relations of the five tissues. With neurological analogies, Schäffle wanted to establish ground to investigate how a variety of individuals and collectives interacted through "symbolic goods". With differentiation and integration, and with Haeckel's phylogenetic tree, Sombart could explain how a variety of firms coexisted, for example, how even small and non-mechanized businesses could survive in a capitalist economy. By assuming that firms were like cells with a metabolism that connected them to other parts of the economy, Wagemann gained an ordering principle for his large collection of time series. On its basis, Wagemann could analyze how the variety of branches interconnected without reducing them to general indices.

Hence, I believe that the biological analogies had an epistemological value for the three economists, because they allowed them to form hypotheses and develop new insights about economic phenomena. In particular, I will follow Mary Morgan's (2012, p. 20) account of how economists are "choosing analogies" to "give form". Schäffle, Sombart, and Wagemann resorted to biological analogies to give form to their ideas that the economy was a great variety. Biological analogies provided them with a more explicit representation of variety. In some cases, the economists turned these representations into pen-and-paper objects, in other cases they simply referred to the images that the biologists provided. There is also much reason to believe that analogies were a "medium" that filters and transforms as philosopher of language Max Black (1909-1988) has suggested (1962, p. 42).[10] We will see that in the hands of Schäffle, Sombart, and Wagemann, biological analogies filtered, that is, they brought forward certain aspects while neglecting others. In my view, the aspect of filtering also had a heuristic value as it led the three economists on new research paths.[11] In each case, biological

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[10] I chose the term 'analogy' to describe the economists' borrowings from biology because Schäffle and Sombart preferred the term over 'metaphor' to characterize their method of comparing society, or the economy to the natural world. There is also much to be gained from Morgan's (2012, p. 173) notion that metaphors "provide the raw material from which to make substantive analogies". One can argue, for example, that the figure of speech 'the economy is an organism' was a metaphor or the raw material for the three economists. As they became more explicit about what aspect of an organism was to be used in their economics, they turned the metaphor into an analogy.

[11] On the heuristic value of analogies in economics, see Klamer and Leonard (1994).

analogies allowed the formation of new insights within the specific niche domain to which they were applied.

My main claim goes further than attributing biological analogies an important role in giving form, or in filtering. I will claim that biological analogies had fundamental consequences on the three economists' style of thinking. Biological analogies became the economists' essential reasoning tools and shaped the way they handled empirical data or applied theories. Schäffle, Sombart, and Wagemann not only conserved variety to reflect what they observed in their empirical studies, but also conserved variety in order to investigate the interrelationships between the unequal parts of a whole. With the help of biological analogies, they created systems, schemas, and networks. They aimed to establish a *variety in unity*.

These aspirations make the three economists worthy representatives of what Austrian-Hungarian sociologist Karl Mannheim (1893-1947) called the "conservative style of thought".[12] Mannheim distinguished between a "natural-law thinking" style and a "conservative style of thought" for his 1920s study of German political romanticism and conservatism at the turn of the 19th century. According to Mannheim, natural-law thinkers incline towards deduction, universal validity, and applicability of laws, and atomistic, mechanistic, or static explanations.[13] In contrast, conservative thinkers tend to reject reduction, emphasize the totality of phenomena, embrace the dynamic nature of things, and adhere to the idea of the social organism. They elucidate the "oppositions" within "a whole (organism)" and investigate their interactions (*Wechselleben*). The conservative style of

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[12] I take over Mannheim's definitions of styles of thought because the three economists do not fit adequately into the well-known classifications of "styles of thinking" by Alistair Crombie (1915-1996) and Ian Hacking (1936-2023). In Crombie's classification of six "styles of thinking", the three economists would fall under the "hypothetical modelling" style as it involved the "construction of analogies" (Crombie, 1988, p. 11) as one of its most characteristic features. Then again, Schäffle could also be partly placed under the style of "taxonomy" as he classified the variety of economic commodities into different layers. Similarly, Sombart could be seen as forming his thoughts under a "historical" or "genetic development" style, and Wagemann made vast use of the methods of the "statistical" style. I mainly hesitate to classify the three economists' styles under Crombie's style of thinking or Hacking's (1992) almost congruent "styles of reasoning", because it would not distinguish them from reductionist and mathematical economists like Jevons, Marshall, Edgeworth, and Fisher that made use of analogies from physics and mechanics in their economics.

[13] Mannheim (1986, pp. 154, 165) claimed that natural-law thinkers like Rousseau and Montesquieu strive "to penetrate their objects merely from an abstract point of view". They attempt to work out "a pure sphere marked by calculability or by some different kind of rationalizability" and go "beyond history". In the natural-law style, "rationality means calculation (deduction) of something which is valid once and for all".

thought is able to "conserve" what the natural-law thinking style "pushed aside" (Mannheim, 1986, p. 65).[14]

Mannheim's distinction between the two styles can also serve as a rough guide to group the economists against which Schäffle, Sombart, and Wagemann campaigned. Menger, Marx, and Fisher adhered to different degrees to the characteristics of the "natural-law" thinking style. I will use these reductionist economists in the individual chapters to contrast their styles of thinking to the conservative style of the three main actors of my thesis. I believe that in their aim to isolate the common, or typical from a variety, Menger, Marx, and Fisher moved in the opposite direction from Schäffle, Sombart, and Wagemann. The former wanted to isolate the *unity in variety*, while the latter aimed to conserve a *variety in unity*.

Mannheim maintained that the conservative style of thought was an "antithetical countermovement" comparable to "the movements of a pendulum, which, having swung to an extreme point, abruptly reverses itself".[15] Knowing of the ability of Schäffle, Sombart, and Wagemann to deal with reductionist theories in economics, one is tempted to see in biological analogies the decisive impetus to push the pendulum towards the conservative style of thought. However, as we will see in the respective chapters, the three economists became critical of reductionist theories before they introduced biological analogies. Hence, I think of biological analogies as the tools that reinforced the conservative style of thought and brought it to full fruition by making variety visible and more concrete.

I refer to biological analogies as tools, because the three economists considered their borrowings from biologists as useful means to an end.[16] In other words, the economists used biological analogies as epistemological tools and not due to ontological commitments. In a retrospective of his work, Schäffle (1903a, pp. 194–195) claimed that biological analogies gave him "pictorial representation" (*Anschaulichkeit*) to represent variety, and that they helped him as heuristic "crutches" (*Krücken*) to

[14] Mannheim (1986, pp. 15, 143, 154) argued that conservative thinkers like German state scientists Friedrich Carl von Savigny (1779-1861) and Adam Müller (1779-1829) are "immersed, struggling, in a flow which is inherently incalculable". They mediate "between the clashing, active cross-currents, while in their midst", and elucidate "oppositions" within "a whole (organism)". These oppositions, for example the estates (clerical, mercantile, noble, civic), and their interactions (*Wechselleben*) were constantly changing and could not be grasped by rigid thinking in "fixed", "single", and "atomistic" concepts.

[15] Mannheim (1986, p. 116) argued that this countermovement could even be witnessed "among major representatives of the Enlightenment" like Rousseau and Montesquieu.

[16] On analogies, or models as tools in economics, see Morgan (2003).

form new ideas. Similarly, Sombart (1903, p. 29) argued that "the analogy from the natural sciences [differentiation and integration] does not fit perfectly for social life, but it does fit to the extent that it is necessary for our purposes". In a later work on economic methodology, Sombart (1930, p. 340) claimed that theory only had value as a "tool" (*Werkzeug*), or "scaffolding" (*Baugerüst*) applied to the "building material" of empirical studies. Wagemann (1928a, p. 12) explained that biological analogies were fruitful in his "practical work" and that he was willing to discard them if they did not meet his requirements. Likewise, the idea of metabolism served Wagemann (1928a, p. 142) as an "ordering principle" (*Ordnungsprinzip*) for his statistical times series. We will see that the three economists were never entirely satisfied with their tools and modified or even discarded certain biological analogies over the years.

If biological analogies were not the result of an ontological commitment, the question arises why the economists borrowed images, theories, and concepts particularly from biology? Drawing upon Mary Hesse's (1966) account of how analogies in science work, I will argue that the three economists found striking "positive analogies" between the economy and biological organisms. English philosopher of science Mary Hesse (1924-2016) suggested that scientists chose an analogical world because they first perceive "positive analogies" between the home field (in our case economics) and the analogical world (in our case biology). Scientists recognize that there are qualities shared between the two worlds, and begin to transfer insights, concepts, images, and theories from the analogical world to the home field.

Based on Hesse's (1966) account, Morrison and Morgan (1999) pointed out that in many cases the source of the creative element in theory building originates in "negative" and "neutral" features between the analogy and the economic world—features that are not to be found in the economy, or do not figure in economic knowledge at the time when analogies are introduced. We will see that Schäffle formed new ideas about how misaligned tissues could give rise to social pathologies and that he created a system of social ganglia, thresholds and stimuli through which he gained a new perspective on the creation of subjective value. Haeckel's principle offered to Sombart a theory that pointed to the reason why a variety of firms coexisted next to each other and one that allowed him to explain economic development independent of technology. The idea of metabolism suggested to Wagemann that businesses connected to each other through their streams of commodities and money (inputs and outputs) and were not independent entities that maximized profit by rigorous book-keeping only.

I will also emphasize that the economists had to invest much cognitive work to deal with the negative and neutral features of biological analogies. In the case of Schäffle, the negative features had ontological consequences as the social body is not held together by the same matter as biological organisms—a negative feature that made his tissue analogy inconsistent and difficult to expand further. In contrast, the fact that the process of "integration" differed substantially between natural and social organization pushed Sombart to think more profoundly about how a highly differentiated firm did not fall apart, which led him to new ideas about planning in the economy.

We will see that the three economists recognized different "positive analogies", but that they always highlighted the variety (*Mannigfaltigkeit*) in both the social and the natural world.[17] Still, the question remains why the economists chose biology and not another domain as their analogical world. As the Austrian corporatist economist Othmar Spann (1878-1950) highlighted, a mechanical contrivance can serve economists just as well as an organism to represent variety and interconnection. Spann (1908, p. 5) argued that, in principle, a "whole" that consists of unequal interconnected parts can also be depicted by a machine. And just as well as a biological organism, the machine was a "system of interdependent organs" with a specific "purpose" (*Zweck*). Each of these organs had a "function" and "performance" (*Leistung*) while the whole was more than a sum of its parts.[18] Concrete examples of such mechanical analogies in economics are the system of pipes and reservoirs by William Trufant Foster and Waddill Catchings (1924), the circuit diagrams by Otto Bredt (1934), the Newlyn-Phillips machine (Morgan, 2012, pp. 172–216), or the economic "circuit board" by Walter Waffenschmidt (1957).

If variety and interconnection could be depicted by mechanical analogies, why was it more appealing for the three economists to depict the economy as an organism with tissues, a nervous system, a blood circuit, cell metabolism, or as a phylogenetic tree, than thinking of the economy as a machine with

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[17] Since at least the mid-17th century, the term *Mannigfaltigkeit* has been used to describe variety in both the social and the natural world. In the 18th and 19th centuries, the term became widespread among biologists. Botanists expressed how great and colorful the variety in nature is. When opening and dissecting organisms biologists described what a great variety they discovered. Also Virchow, Haeckel und Driesch used the term relentlessly. In one of the first uses of the term *Mannigfaltigkeit*, German entomologist Johann Leonhard Frisch (1721, p. 36) explained that "variety" kept him in a "constant desire to study nature" (*Die Mannigfaltigkeit der Arten der Insecten erhält mich, nebst andern wichtigern Umständen, zugleich bey der beständigen Lust zur Untersuchung ihrer Natur; und ich suche den Leser wiederum durch Vorstellung unterschiedlicher Arten durch einander bey der Lust zu erhalten, diese Blätter durchzulauffen*). For more examples, see the lemma *Mannigfaltigkeit* in the Digital Dictionary of the German Language: https://www.dwds.de/wb/Mannigfaltigkeit (10.8.22).

[18] Spann was also preoccupied with interconnections of different parts of the economy. His solution to depict interconnection was by drawing or imagining organigrams of what he called the *Ständestaat*. We will encounter Spann again in Chapter 5.

"wheels, pullies, wedges, levers, skrews, chords, canals, cisterns, strainers, or the like"?[19] Why did biology have such an allure for the three economists?

i The Allure of Biology

The two historians of economics who investigated most profoundly the impact of biological analogies in economics, Michael Hutter (*1948), and Geoffrey Hodgson (*1946), believed that economists' borrowings from biology can be explained by large philosophical tenets and general circumstances. Hutter (1994, p. 289) surveyed the comparisons made "between biological 'organisms' and economies as parts of social 'organisms'". To do so, he picked out ten German-speaking economists, two of which were Schäffle and Sombart.[20] In Hutter's eyes, the ten economists' use of the organism metaphor has to be explained by the "general intellectual discourse". Referring to the long tradition in the German language area and by German Idealist philosophers to use the concept of organism to describe complex objects, Hutter (1994, p. 294) argued that the metaphor was in "the intellectual air from 1790 to 1940".

Hutter's choice of authors was based on the criteria that they used "specific anatomical and physiological characteristics of biological organisms". However, Hutter does not disclose these characteristics in detail and they quickly resort into the background of his study.[21] Instead, Hutter proposed a common denominator of the economists' borrowings from biological organisms. In his view, it was the "life force" of organisms that 19th century economists transferred to the realm of economics.[22] Yet, in Hutter's eyes, this "organic approach failed", because "biological details" do not have their social equivalents.[23]

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[19] See the lemma 'Mechanical' in Ephraim Chambers' Cyclopdia of 1741. I quote here from Maas (2005, p. 14).

[20] Hutter focused his investigation on ten economists and sociologists and their main publications between 1809 and 1939. In chronological order, they were: Adam Müller, Friedrich List, Wilhelm Roscher, Karl Knies, Paul von Lilienfeld, Albert Schäffle, Carl Menger, Othmar Spann, Werner Sombart, and Walter Eucken. Except for Paul von Lilienfeld, who was Baltic-German, all authors are either German or Austrian.

[21] Hutter clearly did not have the space in a book chapter to investigate in detail the explicit analogies made by Schäffle and Sombart. However, except for Schäffle, Lilienfeld, and Sombart, the other seven authors did never transfer "specific anatomical and physiological characteristics" in the first place. As we will see later, both in Schäffle's and Sombart's case, Hutter did not choose the most striking biological analogies.

[22] Several times, Hutter (1994, pp. 296, 298, 299, 301) mentioned the "living force", or "life force".

[23] In a similar manner, Rieter (1992, 2002) dismissed the organism metaphor, because in his eyes, the metaphor was not helpful to make explicit comparisons.

On a more positive note, Geoffrey Hodgson (1993a, 1993b, 1995, 2001, 2002) investigated the use of biological analogies by several well-known economists like Carl Menger, Alfred Marshall, Joseph Schumpeter and Thorstein Veblen. According to Hodgson (1993a, p. 397), it was the "evolutionary paradigm" and its Darwinian or Spencerian terms "struggle", "selection", and "survival" that drew economists to biology.[24] Hodgson went on to divide the field of past economists into those who successfully used the idea of evolution and those who did not. For Hodgson, it was Veblen who applied the "evolution" and "selection" metaphor most successfully.[25]

It is certainly true that biological knowledge was in "the intellectual air" at the time when Schäffle, Sombart, and Wagemann borrowed from Virchow, Haeckel, and Driesch. As we will see in the respective chapters, the three biologists were publicly renowned, immensely popular and had a far reach particularly in Germany.[26] The popularity of biologists can also be attributed to the ample "cross-fertilization" in the 19th century between the natural and the social sciences that philosophers of science have long pointed out (Maasen, Mendelsohn, & Weingart, 1995). Virchow and Haeckel made use of analogies from the social and referred to the "cell state", the "mother cell", "associations" of cells, or the "division of labor" in nature.[27] With Auguste Comte's (1798-1857) work in the middle of the 19th century the social and the natural moved closer, as sociology and biology were regarded as the two most complex sciences.[28]

With some reservations, I also accept Hutter's and Hodgson's claim that life force, and evolution were qualities that the economists recognized in biological and social entities alike. Schäffle and Sombart mentioned on several occasions that they investigated a "living economy" (*lebendige Wirtschaft*) and also Wagemann (1930, p. 11) treated the economy as a "living organism". However, for the three economists, the "living economy" was a useful assumption rather than an ontological conviction about the existence of an inner life force. We will also see that the concept of "evolution" played only a minor role in explaining why the economists resorted to biology. What the economists wanted to express with the term "living" was the long-held idea by German historical economists that

[24] See also the collection of essays concerning "evolution" in Hodgson (1995).

[25] Other historians explored "evolutionary metaphors" by U.S. economists of the late 19th and of the second half of the 20th century (Hirshleifer, 1977; Morgan, 1995). The allure of evolution and development for German and Austrian economists was also an important topic for Krabbe (1996) and Yagi (2011).

[26] On the popularity of Virchow, see Mazzolini (1988). On Haeckel, see Gasman (1971/2004) and Kleeberg (2005). On Driesch, see Harrington (1996). On the popularization of the natural sciences in the German public, see Daum (1998).

[27] On Virchow's use of "social" analogies, see Mazzolini (1988), Johach (2008) and Sander (2012). On Haeckel's "cell state", see Reynolds (2008).

[28] See Ward (1898) on Comte's hierarchy of the sciences.

the economy developed gradually, altered its shape, ratios, and interconnections over time.[29] Such an economy could not be represented by fixed and precisely quantifiable relations of mechanical contrivances or by universal laws, static models, and mathematical functions.

Hutter and Hodgson thus provided sufficient arguments that explain why Schäffle, Sombart, and Wagemann resorted to biological and not mechanical analogies to give more substance to variety in their economics. Due to the German tradition of comparing society with a developing organism, and due to the popularity of biologists, the three economists preferred to borrow from biologists rather than physicists and engineers. Where I disagree with Hutter and Hodgson is in the way they assigned agency to circumstances and paradigms instead of considering the economists as somewhat independent actors. By accentuating large philosophical tenets and the "the intellectual air", Hutter and Hodgson portray economists as passive members of an "organic paradigm", or an "evolutionary approach".

By denying the three economists agency, Hutter and Hodgson were unable to explain why Schäffle, Sombart became much more explicit about their borrowings from biology than their contemporaries. The two historians also overlooked that Schäffle, and Sombart broke with the tradition of their teachers of using "organism as a metaphor". Both economists considered the term "organism" to be too obscure and vague.[30] In my investigation of biological analogies I propose to give the economists more agency and investigate their specific reasons for introducing biological concepts.[31] I will investigate the three economists' borrowings from a more narrow, or what Mannheim (1936) called "microscopic" view, by zooming in on the theoretical and methodological impasses that emerged

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[29] For an overview of historical economists who used the term organism and emphasized its growth, see Sombart (1927b).

[30] Schäffle (1875, p. VII) claimed that he wanted to "avoid" the term in his *Structure and Life*. Sombart (1927b) considered that social scientists used to term not "seriously" enough.

[31] Shifting my attention from economic schools, research paradigms, philosophical tenets, and socio-cultural contexts toward economists as active actors with individual aims and motivations does not mean that the economists were not embedded in a larger context and disciplines. I simply give more weight to the economists' decisions, than I give to the context. I thus follow Gide and Rist (1909), who assume a certain autonomy of ideas, and not Pribram (1983) who gives more weight to context. Extended to the history of science and biology, I rather follow Norton Wise (2011) than Paul Forman (1971), and Anne Harrington (1996) than Daniel Gasman (1971/2004) by focusing on the active *choice* by the actors, rather than insisting on passive *influence*.

shortly before the economists introduced biological analogies.[32] We will then see that Schäffle, Sombart, and Wagemann were working on specific economic problems that centered around variety in the economy. As the economists were unable to solve these problems with the existing theoretical framework, they reached for biological analogies to give representation to variety in their economic theories. None of the three economists inscribed their use of biological analogies in large philosophical tenets like the "organicist tradition" and none of them was interested at the outset in the concepts of evolution or struggle for existence.[33]

My closer reading of the three economists' borrowings from biology also revealed that especially Wagemann and Schäffle believed that they worked like biologists. Wagemann (1928a, p. 12) remarked that taking up the "logic applied in studying organic processes" was justified, because his research was close to the "biological-scientific working method" (*biologisch-naturwissenschaftliche Arbeitsweise*). His method was inductive rather than deductive, and paid heed to variety instead of reducing it to a "single formula" (*Einheitsformel*). Wagemann (1931, p. 173) asserted that the engineering methods by U.S. forecasters were inadequate, because the economy was an "organic whole" (*organisches Ganzes*), and a web (*Geflecht)* of interconnections that could never be comprehended mathematically due to its "infinite variety" (*unendliche Mannigfaltigkeit*).

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[32] My approach is also narrower than Thomas Stapleford's (2017) view on the history of economics "through the lens of practice". While my focus on the economists' reasons and intentions to introduce and adapt biological analogies resonates with Stapleford's call for a more detailed study of practices, I do not embed the three economists in a "web of epistemological practices that are tied into the text" (Stapleford, 2017, p. 122). I also prefer the term "style of reasoning" to "practices" as it makes clear that the economists did not engage in the same practices as biologists. For example, when Schäffle argued that he was "dissecting" society, he was not following the practice of histologists to dissect the social organism with the help of a scalpel and a microscope, but only mentally classifying society into five tissues. We will also see that the style of reasoning with the help of biological analogies transcends various practices. For example, Wagemann's practice of forming claims based on large sets of time series plotted as charts, differed fundamentally from Schäffle's and Sombart's discursive practices.

[33] The terms "evolution" and "struggle for existence" only played a minor role in the economists' works. When theorizing about the "development" of the economy, they did not refer to Darwinian evolution but rather formed their ideas based on the stages theories by their teachers Roscher and Schmoller. As Schefold (2012) clarified, the stages theories, and with it, the idea of development, can be traced back to the 16th century. In later years, Sombart had a very deterministic and teleological view of the development of capitalism, which made it eventually unsuitable to Darwinism. Wagemann, who was not particularly interested in the long-term development of the economy, took over Sombart's stages theory. Only Schäffle transferred the concepts of "struggle" and "selection" to economics and society. These transfers had some consequences on his view on competition and made him into the "quintessential German Social Darwinist" (Weikart, 1993, p. 480). However, Darwinian concepts were not Schäffle's main reason to turn to biology, and, as I will briefly argue, they had not much heuristic value for him.

Schäffle (1878c, pp. 505–506) argued that biologists had already sufficiently understood the "interdependencies and unity of the organs and functions of the animal body". Thus, Schäffle believed that he could profit from biologists' knowledge about the tissues of the human body and use them for a "systematic dissection of society". Sombart (1902a, p. XIII) did not compare himself to a biologist, but his commitment to empirical methods and his assertion that human reason combined "the individual, the manifold, the particular to a higher unity" strongly resonates with Schäffle's and Wagemann's statements. I believe that the three economists did indeed work in a similar fashion. They used inductive methods, that is, they collected the variety of economic phenomena. They then reduced this variety by creating different layers (Schäffle), types of firms (Sombart), or branches (Wagemann) and finally, they tried to combine the different parts into a "higher unity", or "organic whole" by creating systems, schemas, or networks. Hence, it is worth taking brief detour into the history of biology to see whether there is any truth in the statements of the economists that their working methods were similar to those of biologists.

ii Variety in Unity

Historians of biology have shown that the three steps of collecting, reducing, and combining had been occupying biologists or, more specifically, botanists, since at least the 18th century. Already Swedish botanist Carl Linnaeus (1707-1778) had to abstract from an infinite variety of plants by classifying them into different species. After collecting and comparing plants, Linnaeus had been "taming nature's variability" (Daston & Galison, 2007, p. 63) by working out his system of classification, for example, on the basis of typical leave shapes.[34] As historians of science Staffan Müller-Wille and Isabelle Charmantier (2012, p. 4) put it, Linnaeus wanted to "contain and reduce information overload". However, for another botanist, German poet and playwright Johann Wolfgang von Goethe (1749-1832), Linnaeus did not go far enough. What was a *variety* of species for Linnaeus, was for Goethe a still reducible *variability*. Hence, Linnaeus' 93 species of tulips were "only one" for Goethe (Daston & Galison, 2007, p. 59).

This is not to say that Goethe did not awe at the variety of nature. On the contrary, Goethe's diaries of his Italian journey are full of his fascination for the new and beautiful vegetation he encountered. After his visit to the botanical garden of Padua in late September 1786, Goethe noted:

[34] Ernst Cassirer (1950, p. 124) described that with Linnaeus, "[a]t one stroke the manifold variety of these forms, which were incapable of being seen in any one view, were classified as members according to a regular scheme."

> "Here where I am confronted with a great variety of plants, my hypothesis that it might be possible to derive all plant forms from one original plant becomes clearer to me and more exciting."[35]

Goethe famously named this one plant from which all others can develop the "primal", or "archetypal" plant (*Urpflanze*). Since he had searched in vain for the archetypal plant, he needed the power of imagination to picture it. The "primal plant", Goethe described to his friend Charlotte von Stein (1742-1827), was "the strangest creature in the world, which Nature herself shall envy me". The (mental) image of the plant was the "key" to "go on for ever inventing plants and know that their existence is logical".[36]

Goethe never sketched the archetypal plant himself and left it for others to put his description into something more tangible. Only after Goethe's death, the plant's first visual interpretation (Figure 1) was published in 1837 by French botanist Pierre Jean François Turpin (1775-1840).

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[35] See Goethe (1982, pp. 54–55). In the German original Goethe stated: "*Hier in dieser neu mir entgegen tretenden Mannichfaltigkeit wird jener Gedanke immer lebendiger: daß man sich alle Pflanzengestalten vielleicht aus Einer entwickeln könne*" (Goethe, 1903, p. 89).

[36] See Goethe (1982, pp. 305–306). In the original, Goethe wrote: "*Die Urpflanze wird das wunderlichste Geschöpf von der Welt über welches mich die Natur selbst beneiden soll. Mit diesem Modell und dem Schlüßel dazu, kann man alsdann noch Pflanzen ins unendliche erfinden, die konsequent seyn müßen, das heißt: die, wenn sie auch nicht existieren, doch existieren könnten und nicht etwa mahlerische oder dichterische Schatten und Scheine sind, sondern eine innerliche Wahrheit und Nothwendigkeit haben*" (Goethe, 1890, pp. 232–233).

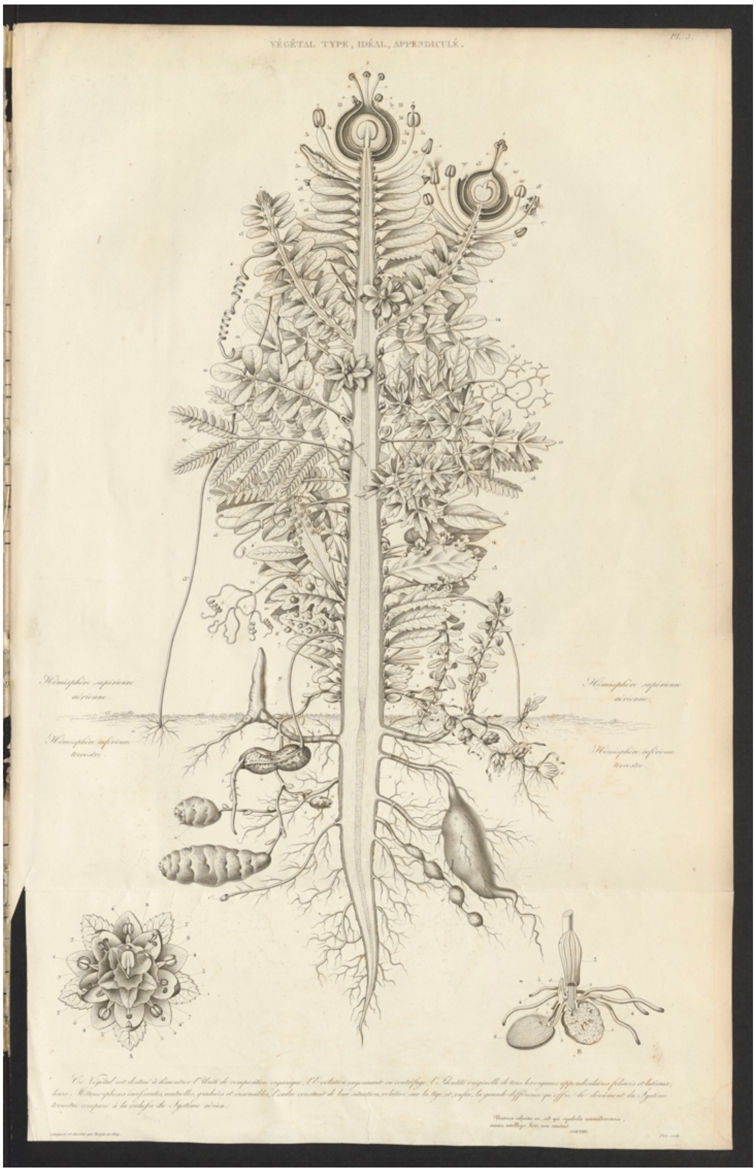

Figure 1 Turpin's primal plant (*plant idéal*). Source: Turpin (1837).

The print from a French edition of Goethe's natural history works (Turpin, 1837) is exactly what Goethe explained: it is strange, but allows to invent a great variety of plants. With the coffee-plant as its basis, Turpin's plant assembles the variety of the flora of Santo Domingo (today's Haiti) in one "ideal" plant model. It allows to visualize existing plants, can be used to invent new combinations, and even includes "monstrosities".[37] Turpin explained that his plant was a "variety in unity" (*la variété dans l'unité*), a "synthesis", or a "summary" of variety.[38]

Later botanists went in the opposite direction when interpreting Goethe's archetypal plant. Instead of putting emphasis on the variety of plants, they made variety disappear. The archetypal plants by German biologist Matthias Jacob Schleiden (1804-1881), or Austrian botanist Franz Unger (1800-1870) conform to a reductionist idea in which only the most important traits common among a wide variety of plants are accentuated (Figure 2 and Figure 3). Schleiden (1848, p. 82) argued that "despite the manifold differences in particulars, [the plants' organs] show an essential basic physiognomy".[39] Similarly, in Unger's plant it was "not variety that comes to the fore, but the unity in variety".[40]

[37] Turpin did not think that his plant actually existed, but rather that it allowed to think about possible combinations of parts. Combinations between different types of leaves in one plant, for example, are quite common. Most Juniper species have needles on young branches and scales on more mature ones. The Acacia koa species, a common tree in Hawaii, has compound leaves (pairs of small leaflets) and phyllodes (thick sickle-shaped leaves) as a young plant. Turpin (1837, pp. 6–7) commented on the ideal plant: "*Ce même type fut encore un flambeau à l'aide duquel nous expliquâmes, tout naturellement et sans sortir de la loi commune, toutes les anomalies constantes ou accidentelles et toutes les monstruosités*".

[38] Turpin (1837, p. 6) explained that the primal plant was a "summary" : "*La première [planche de l'Atlas], qui représente la coupe vertical d'un végétal type et idéal, sorte de résumé de la végétation appendiculée, fut composée par nous en 1804, peu de temps après notre retour de Saint-Dominque à Paris*".

[39] Describing the primal plant, Schleiden (1848, p. 82) explained that: "*Das zweite Organ stellen die mit c bezeichneten seitlichen dar, bei mannigfacher Verschiedenheit im Einzelnen doch eine wesentliche Grundphysiognomie zeigend, welche sie nie ablegt und welche besonders in ihrer Entwicklungsgeschichte hervortritt; man nennt sie im Allgemeinen 'Blattorgane oder Blätter'*".

[40] "*Diese Anschauungsweise der Pflanze musste für die Erkenntnis der Gestaltung von wesentlichem Einflusse sein. Nicht das Mannigfaltige ist es, was hierbei in den Vordergrund tritt, sondern das Einheitliche im Mannigfaltigen*" (Unger, 1852, p. 72).

Figure 2: Schleiden's "primal plant" (*Urpflanze*). Source: Schleiden (1848).

Figure 3: Unger's "ideal plant" (*Ideale Pflanze*). Source: Unger (1852, p. 72).

Schleiden and Unger wanted "unity in variety" while Turpin sought after "variety in unity". Consequently, Schleiden did not think much of Turpin's plant when describing it as a "disgustingly tasteless amalgamation of a multitude of individually possible forms into a veritable monstrosity of a plant".[41] For other biologists it was a "nightmare"[42], or a "rat king".[43]

However, it would be too simple to discard Turpin's image as a freak object, or figment of his fantasy. Turpin had been stationed in Haiti as a member of the French army in 1794 and got acquainted with

[41] "*So viel ist gewiß, daß solche widerlich geschmacklose Zusammenhäufung einer Menge im Einzelnen möglicher Formen zu einer wahren Mißgeburt von Pflanze, wie sie von Turpin in seinem Atlas zu Göthes naturwissenschaftlichem Werke gegeben ist, alles andere sind nur nicht das, was sich der klare Göthe unter seiner Urpflanze vorstellen mochte*" (Schleiden, 1848, p. 81).

[42] For historian of biology Agnes Arber (1879-1960) Turpin's plant was "a botanist's nightmare" (Arber, 2012, p. 62), which is surprising, given that she was well aware of both perspectives of unity in variety and of variety in unity.

[43] For the somewhat artificial 'gluing together' of variety, German botanist Wilhelm Troll (1897-1978) labelled Turpin's plant a "rat king" (*Rattenkönig*), the mystic and unexplained phenomenon of rats getting tied together at their tails. See Meister (2005, pp. 226–242).

French botanist Pierre Antoine Poiteau (1766-1854), through whom he learned botany and accumulated a vast knowledge about tropical plants. Fleeing from the Haitian massacre of 1804, Turpin arrived in Philadelphia, where he met with German polymath and revolutionary plant geographer Alexander von Humboldt (1769-1859). Impressed by Turpin's botanical illustrations, Humboldt collaborated with him on many occasions. Humboldt's most iconic prints of plants and tableaus are based on Turpin's drawings and engravings. Back in Paris in late 1804, Turpin drew the archetypal plant that formed the basis of the 1837 print. Shortly after, Turpin painted the ground-breaking "*Tableau physique des Andes et pais voisins*" based on Humboldt's sketch (Figure 4).[44]

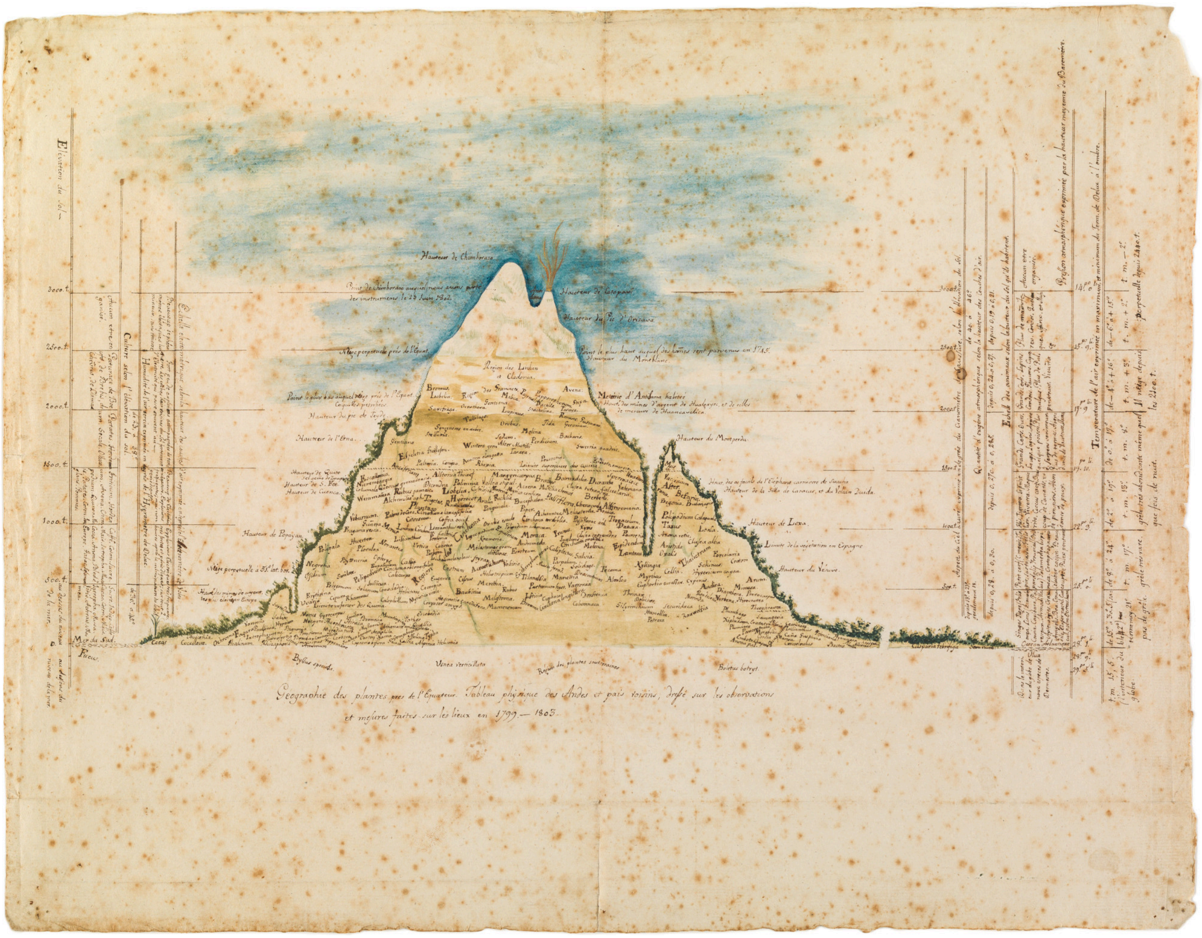

Figure 4: Humboldt's *Tableau Physique* ("*Géographie des plantes près de l'équateur*. *Tableau physique des Andes et pais voisins, dressé sur les observations et mesures faits sur les lieux en 1799–1803*"). Source: https://humboldt.unibe.ch/erschliessung/transversal/09_pflanzen_und_oekologie (08.20.2022).

Like Turpin's archetypal plant, Humboldt's sketch depicts the great variety of the world of plants. But while Turpin created a unity by 'gluing together' different plant species and stages of development on one common stem, Humboldt grouped together various plant species into 16

[44] See also Güttler (2014), Abbildung II/7: Humboldt's Entwurf. For Turpin's print, see Humboldt and Bonplant (1805).

physiognomic types (the diagonal names) and showed how they dispersed over different altitudes or types of soil.[45] Goethe, despite heading into a more reductionist direction with his "leaf theory", admired Humboldt's work because he formed an overall picture from single findings.[46] Such an overall picture did not come into existence by just gazing into nature.[47] Altitude, soil and other qualities had to be measured and the details of the different species had to be meticulously compared and analyzed. It was a detailed examination of the "immense variety of plant forms".[48] As Turpin had already highlighted, unity was only the "synthesis", while variety was the "analysis".[49]

Looking at the sketch it becomes clear why Humboldt did not go along a reductionist path like Schleiden, but continued to conserve the variety of plants. Humboldt wanted to investigate the interdependencies between various plant species and their relationships to other observations like altitude, temperature, and soil type. Some plants coexisted in the same areas; others were crowded out by more dominant species. Even unspectacular lichens and mosses had their role to play in nature and could not be neglected.[50] Without preserving a certain level of variety, the 16 physiognomic types, Humboldt could not have worked out the interrelationships of plants and how they related to

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[45] The 16 "plant forms" or "physiognomic types" of plants Humboldt (1806) defined in his essay helped him to pin down different plant "regions" from the sea level to the mountain tops.

[46] Goethe pursued different goals than Humboldt and tried to explain the development of all plants based on a "leaf theory" that he elaborated in his 1790 *Metamorphosis of Plants* (*Versuch die Metamorphose der Pflanzen zu erklären*). Turpin also paid attention to the theory as he showed in his primal plant the different leaf stages. It is for this reason that Daston and Galison (2007, p. 59) described Goethe as following the "concrete practices of abstract reason as understood by Enlightenment naturalists". Accordingly, Goethe wanted to "fix the empirically variable, exclude the accidental, eliminate the impure, unravel the tangled, discover the unknown". Still, Goethe (1806) believed that Humboldt's work was one of the most important scientific developments in botany. Humboldt's essay was like an "aesthetic breath that enlivens the long stacked and smoking wood pile into a bright flame" (*ästhetischer Hauch der den lange geschichteten und rauchenden Holzstoss zur lichten Flamme belebte*).

[47] In my opinion, it is important that Humboldt (1806, p. 11) described his work as "encompassing nature in one glance" (*mit einem Blicke umfassen*) and not as c*apturing* nature in one glance (*mit einem Blicke erfassen*).

[48] "*C'est cette science* [*la géographie des plantes*] *qui examine si, à travers l'immense variété des formes végétales, on peut reconnaître quelques formes primitives, et si la diversité des espèces doit être considérée comme l'effet d'une dégénération qui a rendu constantes, avec le temps, des variétés d'abord accidentelles*" (Humboldt & Bonpland, 1805, p. 20).

[49] "[…] *et nous devons observer sans cesse sous le double point de vue de l'unité, qui est la synthèse, et sous celui de la variété, qui est l'analyse*" (Turpin, 1837, p. 10).

[50] Humboldt (1845, p. 61) argued that even the "organic tissues that color our cliffs" (*organische Gewebe, die unsere Felsklippen färben*) were important for his "description of the world" (*Weltbeschreibung*).

their surroundings. He could not have worked out what he called the "natural system" (Humboldt, 1806, p. 15).

In his monumental *Cosmos*, Humboldt (1849, pp. 2–3) thus explained that:

> "Nature considered rationally, that is to say, submitted to the process of thought, is a unity in diversity [*Einheit in Vielheit*] of phenomena; a harmony [*Mannigfaltigkeit*], blending together all created things, however dissimilar in form and attributes; one great whole […] animated by the breath of life. The most important result of a rational inquiry into nature is, therefore, to establish the unity and harmony [*in der Mannigfaltigkeit die Einheit erkennen*] of this stupendous mass of force and matter, to determine with impartial justice what is due to the discoveries of the parts of natural phenomena without succumbing beneath the weight of the whole".[51]

From this short excursion into natural history, I believe to have shown that there is some truth to the economists' claims that they worked like biologists. Like the "romantic natural scientists" Turpin and Humboldt, the three economists collected and conserved variety, investigated its interrelationships and created a variety in unity.[52] Still, the question remains, why the economists needed biological analogies and did not simply collect, conserve and combine variety without them?

Schäffle's (1878c, pp. 505–506) remark that biologists had already understood natural organisms suggests a daring answer to this question. Schäffle, Sombart, and Wagemann seemed to believe that they could adopt the biologists' findings, because biologists had already completed the task that still lay ahead of them. By studying and reducing variety, biologists had already established classifications of tissues, had discovered the principles that governed the development of organisms and had unveiled how the different parts of the body interlinked through the metabolism of cells. The economists could take over successful classifications, theories and systems that conserved variety and use them in their economics. Another benefit that biologists had over economists was "pictorial

[51] "*Die Natur ist für die denkende Betrachtung Einheit in Vielheit, Verbindung des Mannigfaltigen in Form und Mischung, Inbegriff der Naturdinge und Naturkräfte, als ein lebendiges Ganze* [*sic*]. *Das wichtigste Resultat des sinnigen physischen Forschens ist daher dieses: in der Mannigfaltigkeit die Einheit zu erkennen, von dem Individuellen alles zu erfassen, was die Entdeckungen der letzteren Zeitalter uns darbieten, die Einzelheiten prüfend zu sondern und doch ihrer Masse nicht zu unterliegen* [...]" (Humboldt, 1845, pp. 5–6).

[52] On Humboldt as a "romantic natural scientist" (*romantischer Naturforscher*), see Köchy (2002).

representation" (*Anschaulichkeit*).[53] The images of tissues, nervous systems, phylogenetic trees, gave form to variety and provided the economists with more concrete ideas about interconnections. We will see, for example, that Schäffle considered pictorial representation as one of the main reasons for why he needed biological analogies. [54]

The three economists' main biological references were not Humboldt or Turpin. By the late 19th century, the two biologists were overshadowed by the fame of younger scientists like Virchow, Haeckel, and Driesch—three of the most widely read biologists of the late 19th and early 20th century. These three biologists had different and changing views about the usefulness of reductionism in biology, but always adhered to what historian of biology Ernst Mayr (1904-2005) called the "autonomy of biology": they were convinced that many "attributes of living organisms that interest biologists cannot be reduced to physiochemical laws" (Mayr, 1998, p. 32).

In contrast, biologists like the abovementioned Schleiden followed a more reductionist agenda. Schleiden thought to be able to do away with variety by extracting the common among all plants. His procedure bore more resemblance to the method of Belgian astronomer and statistician Adolphe Quetelet who went to great lengths to isolate the common, or "average", from a great variety.[55] Schleiden had also further reductionist tendencies. He claimed that botanists should know more about chemistry and physics, and that the highest stage of science was "mathematical theory".[56] Even more pronounced than Schleiden, German physician and physicist Hermann von Helmholtz (1821-1894) is a definite representative of epistemological reductionism. Helmholtz sought to explain biological

[53] Throughout this thesis, I will use the translation of *Anschaulichkeit* as "pictorial representation" by German historian of science Christoph Meinel (2004, p. 245). Meinel also suggested a longer but more enlightening definition of *Anschaulichkeit* as "the ability to appeal to the mind's eye by transforming abstract notions into vivid mental images". Meinel's article about *Anschaulichkeit* in 19th-century chemistry is part of a collection of essays that emphasize the scientific value of 2-D and 3-D pictorial representation in various scientific disciplines (de Chadarevian & Hopwood, 2004).

[54] Schäffle (1898, p. 755, 1903a, p. 295) referred several times to *Anschaulichkeit* as one of the most important functions of biological analogies.

[55] We will encounter Quetelet's method in Chapter 2. Schleiden's plant is also the key to understand Ingram's above claim that "all science" sought after "unity in variety".

[56] Schleiden (1838) was one of the first to insist that physiology of plants had to be explained by the smallest unit: the cell. Schleiden (1849, pp. 12, 41) also argued that botanists did not know enough about physics and chemistry and he thought that the highest stage of "science" was "mathematical theory". On Schleiden's reductionism, see Mylott (1997). As Kleeberg (2005, pp. 50–51) has shown, however, Schleiden had other sides that did not conform to his materialistic-reductionist convictions.

phenomena through physical laws and mathematics.[57] Yet, despite being just as popular as Virchow, Haeckel and Driesch, Schleiden and Helmholtz do not show up in the works of the three economists.

For other economists, however, Helmholtz had quite an appeal. In the early 1870s, around the same time when Schäffle started to explore biological concepts and theories, there emerged several economists who elevated isolation, and reductionism to the highest virtue in economics. They became "natural-law" thinkers in the sense of Mannheim (1986, p. 107). Instead of investigating the works of biologists, these economists referred to the methods of physics and invoked mechanical analogies to form their claims. As has been abundantly explored by historians of economics, it was William Stanley Jevons (1835-1882), Léon Walras (1834-1910), and Carl Menger who spearheaded the movement of further reducing economics to individual actions, or mathematical formulas.[58] Without exception, these economists, and their followers like Francis Ysidro Edgeworth (1845-1926), Irving Fisher, and Vilfredo Pareto (1848-1923), invoked the realm of classical physics (or mechanics) in support of their reductionism. Physics provided economists with concepts, theories, models, and equations that were sources of creative elements in theory building. Their works can be seen as the "successful penetration of mathematical discourse into economic theory" (Mirowski, 1984, p. 362).

As we will see in the individual chapters, the three economists had convincing arguments to not follow a reductionist and mathematical path. Yet, their criticism of what they considered too reductionist is not my main concern. The limits and flaws of reductionism in economics have been discussed at length.[59] Rather, I want to shift the attention to what can be called a conservative style

[57] See Turner (1993) for an investigation of Helmholtz's reductionism in vision studies.

[58] Jevons imported the "British style of reasoning" into economics, a style that "heavily relied on mechanical analogies to uncover the laws governing nature" (Maas, 2005, p. xvii). Edgeworth (1881, p. 9) claimed that "[p]leasure is the concomitant of Energy" and could thus be summed up as a measure of general welfare. Fisher (1911, p. 296) thought to be able to express the economy as one single equation and form "a law as real […] as Boyle's law of direct proportion between density and pressure". Alfred Marshall had noticed that many authors "have carried over physical conceptions into social science" and continued this tradition by arguing that complex economic phenomena could be studied "one bit at a time" whereby pre-defined "disturbing forces" could be isolated by putting them into the "pound [..] called *Caeteris Paribus*" (Marshall, 1898, pp. 38–40). Menger (1883, pp. 155–156) justified his reductionism and method of isolation by reference to a "physical-chemical (the atomistic!) understanding" of society. Because Menger did not use mathematical methods, Mirowski (1984, p. 371) argued that Menger's reference to physics cannot be taken seriously.

[59] See, for example, Hermann's (1832) critique of Ricardian economics, Zwiedineck's (1909) assessment of the quantity theory of money. On the limits of Menger's reductionism, and similarly, methodological individualism, see Heath (2020). See Lowe (1951) for a critical view on Walras' general equilibrium theory and reductionist economics of the 1940s and 1950s. For a criticism of the ceteris paribus condition, see Reutlinger et al. (2021). For a critique of "micro foundation" and of the "representative agent", see Hoover (2009) and Hodgson (2000).

of thought in economics that seeks variety in unity by using biological analogies as tools of reasoning. What was this style of reasoning capable of? What theories could be constructed and to what insights did they lead?

iii Outline and Goal

Before diving into the individual chapters, let me briefly provide an outline of what can be expected from my thesis. The five biological analogies that I singled out are the pillars on which the thesis rests. They can be seen as case studies of scientific analogies in economics and will support my claim that Schäffle, Sombart, and Wagemann used biological analogies to conserve variety. We will see how the analogies were scientific tools that remained by the economists' sides and did not disappear even when new statistical and mathematical methods gained a foothold in their research. The economists used analogies as tools of reasoning, and not only discovery.

I devote one part to each of the three economists and assign three chapters to Schäffle, two chapters to Sombart, and three chapters to Wagemann. While I introduce the parts of Schäffle and Wagemann with a biography (Chapter 1 and Chapter 6), I do without a longer introduction to Sombart's life as there exist three exhaustive biographies of Sombart (Appel, 1992; Lenger, 1994; vom Brocke, 1992). Apart from these differences, the three parts are very similar in structure. In each part, I will first reconstruct the lead-up to the theoretical and methodological impasses that the three economists found themselves in. Having established sufficient proof that the economists believed to have reached a dead end with existing theory, I will then explore their search, choice, and application of biological analogies.

In Chapter 2, I will discuss Schäffle's path toward the tissue (*Gewebe*) analogy that he discovered in his search for a means to depict "symbolic goods". I will then show how he created a mental model of five layers of tissue which he could use to make sense of the interrelationships of different economic layers. Schäffle used this mental model to investigate social pathologies and to explore new ways to make use of statistics. I will claim that Schäffle went too far in trying to map the entire society to the human anatomy, which explains why his tissue analogy was not taken up by his contemporary sociologists. In Chapter 3, I will detail Schäffle's investigation of the social nervous system and his non-reductionist treatment of the flow of information in society. With a narrower application of biological analogies, Schäffle profited from their heuristic value. Thinking about individuals as nerve cells and collectives as social ganglia that connected to each other through fibers allowed him to form new ideas about how economic and non-economic values were determined in society. The concepts of thresholds and stimuli suggested to Schäffle that knowledge was locally tied and had to be actively disseminated.

In Chapter 4, I will reveal why Werner Sombart began using Haeckel's principle of differentiation and integration and will show how he could form a new theory of industrial development on its basis. Opposite to Marxist and reactionary economists who warned of overwhelming industrial dominance, Sombart's theory attenuated the idea that machine-based factories would eventually rule over the whole economy. In his theory, Sombart explained how a great variety of firms unfolded in modern capitalism. Many of these firms were highly productive without machinery, because of their high degree of organization, and their adoption of what Sombart called capitalist spirit. In Chapter 5, I will not introduce a new biological analogy but will argue that Sombart created a "schema" (*Schema*) from the insight he gained through using the biological principle of differentiation and integration. The schema consisted of three main categories (spirit, order, and technology), which served him in the 1920s to assess the "unity" of an "economic system". I will also show that Sombart abandoned biological analogies, and in particular, I will argue that Haeckel's principle proved him too reductionist to be able to explain the almost infinite variety of firms.

In Chapter 7, I will retrace the development of Wagemann's monetary theory and suggest reasons why he introduced the human blood circuit analogy to create a model of the monetary circuit. We will see that this particular case study does not fit my claim that the three economists always recognized "variety" as the outstanding positive analogy between organic nature and the economy. Nevertheless, the blood circuit analogy is crucial to understanding how Wagemann tried to overcome the methods of forecasting the business cycle by his contemporaries. In his eyes, the existing theories, and what have been called "barometers" were too mechanical and monocausal. Instead, Wagemann proposed to investigate the functional relationships between markets, by which he meant that causality could run in both directions between two variables. We will see that Wagemann could not live up to his claim to forecast the economy by investigating the functional relations because he always had to define certain leading indicators.

In Chapter 8, I will introduce Wagemann's "organic-biological principle" that he defined as his guideline in business cycle research. With the organic-biological principle, Wagemann emphasized that he gave priority to functional relations and underscored his aim to forecast the course of the economy with a large set of barometers instead of relying on single statistics and indices. I will show that his efforts to collect large amounts of time series did not help him to live up to the organic-biological principle. As a result, Wagemann suggested a new "ordering principle" for his statistical time series that paid attention to the variety of branches and their functional relationships. Wagemann depicted businesses as the cells of the economic organism. As cells, businesses possessed branch-specific metabolisms that connected them to the whole economy. Like cells, businesses took up materials, reworked them, and gave them off. We will see, that based on such insights, Wagemann created a new barometer system that could dispense with leading indicators and thus meet the requirements of the organic-biological principle. I will further show how Wagemann tried to induce businessmen to rely on his new barometer system by making his publications more user-friendly and by distributing handy booklets. Yet, such efforts were rather short-lived and gave way to the planning and rearmament efforts under the 1936 Four-Year Plan.

When going through the individual chapters, it is helpful to keep in mind Turpin's primal plant and Humboldt's sketch. They provide the necessary pictorial representation to understand what the economists meant by variety in unity. I will provide additional vivid representations by reproducing the images that the three economists referred to and occasionally reprinted or sketched themselves in adapted versions: the tissues, the nervous system, marine organisms, phylogenetic trees, the blood circuit, and the cells. Hence, aphantasia—the inability to voluntarily create mental images—should not hinder someone from going through my arguments.

My treatment of the three economists and their work is far from comprehensive. I single out their most prominent and consequential uses of biological analogies, show the lead-up to them, and reveal their consequences. The main sources for this thesis are the published works by the three economists in which they made claims based on biological analogies. With the exception of Wagemann's (1928a) *Konjunkturlehre*, none of these articles and books have been translated into English.[60] Hence, all translations are my own unless otherwise indicated.[61] To supplement certain claims about the lives of the three economists and the impact of their work, I will also rely on unpublished sources and correspondences from several archives. As Schäffle, Sombart, and Wagemann borrowed from Virchow, Haeckel, and Driesch, the works of the three biologists are also vital sources for my thesis.

[60] I will occasionally make use of the translation of Wagemann's *Konjunkturlehre* (1928a), which has been published as *Economic Rhythm. A Theory of Business Cycles* (1930). In many paragraphs the translation obscures Wagemann's ideas, which is why I also use the original German version. I will also use the English translation of Schäffle's (1885) *Impossibility of Social Democracy* (Schäffle, 1892a) in Chapter 3, and will refer to the English translation of Marx's *Capital* (1887/1996) in Chapter 4.

[61] When I quote longer paragraphs, I will add the German original in the footnotes. For important or ambiguous concepts, I will also add the German terms in brackets within the main text. In both cases, I will italicize the German terms.

Although I do not cover the entire work of the three economists, I hope that it will transpire that biological analogies are at the core of what Schäffle, Sombart, and Wagemann have elaborated in economics. Biological analogies were not only their tools of discovery, but also their tools of reasoning. They shaped their style of thought. By conserving the great living variety, Schäffle, Sombart, and Wagemann gained a perspective on the economy that is largely forgotten in modern economic theory and that can be eye-opening when encountered for the first time as a modern reader.

Part I ALBERT SCHÄFFLE AND HIS BIOLOGICAL "CRUTCHES"

"Nowadays, I believe in being able to present a complete system of all social facts and to throw away the crutches of biological-psychological analogies (as a means of illustration and pathfinding) completely" (Schäffle, 1903a, p. 295).[1]

INTRODUCTION

In mid-1875, Albert Schäffle published the first volume of a four-volume work called *Structure and Life of the Social Body* (*Bau und Leben des socialen Körpers*). Schäffle described his book as an "encyclopedic outline of a real anatomy, physiology and psychology of human society with special regard to the national economy as a social metabolism".[2] Schäffle was an influential German economist who was mostly interested in the theory of value, public finance (*Finanzwissenschaft*), taxation, and the formation of organizations like businesses, and cooperatives. What is more, Schäffle was a social reformer and politician who built an expertise in tariff policy and insurance. Based on his interests, it is at first puzzling that Schäffle wanted to know more about anatomy, physiology, and psychology. But *Structure and Life*, the title of his magnum opus, was not chosen frivolously as some have alleged. Schäffle's work is in fact saturated with biological analogies supported by references to biologists and psychologists like Rudolf Hermann Lotze (1817-1881), Rudolf Virchow (1821-

[1] "*Er* [*Schäffle*] *glaubt sich heute imstande, eine vollständige Systemisierung sämtlicher sozialen Tatsachenkreise vorlegen und hiebei* [sic] *die Krücken der biologisch-psychologischen Analogien (als Veranschaulichungs- und Pfadfindungsmittel) völlig wegwerfen zu können*".

[2] The full title in German reads *Bau und Leben des socialen Körpers. Encyclopädischer Entwurf einer realen Anatomie, Physiologie und Psychologie der menschlichen Gesellschaft mit besonderer Rücksicht auf die Volkswirthschaft als socialen Stoffwechsel* (Schäffle, 1875). For the sake of brevity, I will refer to this work as *Structure and Life*.

1902), Henry Maudsley (1835-1918), Gustav Theodor Fechner (1801-1887), Wilhelm Wundt (1832-1920), and others.

One of Schäffle's main claims was that society, or the "social body", consisted of five tissues (*Gewebe*) that covered the entire social realm. The tissues were the building blocks of social organizations, or "organs" (*Organe*). Any type of organization, be it a family, a business, a cooperative, a school, a municipality, a church, or the state consisted of five layers of tissue. A workshop, for example, consisted of a building (the bone tissue), its walls and fences (the epidermal tissue). It took raw materials and turned them into consumer goods (the vascular tissue), and needed a workforce, tools, and machines (the muscle tissue) for the process of production, all facilitated by the communication and the flow of information (the nervous tissue). In various degrees, the same applied for any other social organization.

I will explore why Schäffle used the tissue analogy and how he applied it in his economic research. I will argue that Schäffle came to use the tissue analogy through his interest in the human nervous system, which he used to understand interconnection and communication in society. Schäffle realized that the concept of tissues was useful to make society visible (*anschaulich*) and that it allowed him to gauge interconnection within society. Schäffle went far beyond using only the tissue analogy. Cell theory, embryology, parasitism, and many other concepts from biology make appearances in *Structure and Life*. Schäffle also invested much time to make use of the newest findings in psychology, neurology, and psychophysics, which in my view had the most bearing on his economics. In the three additional volumes of *Structure and Life* that he published in 1878, Schäffle adopted a set of Darwinian analogies. The concepts of "struggle for existence" and "selection" appear in several accounts of the development of society and of the formation of organizations.[3]

Schäffle's Darwinian concepts, in particular, have already been expounded at length by historians of biology and Social Darwinism (Kelly, 1981; Mann, 1969; Weikart, 1993, 2004; Weindling, 1989). In my view, there is little more to add to Richard Weikart's (1993, p. 479) conclusion that Schäffle viewed "the struggle for existence as both a struggle between individuals and a struggle between societies, nations, and races". Moreover, Weikart's (1993, p. 479) overall assessment of Schäffle as ambivalent, "especially difficult to characterize", and with "a tendency to contradict himself", often rings true.

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[3] The three additional volumes of *Structure and Life* (1878a, 1878b, 1878c) also contain lengthy analyses of the development and growth of the five tissues. I will not discuss them here.

It is quite straightforward to highlight ambivalences and contradictions in Schäffle's *Structure and Life*. Already the brief sketch of his use of the tissue analogy above presents many ambiguities. Should tools and machines be considered part of the muscle tissue, or rather as commodities, for example, as the means of production that circulate in the vascular tissue? How can one imagine that income and commodities circulate simultaneously in the vascular tissue when the biological analogy of blood circulation suggests that there exists only one type of substance for the nourishment of tissues—blood? And finally, what can be learned from Schäffle's observation that every organization possesses a protective tissue in the shape of a "roof", or a "protective wall"?

Due to the ambivalences in what Schäffle called an "outline" (*Entwurf*) of a social anatomy, most commentators to his work resorted to either summarizing, or dismissing *Structure and Life*. Coker (1910), Fabian-Sagal (1909), Mann (1969) mainly retraced Schäffle's work and highlighted his main concepts. An even larger share of sociologists, economists, and historians dismissed Schäffle for being a "naïve positivist" (Mann, 1932, p. 25) who advanced "pseudobiology" (von Wiese, 1932, p. 5) and "played with analogies" (Ith, 1926, p. 163). Max Weber (1864-1920) accused Schäffle of "reification" of the social world through biological analogies.[4] Austrian economist Ludwig von Mises (1881-1973) argued that social science "did itself little good when, inspired by the triumph of Biology in the nineteenth century, voluminous works developed [the biological] analogy to the point of absurdity" (Mises, 1932/1951, pp. 289–290).[5]

More recent commentators to Schäffle's work have also accused him of using "rigid analogies" (Dahme & Rammstedt, 1984, p. 458) and of falling behind sociologists like Ferdinand Tönnies who stood at the "height of modern scientific tendencies" (Bickel, 1988, p. 100). Likewise, historians of economics like Michael Hutter (1994) and Heinz Rieter (1992, 2002) see no value in Schäffle's

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[4] Weber accused Schäffle of not being able to understand the social, because of the fundamental difference between society and biological entities. In Weber's eyes, the social sciences are in a position to go beyond merely demonstrating functional relationships and uniformities in social structures by "understanding" (*verstehen*) the actions of the component individuals. According to Weber (1922, p. 7), when investigating a biological organism, one cannot understand the behavior of cells, but only observe the relevant functional relationships and then generalize on the basis of observations. What Weber described comes close to what U.S. sociologists Peter Berger and Thomas Luckmann (1991, p. 106) have termed "reification": the apprehension of the product of human activity as if they were something other than human products, or the forgetting of human authorship of the world.

[5] According to von Mises (1932/1951, p. 290), terms like "social intercellular substance", an expression coined by Schäffle, was "futile word-spinning". In contrast, biology had borrowed from social science "some of its most important concepts—that of evolution, of the division of labour, and of the struggle for existence", and "proceeded to make profitable use" of them.

adherence to biological analogies. Others, like Erich Streissler (1990) and Knut Borchardt (1961), see much merit in Schäffle's subjective theory of value, but shy away from investigating the consequences of his transfers from biology, possibly due to Schumpeter's (1954, p. 788) damning verdict about biological analogies.[6]

It is rarely mentioned that Schäffle's analogies also stunned his contemporaries. Many considered Schäffle's biological analogies meaningless when applied to economics. Austrian statistician and economist Franz Xaver von Neumann-Spallart (1878, p. 16) critically remarked that Schäffle was "so imbued with the idea of transferring natural laws to social life" that it stained his whole terminology. For Gustav Schmoller (1888a, pp. 227–230) the "analogies to biological phenomena played a too excessive role". And despite Schäffle's sympathies for socialism, he was condemned by most socialists, not least because of his biological analogies.[7]

Still, many of Schäffle's thoughts were taken up by subsequent sociologists like Emile Durkheim, Alfred Espinas, Ferdinand Tönnies, and Georg Simmel (Dahme, 1988a, 1995). Despite his criticism, Weber (1922, 7) also admitted that *Structure and Life* was a "book rich in ideas" (*geistvolles Buch*). Only more recently, historians like Hanno Hardt (2001) and Julian Bauer (2016) have emphasized that Schäffle paved the way for communication science and systems theory. However, the question of why Schäffle used biological analogies, what he created with them, and what consequences he drew from introducing them to economics, is widely neglected. Especially historians of economics and sociology contended themselves with assigning Schäffle a "school" of "organicist", or "organismic" sociologists alongside Auguste Comte, Littré, Herbert Spencer, Lester Ward, Paul Lilienfeld, René Worms and others (Bickel, 1988; Coker, 1910; Hutter, 1994; Pribram, 1983). Historian of medicine Gunter Mann (1969, p. 17) argued that Schäffle had been under the spell of "biologism"—a "sign for the almighty expansion and hegemony of the natural sciences" in Europe and the United States.

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[6] Schumpeter (1954, p. 788) argued that biological metaphors "spoilt" Schäffle's work.

[7] Socialists condemned Schäffle due to his stance as a social reformer, who believed in a gradual development of society. For example, in socialist playwright Hermann Bahr's (1863-1943) *The lack of insight of Mr. Schäffle* (*Die Einsichtslosigkeit des Herrn Schäffle),* written to criticize Schäffle's dismissal of social-democracy, natural "developmental laws" were a main point of contempt (Bahr, 1886). Marx ridiculed Schäffle's *Capitalism and Socialism* (*Kapitalismus und Socialismus*) of 1870 as "stupid" (*blödsinnig*) and "corpulent" (*dickleibig*) in a letter to Engels (See Marx an Engels, 10. September 1870, in MEW 33 (Marx & Engels, 1976, p. 60)). In a letter to Karl Kautsky (1854-1938), Engels maintained that Schäffle had just compiled "awful twaddle" (*horrender Kohl*) in his "numerous big volumes" (See Engels an Karl Kautsky, 1. Februar 1881, in MEW 35 (Marx & Engels, 1967, p. 150)). Also in his *Anti-Dühring* (1878), Engels was very critical of biological analogies.

I suggest approaching Schäffle's work from a different angle. I want to avoid summarizing *Structure and Life* and let go of trying to seek coherence in his magnum opus. Furthermore, I abstain from assigning him to a school, because it would suggest that there existed coherence within a group of "organicist" sociologists on the use of biological analogies, which was not the case.[8] And lastly, I do not dwell on questions pertaining to Schäffle's legacy, that is, what influence he exerted on other scientists. That Schäffle's ideas have been taken up by subsequent social scientists is unquestionable and is evidenced by the subjective theory of value (Borchardt, 1961; Streissler, 1990), public finance and public transportation (Sax, 1887; Wagner, 1892), communication science (Hardt, 2001, pp. 43–66; Rühl, 1999, pp. 169–196), sociology and systems theory (Bauer, 2016; Luhmann, 1984/2001).

Instead, I want to reconstruct why Schäffle started to use biological analogies in the first place. From this new angle, I can show that Schäffle borrowed biological concepts and images to solve economic issues that he had been working on since the 1860s. By retracing his work, I unveil how Schäffle became obsessed with the variety (*Mannigfaltigkeit*) of commodities in the economy. Not only existed there consumer goods and the means of production, but also, amongst others, "public goods" (*öffentliche Güter*) like libraries and schools, "ideal goods" (*ideelle Güter*) like patents, maps, and literature, "presentation goods" (*Darstellungsgüter*) like paintings, art, brands, and designs, and "communication goods" (*Güter der Mittheilung*) like storage vouchers, letters, and bills of exchange.

Especially the last two categories, which Schäffle summarized as "goods of presentation and communication" (*Güter der Darstellung und Mittheilung*), or "symbolic goods" (*symbolische Güter*) puzzled him. They had neither subjective, nor labor value, but were still highly valuable for the smooth running of the economy. Not knowing how to tackle the symbolic goods with existing theories of value, Schäffle stood at an impasse in the early 1870s. I will argue that the tissue analogy helped him to escape this impasse. With the images of tissue, Schäffle could make society visible, assign the variety of goods to different layers of tissue and bring them into an interrelationship. As several philosophers of science (Gross & Harmon, 2014; Lynch, 1991; Schlechtriemen, 2014; Wise, 2006) have argued, "scientific visuals", or "pictorial work spaces" are important epistemological tools. And like Bauer (2016, pp. 28–30) has suggested for the case of early sociologists and system theorists, I can show how Schäffle used the tissue analogy not as a "hermeneutic passage" (Lynch, 1991) towards a mathematical representation of an economic phenomenon, but as a scientific tool of visualization in itself.

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[8] In the conclusion of Chapter 2, I will briefly investigate the problem of early sociologists to find coherence in their use of biological analogies.

For my argument, it is important to underline that Schäffle's decision to use concepts, images and theories from biology was not as linear as historian of economics Michael Hutter (1994) made it seem. Schäffle was skeptical of the widespread use of the "organism" metaphor by his contemporaries and did not consider himself to belong to an "organicist tradition". I will therefore first address how Schäffle differed from his contemporaries in his use of explicit biological analogies. To this end, I will give a short introduction of Schäffle's life and work and outline his social reform plans in Chapter 1. In Chapter 2, I will bring Schäffle's interests in economics and biology into a historical context and will show how Schäffle came to use theories and concepts from biology within an environment that was rather skeptical about explicit biological analogies. I will unveil that in order to make sense of the variety of symbolic goods (letters, storage vouchers, and telegrams), Schäffle could not resist the idea that society possessed a nervous tissue that was interconnected with other tissues. In the next step, I will show how Schäffle built what can be called a 'tissue model' from insights he gained from Virchow's (1871) *Cellular Pathology*. This model led to new ideas and research paths like an investigation of social pathologies (crime, poverty, suicide) and a reinterpretation of statistical findings. In Chapter 3, I will investigate how Schäffle explored the interconnections between collectives and individuals based on a more specific analogy—the social nervous system. By applying the theories of Gustav Fechner and Wilhelm Wundt, Schäffle came to believe that non-economic goods like symbols and knowledge were assigned value by "social ganglia" and had to surpass thresholds in order to flow through the social body. To some extent, these insights helped him to justify state intervention through social reform.

Chapter 1 Albert Schäffle: Economist, Politician, and Social Reformer

It is often overlooked that in the 1860s and 1870s, Albert Eberhard Friedrich Schäffle (1831-1903) was one of the most influential German-speaking economists. In 1873, at the age of 40, Schäffle had made himself a name as an expert on public finance, cooperatives, taxes, and the subjective theory of value. He had participated in important economic assemblies, edited one of the most prestigious economics journals, was a retired professor, and stood at the peak of political power as an Austrian-Hungarian minister of commerce. He was certainly not on the "periphery of established science" (Hutter, 1994, p. 301).

Schäffle was born on February 24, 1831 in Nürtingen (Württemberg) into the middle-class family of a teacher. In his autobiography, Schäffle (1905a, pp. 3, 51) emphasized that the publisher dynasty Cotta supported him from early childhood. Schäffle's godfather was no less than Johann Friedrich Cotta (1764-1832), one of the most influential publishers at the time. Schäffle stressed how important Cotta's son Johann Georg von Cotta (1796-1863) was for his early career, as I will come to later. Obeying the will of his mother, Schäffle started to study theology at the protestant *Tübinger Stift.* However, after joining the Social Democrats during the Baden Revolution of 1849, he was dismissed but a year after the start of his studies.

In 1850, Schäffle was attached to the editorial staff of the *Schwäbischer Merkur* in Stuttgart and reported on international affairs. With the help of the aforementioned Cotta, Schäffle also became assistant editor of the *Allgemeine Zeitung*. In the meantime, he taught himself political economy (*Staatswissenschaft*) and philosophy. Further connections through Cotta, allowed him to publish his first academic article in the well-known journal *Deutsche Vierteljahrs-Schrift* in 1856. In the article, Schäffle (1856) investigated the demolition and reconstruction of the guilds—a topic that was widely discussed in the second half of the 19th century and one that would occupy Schäffle throughout his life.

Schäffle's main argument in the article was that guilds were outdated and should make room for the liberation of trade (*Gewerbefreiheit*) in the German Confederation and the Habsburg Monarchy. The downside of the liberation of trade was limitless competition, which led to the exploitation of smaller businesses and to overproduction. A year later, the economic crisis of 1857 made it clear to Schäffle that overproduction could lead to severe disturbances to the economy. Schäffle's interest thus shifted to the analysis of economic crises. Impressed by the work of French economist Clément Juglar (1819-1905), Schäffle (1858, 1859) aimed to establish statistical proof for the cyclical behavior of crises. Once more making use of his connection to Cotta, Schäffle's resulting early articles on economic crises and the renown they earned him landed him a position as a professor at the University of Tübingen.

In 1860, aged only 29, Schäffle accepted a call as professor to the chair of "public policy, politics, encyclopedia of the state sciences and economics" (*Polizeywissenschaft, Politik, Enzyklopädie der Staatswissenschaften und Nationalökonomie*) as the successor to Johann Helferich (1817-1892). Schäffle taught courses in economics, politics and state sciences in Tübingen until 1868. The most rewarding work at the university, Schäffle (1905a, p. 79) stated in his autobiography, he found in drafting an encyclopedia of the state sciences, where he first learned to grapple with various scientific disciplines. This skill came to the fore most prominently in his magnum opus *Structure and Life*. With the professorship in Tübingen came the editorship of the journal "*Zeitschrift für die gesamte Staatswissenschaft (ZgS)*" which he held until his death in 1903.[1] Schäffle's first book, *National or General Economics* (*Die Nationalökonomie oder Allgemeine Wirthschaftslehre*) that he published in 1861, is dedicated to Roscher, from whom he acquired economic knowledge through self-study.

Schäffle was a prolific writer and during the 47 years of his career (1856-1903) he published around 25 books and more than 100 articles, of which 94 appeared in his own journal *ZgS*. Remarkably, none of his articles were published in any other leading German economics journal.[2] His magnum opus *Structure and Life* appeared in three editions but has never been translated into English.[3] Alongside many contributions in newspapers (*Münchner Allgemeine Zeitung, Frankfurter Zeitung*), Schäffle also wrote several articles for popular journals like *Die Zukunft*.[4]

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[1] As of 1867, Schäffle is mentioned as "being connected" (*in Verbindung*) to the journal. Since 1875, Schäffle is mentioned as editor (between 1875-1878 with K. V. Fricker, 1878-1886 with Adolph Wagner, 1887-1891 with Gustav von Schönberg), and after 1892 as a sole editor. If we believe Schäffle's student and successor to the *ZgS*, Karl Bücher (1847-1930), Schäffle ran the editorial office almost alone (Bücher, 1904).

[2] There are no articles by Schäffle in the other three important economic journals in Germany, which were the *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft im Deutschen Reich* (1871-today); *Archiv für soziale Gesetzgebung und Statistik*, later called *Archiv für Sozialwissenschaft und Sozialpolitik*) (1888-1934); *Jahrbücher für Nationalökonomie und Statistik* (1863-today).

[3] As Reinert (2010) remarked, there only exists an Italian translation of the third edition of *Structure and Life* (Schäffle, 1896a, 1896b).

[4] For the journal *Die Zukunft* (1892-1922), edited by the well-connected German publisher Maximilian Harden (1861-1927), Schäffle wrote 48 short articles on politics, social policy, and social parasitism. Next to Schäffle, Harden also published articles by Ernst Haeckel, Alfred Russel Wallace and Werner Sombart, mixed with a wide variety of topics like spiritism (table-turning), anarchism, and Buddhism.

Schäffle was not a member of the most important association of German economists, the *Verein für Socialpolitik*, possibly due to frictions with Schmoller.[5] Instead, he boasted a stellar political career. From 1861 to 1865, he was a member of the Württemberg diet as a representative of the *Tübinger Landbezirk* and collected experiences in social policy, tariff policy and coinage laws (Schäffle, 1905a, pp. 119–124). In 1868, Schäffle received a mandate to the German "tariff parliament" (*Zollparlament*), which was set up to establish the German tariff union between the southern lands and the North German Federation. In parliament, Schäffle befriended German socialist politician August Bebel (1840-1913), a relationship that, as we will see later, caused him much trouble in the late 1870s.

Schäffle was no revolutionary socialist and no social democrat. Disillusioned by the revolution of 1848, Schäffle mounted an opposition against democrats based on arguments by Friedrich Julius Stahl (1802-1861), the founder of the German conservative party.[6] Thoroughly national-liberal, Schäffle strongly argued for a unification of the German Länder. Instead of Prussian leadership, Schäffle hoped that the southern lands and Austria would assume a more dominant role—a Greater Germany (*Großdeutschland*) instead of a Smaller Germany (*Kleindeutschland*).[7] After the defeat of the Austrian and south German forces in the Austro-Prussian war of summer 1866, these hopes were thwarted by the Prussian hegemony under the North German Federation. At first, Schäffle considered himself part of the "left wing of the Greater Germans". However, as he saw the efforts to unify a Greater Germany dissolving into the individual and particular interests of the *Länder,* he began to

[5] Schmoller had published six articles in the journal *ZgS* between 1860 and 1874, but halted his cooperation after Schäffle took over the journal in 1875 (Lindenlaub, 1967a, p. 191). Next to the differences in their assessment of biological analogies, Schäffle and Schmoller also clashed over political views. Since his first visits to Austria in the 1850s, Schäffle maintained close contact with the Habsburg Monarchy (Schäffle, 1905a, p. 60). Being openly *Großdeutsch*, Schäffle enjoyed much sympathy from the Austrian-Hungarian empire and was viewed with much skepticism by Prussia, and, in particular, Schmoller (Herold, 2019, pp. 62–67). Schmoller was one of the founders of the *Verein* and held much sway over it throughout his life, which might explain why Schäffle was not invited to participate in the discussions on social policy, and why he seemed uninterested in participating himself.

[6] However, to depict Schäffle as a conservative, or reactionary, would simplify the matter. He was no reactionary, because he did not defend the old order of the absolutist monarchy and the estates (*Ständeordnung*). Schäffle might be viewed as a liberal conservative who embraced the constitutionalist monarchy, promoted social reforms, defended free speech, and the freedom of the press.

[7] Schäffle also attained the first large assembly of the *Greater German Reform Association* (*Grossdeutscher Reformverein)* of autumn 1862 in Frankfurt (Schäffle, 1863, 1905a, p. 113) At the assembly, Schäffle (1905a, p. 114) hoped in vain that a larger German nation could be established with a chamber of delegates from the different German lands, whose members had legislative (and not only consulting) power on a national level.

accept war, or in Bismarck's words "blood and iron", as a means to the formation of the German nation (Schäffle, 1905a, pp. 64, 109–111). [8]

In late 1868, Schäffle was appointed professor at the judicial-political (*juridisch-politisch*) faculty of the University of Vienna and moved to the city. This move underlined Schäffle's attachment to the idea of a Greater Germany, despite his previous efforts in the tariff parliament, which explicitly excluded Austria. Schäffle (1905a, pp. 146–150) also remarked that the salary was particularly high at the faculty, where 3'000-4'000 paying students were enrolled. In Vienna, he quickly gained fame through his public lectures on stock market speculation in which he warned of a collapse of the Viennese banking system—a forecast that came true in 1873. In the modern capital of the Habsburg monarchy, Schäffle was also much more confronted with the misery of the factory suburbs, which urged him to hold public talks on social reform, the labor movement, and social policy. Published as *Capitalism and Socialism* (1870a), these talks reached a wide public (Schäffle, 1905a, pp. 158–160), as did his later pamphlet *Quintessence of Socialism* (1877).

As a professor in Vienna, Schäffle had a profound impact on Austrian economists like Carl Menger, Friedrich von Wieser, and Emil Sax.[9] Yet, by the time Menger was judged on his habilitation—the well-known *Principles of Economics* (1871)—at the University of Vienna, Schäffle had already moved on to the much higher ranked position of minister of trade.[10] As a minister of the cabinet of Karl Siegmund Graf von Hohenwart (1824-1899), Schäffle learned a lot through his audiences (*Audienzen*) in which he welcomed "all classes of the people" with all sorts of economic interests. As Schäffle later put it, at the ministry he was confronted with the "fullness of the living social body".[11] As an important figure of the short-lived cabinet, Schäffle attempted to negotiate for more federalism

[8] Schäffle (1905a) remarked that after 1865, he concentrated his energy on teaching and research. Especially after the German civil war of 1866, Schäffle lost his interest in German politics until he became a member of the German *Zollparlament* in 1868. The *Zollverein* economically unified the North German Bund and the southern lands of Bavaria, Württemberg, Baden, and southern Hessen until the proclamation of the German Reich in 1871. The *Zollverein* is commonly seen as an early attempt toward a *Kleindeutschland* independent of Austria (Hahn, 1984, p. 136).

[9] On Schäffle's impact on Austrian economists, see Borchardt (1961) and Streissler (1989, 1990).

[10] Schäffle could become a minister of the Habsburg Monarchy, because professorship meant an entry into the public service for which Schäffle received Austrian citizenship (Schäffle, 1905a, p. 155). See also the 1811 Civil Code of Austria (*Allgemeines bürgerliches Gesetzbuch für die gesammten Deutschen Erbländer der Oesterreichischen Monarchie. I. Teil. Wien 1811,* https://doi.org/10.48644/mpirg_sisis_97440 (12.8.22)), according to which every foreigner holding a public position received citizenship.

[11] In the original, Schäffle (1905a, p. 244) stated: "*In den Audienzen habe ich binnen kurzer Zeit unbeschreiblich viel Praktisches gelernt, und die ganze Fülle des Lebens eines großen, gliederreichen Gesellschaftskörpers trat mir entgegen*".

amongst the "manifold whole" of the Habsburg Monarchy.[12] Only eight months later, these efforts had failed and the Hohenwart cabinet was dissolved.

Schäffle decided to return to his homeland Württemberg in spring 1872, back to a now unified Germany. As Erich Streissler (1989, p. 121) pointed out, Schäffle could not return to his professional position after the stint at the ministerial office, because of the prevalent ideas of social status at the time—a professorship was three to four steps in rank below a minister, and therefore a social faux pas.[13] Nonetheless, his short career in the Austrian cabinet proved beneficial. As a former minister, Schäffle enjoyed a life-long pension, enabling him and his family of three a modest life. As an independent scholar (*Privatgelehrter)*, Schäffle continued to write on economic issues and politics and took full control of the journal *ZgS*.

It was during this time as an independent scholar that Schäffle found ample time to invest in the lecture of recent publications in sociology and biology that eventually pushed him to write his magnum opus *Structure and Life*. In the introduction of *Structure and Life*, Schäffle not only announced his use of detailed biological analogies but also outright endorsed socialism. Schäffle (1875, p. IX) asserted that he took "socialism very seriously for a distant future". In the third volume of *Structure and Life*, Schäffle (1878b, p. VIII) adjusted his previous claim and argued that discussing the economic merit of socialism was relevant for the "near future". In a longer paragraph, Schäffle (1878b, pp. 457–548) even sketched out a plan for a future socialist system organized on a principle of fair labor compensation.

The timing of Schäffle's proposal of a future socialist organization could not have been worse. While Schäffle prepared the fourth volume of *Structure and Life* for print, Chancellor Otto von Bismarck (1815-1898) passed the Anti-Socialist Laws in October 1878. The law banned socialist newspapers, literature, and the Social Democratic Party. Any advocacy of socialism was decreed subversive. Due to his open sympathies towards a socialist future in the third volume of *Structure and Life*, his pamphlet *Quintessence of Socialism* (1877), and his friendship to August Bebel—one of the main

[12] German historian Dieter Lindenlaub (1967a, p. 177) argued that during his time in Vienna, Schäffle strengthened his adherence to federalism and opposed state centralization, and bureaucratization.

[13] German historian Harald Winkel (1989, p. 112) also pointed to Schmoller's wide-ranging influence on the appointment of economics professors, which might have blocked Schäffle's attempts to become a professor in another German university.

targets of the laws—Schäffle's work was banned for several days.[14] The ban was quite a shock for Schäffle and he instructed his publisher Laupp to take his recently published third volume to safety in Switzerland (Schäffle, 1905a, pp. 134–135). In a letter to Wilhelm Wundt, with whom he occasionally corresponded and exchanged literature, Schäffle complained about the "crushing persecution" (*kniebrechende Verfolgung*) that he was experiencing.[15]

Another possible reason for the ban of Schäffle's work might be the Darwinian concepts that permeated the second and third volume of *Structure and Life*. As German biologist Rudolf Virchow (1877, p. 12) remarked in a public speech, socialists had already "established contact" with the new theory of descent.[16] In the hands of socialists, Virchow warned, biological theories could "return in a frightening appearance". To use Darwinian analogies was a dangerous exercise during the Anti-Socialist Laws and had to be balanced by testimonies to an inegalitarian social structure.

Schäffle quickly adapted to the new political atmosphere, tamed his claims about a possible socialist future, and emphasized the benefits of the struggle for existence (*Kampf ums Dasein*) for public welfare. Underlining that he never promoted egalitarian socialism, Schäffle (1879, p. 264) now directly attacked the "negation of competition [*Wettstreit*] by certain socialist movements". Following Ernst Haeckel (1878, p. 72), who, in a response to Virchow, claimed that "the theory of descent preaches that the socialist equality is an impossibility", Schäffle argued:

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[14] Schäffle's contacts to Bebel were noticed at high political levels and by his fellow economists and social reformers. German jurist Theodor Lohmann (1831-1905), Bismarck's advisor on social reform wondered himself about Schäffle's visits to Bebel. See Lohman an Ernst Wyneken, 28. Oktober 1877, in Lohmann (1995, pp. 475–476). The recipient of Lohmann's letter, German social reformer Ernst Wyneken (1840-1905) knew from Schäffle personally that he had "broken completely with the existing social order" by the end of 1877. See Wyneken an Lujo Brentano, 15. Dezember 1877, in BArch, N 1001 (Brentano, Lujo)/Nr. 65.

[15] Of the correspondence, three letters dating from 1875, 1878 and 1880 survived and can be found in the Wundt papers (Universitätsarchiv Leipzig (UAL), NA Wundt/III/1401-1500/1450/283-286, 287-290, 291-294). In the abovementioned letter from 1878, Schäffle thanked Wundt for sending him the fourth edition of his *Handbook of Human Physiology* (*Lehrbuch der Physiologie des Menschen)* and explained that the social sciences are not as free as Wundt had thought. Hoping that others are spared of persecution, Schäffle stated: "*Möge die kniebrechende Verfolgung der socialen Wissenschaft Niemand schwerer treffen, als ich es zu befürchten habe*" (https://kalliope-verbund.info/ead?ead.id=DE-611-HS-2263246 (4.10.23)).

[16] Virchow did not provide specific sources to underline his claim. However, historians like Peter Emil Becker (1990) and Volker Kruse (1990) have long pointed out that Social Darwinism appealed equally to socialists, conservatives, racists, and social reformers of the last quarter of the 19th century. For prominent examples, see Stiebeling (1879), or Woltmann (1899). Historian of economics Thomas Leonard (2016, p. 151) called attention to the fact that also in the U.S., eugenics and Darwinism "found exponents of every political stripe— conservative, progressive, and socialists alike".

> "The social theory of selection must therefore unconditionally reject the communist tendency to eliminate all competition. He who excludes competition from human society denies progress".[17]

Similarly, Schäffle (1879, p. 280) maintained that eliminating the "collective struggle for existence" (*collectiver Daseinskampf*) between nations would be "adverse to civilization" (*zivilisationswidrig*). In an extension to his *Quintessence*, Schäffle (1885) went on to further declare the "impossibility of social democracy" based on social Darwinist claims. Instead of proposing solutions for political participation of the population, as he had in the 1860s, or further expanding his system of fair labor compensation of the 1870s, Schäffle now set his sights on social reform. His most elaborated reform plan was the erection of an insurance scheme for the working population on a corporatist-cooperative basis. Schäffle's reform plans wielded a far-reaching impact and even drew the attention of Chancellor Bismarck. As we will see in Chapter 3, Schäffle agreed to help the Chancellor to set up his "positive reforms" and introduce an unprecedented insurance system in Germany.

For socialists, Schäffle's collaboration with Bismarck was tantamount to a betrayal. Bebel, for example, broke with Schäffle in the early 1880s.[18] Schäffle's *Quintessence of Socialism*, which had once been praised by Social Democrats, fell into infamy among socialists.[19] Schäffle held firmly onto his convictions that society could only be altered gradually. Until his death in December 1903, caused by a kidney disease that had been plaguing him since the mid-1890s, Schäffle thought that the only way forward was social reform.

What can be learned from Schäffle's suffering under the Anti-Socialist Laws is that biological analogies are neither a sufficient indicator of political sentiment, nor a clear sign of conformity to the state authority. Biological analogies can, as Pribram (1983, p. 218) suggested, be "slogans" of the "German nationalistic literature", but they do not necessarily have to. Schäffle adapted biological theories to reconcile his ideas with the guidelines of the anti-socialist state, but he also made use of

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[17] In the German original, Schäffle (1879, p. 280) stated: "*Die sociale Zuchtwahltheorie muss desshalb die kommunistische Tendenz auf Beseitigung aller Concurrenz unbedingt verwerfen. Wer den Wettstreit aus der menschlichen Gesellschaft ausschliesst, verneint den Fortschritt*".

[18] See Bebel's (1911, pp. 281–282) description of his relationship with Schäffle.

[19] In *Vorwärts*, the central organ of the Socialist Workers' Party (*SAP*), the second edition of Schäffle's *Quintessence* had been highly praised (*Vorwärts*, no. 128, 31. Oktober 1877, p.1). According to German Social Democrat Max Schippel (1859-1928), the *Quintessence* was widely read especially due to its temporary ban and served young socialists as the "most captivating introduction into the secrets and beauties of socialist economic organization". Yet, with the publication of Schäffle's *Impossibility of Social Democracy*, the connection to the *SAP* had been "mercilessly cut" (Schippel, 1905, pp. 1009–1012).

biological analogies as reasoning tools while envisioning a socialist future. We will see in the next two chapters how in many cases, the epistemological and ideological use of biological analogies are almost impossible to disentangle, because Schäffle selected and adapted biological analogies through the lens of his political convictions and his prior theoretical knowledge.

Chapter 2 The Tissues of the Social Body

Following Schäffle's career and investigating his work up to 1873, it is somewhat surprising that he suddenly switched to a strong commitment to biological analogies in 1875. It is for this reason, I believe, that German historian Knut Borchardt (1929-2023) concentrated on Schäffle's earlier work in order to tease out what Schäffle contributed to economics (Borchardt, 1961). Similarly, Michael Hutter saw in Schäffle's biological analogies a step backward to the older tradition by German economists to compare society to an "organism". Hence, Hutter (1994) claimed that Schäffle's valuable contributions to economics lay outside of his explorations with the help of biological analogies in *Structure and Life* (1875).

Instead, I believe that *Structure and Life* resulted not only from Schäffle's inability to deal with his prior economic theories, but also from his dissatisfaction with economists' attempts to depict society as an organism. In the following, I will therefore trace back Schäffle's work and reconstruct why the organism metaphor and Schäffle's economic theory were insufficient to deal with the economic issues he was facing in the early 1870s. I will start my investigation with Schäffle's first book on economics, the *National or General Economics* (*Die Nationalökonomie oder Allgemeine Wirthschaftslehre*) of 1861. In 1867, Schäffle fundamentally revised and extended the book and published it that year as *The Social System of the Human Economy* (*Das gesellschaftliche System der menschlichen Wirthschaft*). In Vienna, Schäffle had started to work on a third edition, but put it aside while he worked at the ministry (Schäffle, 1905b, pp. 73–77). Shortly after returning to Württemberg, Schäffle published it under the same name, but in two volumes (Schäffle, 1873a, 1873b).[1] As Schäffle's teacher Wilhelm Roscher (1817-1894) pointed out, what characterized Schäffle's economics was that he placed human needs at the center of the economic realm.[2]

2.1 Individuals and their Manifold Needs

Already in the first edition of his *General Economics*, Schäffle proclaimed that human needs were satisfied by the individual's environment. This environment involved nature, things (*Sachen*) and

[1] I will refer to the second and third editions of his *General Economics* as *Social System*.

[2] Roscher (1874, p. 1042) approved of the shift of attention towards human needs and remarked that Schäffle's work "had the great merit of presenting not the material goods but the people themselves as the starting point of our science". Instead, Roscher introduced his *Principles of Economics* (1854) with an analysis of commodities. Schäffle (1905a) pointed out that he had been writing his *General Economics* while still being a journalist in the late 1850s before he started his academic career. It is unlikely that Schäffle attended Roscher's classes at the University of Göttingen, but Schäffle's *General Economics* is dedicated to Roscher in gratitude for inspiration.

people (*Personen*). The two prerequisites for economics were therefore "the sciences of man and the science of exterior nature" (Schäffle, 1861, pp. 1–2). Prerequisite did not mean that one needed to be a psychologist, or natural scientist to engage in economic research. Along the lines of John Stuart Mill, Schäffle considered economics a discipline separate from the "natural sciences", but also separate from the "science of man (psychology)".[3] Natural science and psychology were merely helpful signposts to locate the realm of economics.

Economics began where "man stood in an active relationship to the exterior world with the purpose of satisfying his needs". The goal of economic activity was not to "amass Mammon", but to bring about the external means for man's "earthly unfolding" (*irdische Entfaltung*). Once the human subsistence needs were fulfilled, the heterogeneous needs of the manifold personalities of society led to the production of a great variety of goods (Schäffle, 1861, pp. 4–5). The "use value" (*Gebrauchswerth*) that individuals saw in a commodity was the source of all economic activity.[4]

To satisfy their needs, men and women ruled over the exterior world either by themselves, or by connecting to a variety of different collectives, be it into the family, a business, a commune, or a municipality. Despite the "colorful variety" of different collectives and the "fullness" of economic phenomena, Schäffle (1861, pp. 2–6) argued that the economy was based on "regularly acting forces and laws of motion". Yet, these laws were different to those that govern the natural sciences and psychology. Schäffle's emphasis on laws shows that assigning him to an ill-defined and supposedly

[3] Schäffle did not refer to Mill's (1836) *On the Definition of Political Economy*, but praised Mill's *Principles* (1848), which he read in the German translation (Mill, 1852). For Schäffle (1861, pp. 3–4), the natural sciences had an indirect influence on the investigation of the economy. Natural sciences, and with it the knowledge of technology were a means to subordinate nature. Subordinating nature led to technological progress and in turn economic progress. Technological progress already started at the "low stages of the economy" when insight into nature was needed to be successful in hunting.

[4] As Streissler (1990) emphasized, the understanding that commodities had value as a result of individual, or subjective valuation, was widespread among German economists at the time. Schäffle probably discovered the term "use value" (*Gebrauchswerth*, or *Nützlichkeit*) in Mill (1852, pp. 452–470). Roscher (1854) used the synonymous term "*Brauchlichkeit*".

untheoretical "historical school" does not do justice to his economics.[5] Even though the economy was complex and evolving, Schäffle did not resort to detailed, regionally specific studies, or historical research, as, for instance, his contemporary Schmoller chose to.[6]

Instead, Schäffle (1861, pp. 247–279) explained that he considered as the fundamental forces what Roscher (1854) had defined as the two "mainsprings", or "driving forces" *(Triebfedern*) of the economy: private and common interest (*Eigennutz*, S*onderinteresse*, or *Privatinteresse* and *Gemeinsinn*, or *Gemeininteresse*).[7] To expand on Roscher's economics, Schäffle suggested investigating more profoundly what "organizations" these two fundamental forces created. Starting with the individual, Schäffle argued that the "private person" (*Privatwirthschaft*) created different forms of businesses (*Unternehmen*), guided by private interest. Alone, or in a collective, a business combined labor and capital to "produce for the needs of others". Businesses appeared in different forms that Schäffle (1861, pp. 206–210) classified on the basis of judicial criteria of liability and equity (*Privatwirthschaft, Kollektivunternehmung, Associetät, Kommandit, Aktiengesellschaft*).

Schäffle (1861, p. 215) noted that businesses not only had an internal division of labor, but increasingly divided labor between themselves by spreading out into various branches in the same

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[5] Ingram (1878, 1885, 1890), Gide & Rist (1909), Mann (1932, p. 13), Hutchison (1953, p. 296), Pribram (1982), Hutter (1994), and others claimed that Schäffle was part of a "historical school". However, Roscher (1874, p. 1042) and Mombert (1927) argued that Schäffle cannot be considered a historical economist as he sought to explain economic phenomena by fundamental laws. Similarly, German economist Lujo Brentano (1844-1931) considered Schäffle to work on "constructions" that were far from "reality". See Brentano an Schmoller, 1. Februar 1873, in Goetz (1939, pp. 153–156). Schäffle (1873a) considered history to be a useful addition to inductive research, but never saw himself following a historical research method. There is still an unresolved discussion as to whether a "German historical school" existed. Pearson (1999) suggested to broaden the school and include other authors like Carl Menger, Friedrich von Wieser, and Max Weber. Caldwell (2001) countered by highlighting that mainly Gustav Schmoller was "historical". Pearson's suggestion is too broad, but when Caldwell considers the historical school as embodied by Schmoller only, why should one call it a school? I therefore avoid the term "school" and consider economists as individual actors within a broader context of currents and trends.

[6] Schmoller did not only place much hope in historical explanations of economic phenomena, but also wanted his students to inquire into the details of a region, branch, or commodity. As Hodgson (2001, 2005, 2010, p. 297) emphasized, Schmoller did not believe that induction alone was sufficient for such tasks. Yet, as we will see in Chapter 4, even Schmoller's student Werner Sombart thought that Schmoller's historical method put too much emphasis on collecting detailed empirical material.

[7] Schäffle (1861, p. IX) also indicated that the structure of his book drew much from Roscher. Like Roscher, Schäffle (1861, pp. 1–160) first defined the "fundamental circumstances" (*Grundverhältnisse*) of commodities (*Güterlehre*), theory of value, production and population. In the second part of the book, Schäffle discussed the types of businesses, private and common interests, and public finance.

way as a plant develops buds, leaves, twigs, and branches. Individual parts of the economy became more complementary (*ergänzend*), and therefore more dependent on each other. Schäffle's plant metaphor, however, can easily be misinterpreted as suggesting that businesses guided by private interest created a harmonious interconnected whole by *laissez-faire*. Quite to the contrary, Schäffle (1861, p. 249) thought that division of labor "dissolved" the old community (*Gemeinschaft*) of the guild system and led to a raw war of all against all. What was needed to create a new community, was a common interest that brought into harmony what had been separated by private interests.

2.1.1 An organism instead of a pile of sand

In his first article about the demolition and reconstruction of the guilds (*Gilden,* or *Korporationen*), Schäffle (1856, pp. 189–190) had pointed out that the force of private interest and competition took the upper hand in the new "economic epoch" of individualization (*Verselbständigung*) in industry and agriculture. The demise of feudal organization led to a "dissolved", "atomistic" and unconnected society that Schäffle (1856, pp. 189–190) described in Hobbesian terms. In the modern economy there raged a "bellum omnium contra omnes" and "the single elements [labor and other forces of production] of industry attracted and repelled each other in fast combinations, soon joining this, soon joining that center point".[8] Such ideas were commonplace at the time, but Schäffle did not mourn the end of the guilds like others.[9] Liberalization of commercial life was unavoidable even in the conservative Austrian Empire.[10] Likewise, Schäffle (1856, p. 186) thought that German economist Adam Müller's "state economic romanticism" (*staatswirthschaftliche Romantik*) could not halt the decay of the guilds in the German Confederation.[11]

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[8] Compare to "*Appetite*, and *Aversion*", and "Warre *of every one against every one*" in Hobbes' *Leviathan* (1651, pp. 23, 62).

[9] See, for example, German statistician Ernst Engel's (1861, p. 86) mournful description of the current state of society and the economy. The term "dissolution" (*Auflösung*) is also very prominent in the second chapter of *The Communist Manifesto* (Marx & Engels, 1848). On the "dissolving" characteristic of social change in the 19th century, see also Osterhammel (2010, pp. 1056–1063), and Polanyi (1944/2001, pp. 187–217).

[10] On the liberalization of trade in Austria, see Pichler (1994).

[11] The 1860s and 1870s were also formative periods for the judicial framework of the economic order in the German Confederation (*Deutscher Bund*). Trade regulations abolished guild monopolies in 1869 only to reintroduce them shortly after with the establishment of the German Reich in 1871. As German economic historian Werner Abelshauser (1990, p. 125) explained, in German territories, "the guild was diminished in its legal form but hardly affected in its social effectiveness even beyond the Industrial Revolution". The last quarter of the 19th century was therefore still dominated by the tendency to form new types of guilds (*Innungen*), and associations (*Verbände*).

Dissolving the old "economic ties" (*gebundene Wirtschaft*) that the guilds represented was at first vitalizing, as, according to Schäffle (1856, pp. 181–183), the guilds were a breeding ground for wickedness and undeserved monopolies that "stifled higher aspirations in the germ".[12] Left without their counteracting force of common interest, however, competition quickly turned into exploitation of small businesses by the larger firms, as well as supremacy of wealth, and exploitation of laborers (Schäffle, 1861, p. 190). Competition led to overproduction, usury, speculation, and economic crises. Many of these "disturbances of harmony of interests" could not be easily tamed by law (Schäffle, 1861, pp. 258–263). People started to realize that the guilds had represented institutions formed through the common interest and had been important centers of quality control, education, social life, and poor relief (Schäffle, 1856, pp. 173–191).

Instead of going back to the guild system, Schäffle (1856, pp. 192–208) argued that a new type of common interest in the form of cooperatives (*Genossenschaften*) and other associations (*Vereinigungen*) could establish a new "tied" (*gebundene*) order.[13] Cooperatives created an "inner organic structure" as they autonomously "synthesized" the productive forces (*thätige Elemente*) of capital, labor and credit (Schäffle, 1856, pp. 195–201).[14] Other forms of the common interest like family solidarity, municipal and clerical charity, insurances, savings banks (*Sparkassen*), schools and the state, also tried to mitigate the disturbances created by free competition. Moreover, the "clarity of insight" by the social reformers created laws against usury and established tariff regulations that subordinated private interest to common interest and thus brought individual interest into harmony once more (Schäffle, 1861, pp. 250, 263–265).

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[12] Schäffle (1856, p. 174) argued that the prospect of abolishing guilds in the Austrian Empire—the last remaining "guild structure of commercial life […] in a large nation"—had both positive and negative effects. Yet, Schäffle was in favor of the new legislation that would lead to freedom of trade (*Gewerbefreiheit*) in 1859. On the liberation from the strict guild order (*Zunftordnung*), see also Schäffle (1861, pp. 228–229, 251–252).

[13] In order to be effective, that is, to resolve disputes between the constituent parts of firms, the cooperatives had to include the factory owner, laborers and even apprentices (Schäffle, 1856, pp. 193–194). It is for such statements that Schäffle has been characterized as an early corporatist (Bowen, 1947, pp. 124–137).

[14] Moreover, Schäffle (1861, pp. 198–201) argued that collectives allowed the organization of credit (*savings banks, credit institutes*) and insurance, the training of skills (schools, collections of models and designs, presentations), organization of consumption (consumer cooperatives), and the standardization and merging of sales (*Absatz*). Merging sales benefitted the salesman who did not have to "collect his supplies in atoms" anymore. The term "organic" not only meant that individuals connected into a structure, but also indicated that associations formed autonomously and unforced by a central power. Schäffle (1861, pp. 268–270) preferred private, or free associations over the "forced type of community [*Gemeinform*]" of the state even in education, insurance, and transport.

While the guilds had “absorbed” the whole life of an individual, associations were much more open and inclusive (Schäffle, 1861, p. 268). They interconnected the individual with more comprehensive and more diverse “threads” to a “community organism” (*Gemeinorganismus*). Without such “organization” through the common interest, the urban communities were like a loose and unstructured “pile of sand” (*Sandhaufen*), or “mechanism” (Schäffle, 1856, pp. 201–204). With the term “organism”, Schäffle meant that every individual member of a whole (society, economy, folk, state) was interconnected with other members into several different associations. The mental image of this organism, however, remained vague. Schäffle therefore evoked other images like “threads” (*Fäden*) and “circles” *(Kreise*) to mentally visualize the interconnections. On the one hand, individuals connected through threads to other members of a whole. On the other hand, individuals were part of circles, starting with the natural circle (*Umkreis*) of the family, up to the “combination of forces by several private economies, the business”.[15]

Associations were the result of individual action, but once established, attained “the greatest influence on economic life”, they were “cause and effect” and “means and end” (Schäffle, 1861, p. 4). After being created, associations, or synonymously “institutions” (*Institutionen*) attained agency which in turn also influenced the behavior of individuals. Being part of a group, individuals subordinated their private interest to the interest of the group, which for Schäffle was a sign that the public interest took the upper hand.[16] Schäffle (1861, p. 179) clarified the formation of groups by referring to the emergent properties of chemical compounds—an analogy he possibly took over from Mill.[17] Accordingly, “economics did not exhaust itself in the study of the individual, as little as chemistry

[15] That Schäffle included businesses here somewhat contradicts his previously made statements that businesses form only through private interests. As we shall see further below, the difficulty of distinguishing which forms of organizations were the result of private interests and which were the result of common interests prevailed until *Structure and Life*, where he presented a new theory of organization.

[16] Schäffle’s (1861, p. 249) emphasis on the effect of institutions on individuals resonates well with how U.S. institutionalist economist John R. Commons (1862-1945) defined an institution. According to Commons (1931, p. 648), an institution “is defined as collective action in control, liberation, and expansion of individual action.”

[17] Again, Schäffle was not explicit with his references. It is likely that Schäffle knew Mill’s *A System of Logic*, because he referred to Mill’s (1852) *Principles*. In *A System of Logic*, Mill (1843, p. 426) argued that in “mechanical philosophy” the “principle of the Composition of Forces” held: “the joint effect of several causes is identical with the sum of their separate effects”. However, the principle “by no means prevails in all departments of the field of nature”. In “chemical combination of two substances produces” there emerged “a third substance with properties entirely different from those of either of the two substances separately, or of both of them taken together. Not a trace of the properties of hydrogen or of oxygen is observable in those of their compound, water.” For further examples of emergent properties, or emergence, see O’Connor (2021).

has attained enough with the study of the [chemical] elements". The basic elements interconnected and "emerged" (*aufsteigen*) into "salts, organic and inorganic acids etc." And like the "chemical-organic life", the "many individuals do not act directly on each other, but group themselves into particular associations, become manifold and only then enter into the whole process of life."

Schäffle emphasized not only emergence, but also a notion that strongly resonates with what we have encountered in the introduction with respect to the life of plants. A variety can only unfold in interdependency, or, thinking about Schäffle's example above, only when tied to others, an individual could specialize itself. Only in this specialized or differentiated fashion the individual affected others in the group and in society as a whole. The notion of the individual as an attached "member" (*Glied)* of society can already be found in Adam Müller's (1809b) opposition to Adam Smith's account on the division of labor. Moreover, like Schäffle, Müller (1809a) had argued that society was an growing organism rather than an artificial machine, or a loose pile. The major difference between Müller and Schäffle was that the latter thought that the division of labor did not only destroy the old order, but also gave rise to a new type of interconnection between individuals—a new type of organism tied together by the common interest. While Müller mourned the dissolution of the old guild organism, Schäffle welcomed the new "community organism" created by the division of labor and the common interest.[18]

A comparison between Schäffle and Müller also shows that depicting society as an organically grown entity, or "organism" was not a novel idea. The notion that society was an organism instead of a machine, or pile of sand, was in fact so prevalent in 19th-century Germany that Schäffle saw no need for references when invoking such metaphors. As historian of biology Renato Mazzolini (1988, p. 54) put it, from the late 18th century to around 1840, the social and the natural sciences were "downright flooded" with the term organism. Emblematic of the widespread use of the term is a presentation held by German physician and journalist Friedrich Ludwig Lindner (1772-1845) in 1834. At the third meeting of the *Society of German Natural Scientists and Physicians* (*Gesellschaft Deutscher Naturforscher und Ärzte*), Linder (1834) talked about "The term organism as generally prevailing in the three natural realms, as well as in history and politics".

[18] One cannot fail to notice a similarity between Schäffle's "community organism" and Émile Durkheim's (1893) "organic solidarity" (*solidarité organique*). Schäffle was an important source of inspiration for Durkheim's *De la divison du travail social* (1893) in which Schäffle is mentioned favorably. Durkheim can also be considered as one of Schäffle's first admirers, evidenced by his positive review of *Structure and Life* (Durkheim, 1885). On the Schäffle-Durkheim connection, see Lukes (1973), and Jones (1992).

Historian of science Peter Hanns Reill (2005, p. 5) pointed out that since at least the mid-18th century, natural scientists had become skeptical of the "radical Enlightenment" by Newton and Descartes who had reduced "the manifold appearances of nature to simple principles" and had turned nature into "a heap of things". The same can be said about the German state scientists and economists from whom Schäffle learned the most. In opposition to a mechanistic understanding of the state, society, and the economy, they used the term organism in what Karl Mannheim (1986, p. 106) has termed the "conservative style of thought".

One of Mannheim's main protagonists, German state scientist Friedrich Carl von Savigny (1779-1861), argued that the state was grown gradually or "organically" and that every individual was part of a higher whole.[19] Similarly, the dean of the German state scientists Robert von Mohl (1799-1875), considered society to be an "organism", or a "variety" that connected to a "unity". From his botanist brother, Mohl could learn that even when cut apart, some organisms could grow back together.[20] Both Savigny and Mohl were important sources for Schäffle's (1862) theory of the state.[21]

As Mannheim (1986), James Sheehan (1978, pp. 86–87) and Norton Wise (1987) pointed out, for German state scientists, "organism" was the expression of a middle way between individual freedom and the prerogatives of the state. Many of Schäffle's predecessors and contemporaries believed that

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[19] German jurist Savigny mounted an opposition against the natural law (*Naturrechtslehre*) of the Enlightenment and made ample use of the organism metaphor. Savigny (1828, pp. 12, 32), for example, argued that the judicial system and the life of the people (*Volksleben*) were grown "gradually" (*allmählich*) in an "organic manner" (*auf organische Weise*). In contrast, the "new codes of law" demanded "mechanical security", and built on "abstraction", "arbitrariness" (*Willkü*r), and "intention" (*Absicht*). Savigny (1815, p. 15) believed that every individual was a "member of a higher whole" (*Glied eines höheren Ganzen*) like a family, a people, or a state instead of a "isolated human existence" (*abgesondertes menschliches Dasein*). For a derogatory perspective on the influence of Savigny on German economists, see Lifschitz (1914).

[20] Mohl (1851, pp. 27–34) claimed to have established three facts (*Zustände*) about society (*Gesellschaft*). First, society was a variety (*Vielheit*) of individuals (men, women, elderly, children, employer, employee etc.). Second, this variety "merged" to a "unity" (Einheit)—an organism composed of "institutions" (*Einrichtungen*) guided by a common will. Third, for the common will to take effect, the different "organs" had to be ordered. Mohl emphasized that even when this "organism" with its manifold interconnections was "smashed into pieces", its parts would "unite to form new organisms". It is possible that Mohl had learned from his botanist brother Hugo Mohl (1805-1872) about how some organisms could grow together after having been cut apart. In his *Anatomy and Physiology of the vegetative cell*, Hugo Mohl (1851, p. 106) explained that "A detached part of a plant [...] not only has the ability to produce the organs it lacks to form a complete plant, but it is also able to grow together with another plant and lead a life with it [...]". Like his brother Robert, Hugo Mohl (1851, p. 6) also claimed that all parts of an organism "stood in mutual relationship" to each other and work together "for a common purpose".

[21] Mohl was also an important source in Schäffle's (1862) article on state theory.

if one went to either of the two extremes, one would violate the idea of "organism" and become mechanistic. Individuals were not independent, detached atoms, or grains of sand of an anarchistic society. They did not only possess one driving force of private interest, but also connected through the common interest to groups and associations. Through the division of labor, individual personalities became manifold, complementary, but interconnected again into a community (*Gemeinschaft*). As a result of their individual specialization, however, individuals could not be aggregated. As Wise (1987, p. 396) fittingly put it, there existed a widespread acceptance amongst "moderate liberal" state scientists and economists that "*German individuals do not sum*".

At the same time, the state could not rule "mechanically" by enforcing new laws without interplay with the estates, manifold interest groups, and new corporates (firms, associations, cooperatives). Schäffle's hope for "organically grown" associations, and cooperatives is exemplary of this latter notion that organizations should form without force (*Zwang*).[22] For Schäffle (1861, p. 262), the French political and economic doctrine came closest to a mechanism, because the idea of centralized power (*Willkühr*) guided the thinking of French jurists and was widespread among socialists who wanted to distribute wealth at will.[23]

Amongst the economists from whom Schäffle learned the most, the term organism was used to highlight various characteristics of the economy like interconnection, autonomy, or growth. Roscher (1854) used the same "mainspring" argument as Schäffle to claim that public interest reconciled the private interest into a well-structured organism.[24] Karl Heinrich Rau (1792-1870) considered commerce (*Gewerbeleben*) to be an "organism" independent of state borders, and one, that developed

[22] We will see in the last section of Chapter 3, how Schäffle interpreted the notion of "mechanistic", or "forced" versus "autonomous", or "organic" quite freely when it came to compulsory insurance.

[23] In contrast, the English economic and political order was more like a pile of sand. Schäffle (1861, p. 60) argued for example, that the English factory was like the English state, in which every individual was full of self-confidence and self-activity. That many German scholars thought that the French state was "mechanistic" might be owed to the verdict about the French Republic by the German poet Friedrich Schiller (1759-1805). In his reaction to the Reign of Terror following the creation of the First French Republic, Schiller (1795, pp. 28–30) argued that a state should not be the mere "creation of reason", or "artistic clockwork". Schiller claimed that the "rough mechanics" of the First Republic were far from the organization of the ancient Greek republics in which individuals were free and independent "polyps" that only assembled into a whole in an emergency.

[24] Roscher (1854, p. 17) argued that "public interest" (*Gemeinsinn*), reconciled the egoistic war of all against all into a "higher, well-structured organism". The economy was more than a mere "coexistence" (*Nebeneinander*) just as the "people" (*Volk*) were more than a mere "pile of individuals" (*Haufen von Individuen*). In his *State Economics*, Roscher (1843, p. v) pointed out that his research program was a derivative of the Historical School of Law by Savigny and Karl Friedrich Eichhorn (1781-1854).

through private interest only.[25] Others, like Lorenz von Stein (1815-1890) depicted the "life of commodities" (*Güterleben*) as a "living organism" that moved "according to its own laws given by its own content" (Stein, 1858, pp. 11–13). According to Stein (1858, p. 163), production and consumption created a "massive organism" that expanded into the whole world, while the individual remained the "source and goal".

In another instance, Roscher (1854, p. 18) emphasized that the economy should be considered an organism because it was dominated by interplay (*Wechselwirkung*). As cause and effect (*Ursache und Wirkung*) were "mutual" (*wechselseitig*) within the economy, it resembled the workings of a human body. Roscher explained that in the same way as the respiratory system and the spinal cord were mutually dependent, agriculture was interrelated with industry (*Gewerbe*) as the one could not exist without the other. By contrast, in a machine like the windmill, cause and effect could be easily separated—the characteristic of interplay set the organism apart from the machine.[26] Roscher (1854, pp. 18–19) also pointed to a further positive analogy that made it more appealing to depict the economy as an organism instead of a machine. As the machine was artificially created, knowledge of its working pre-dated the machine itself. By contrast, biological organisms and the economy already existed and operated before scientists knew more details about them. In organisms and in the economy, the "harmonies" and "natural laws" still had to be discovered and understood by induction.[27]

What can be learned from contextualizing Schäffle's use of "organism" is that the term was difficult to bring under one heading. Already in Schäffle's time, the open definition of "organism" spurred an intense controversy amongst state scientists. As a dispute of the 1860s and 1870s between Joseph Held (1815-1890), Albert van Krieken, and Otto von Gierke (1841-1921) reveals, the outstanding common denominator of the various uses of the term organism was "mutual interaction", or

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[25] Roscher's teacher Karl Heinrich Rau (1821, pp. 30–31) described an "organism" of "commerce" (*Gewerbewesen)* and thus an organism independent of the borders of a state—a "folk economy" (*Volkswirthschaft*). Roscher (1843, p. V, 4) ascribed the first use of the term "folk economy" to German jurist Gottlieb Hufeland (1760-1817). With the reception of Adam Smith in Germany, Hufeland (1815) began to depict economic exchange of commodities as activities autonomous of the "organism of the state".

[26] Roscher (1854, p. 18) explained that in the windmill, cause and effect were unidirectional: wind caused the millstones to move and not vice versa.

[27] Roscher's juxtaposition of the machine and the organism resonates well with Mannheim's characterization of the two styles of thought: the "natural-law" style is mechanistic and a priori, while the "conservative style of thought" adheres to the social organism and is empirical.

"interplay" (*Wechselwirkung*).[28] This characteristic, however, had already been used by Kant in his *Critique of Judgment* to distinguish the organism from a mechanism. For Kant (1790/1987, p. 252), one of the main features of a "product of nature" or "organized being" was that "the parts of the thing combine into the unity of a whole because they are reciprocally cause and effect of their form". The organism was a "systematic unity in the form and combination of all the manifold contained in the given matter".[29]

For Schäffle's contemporary state scientists, the question remained what specifically could be learned from thinking of society as a combination of the manifold? Albert van Krieken (1873, p. 58), for example, thought that not much was to be gained from thinking with these broad characteristics. Van Krieken claimed that even when trying to detail what concrete aspect of the "organism" could be made use of, the whole "organic theory" turned into a "Proteus, too diverse to be characterized or defined in general terms".

[28] Held emphasized throughout his *State and Society* (1861) that "interplay" was the dominant characteristic that state scientists recognized in the term "organism". Van Krieken (1873, pp. 105–106, 115, 128) singled out the characteristic of "interplay" of parts amongst various groups of "organic state theoreticians". Gierke (1874, p. 276) highlighted that many state scientists conceived of the state as an "organism of society" in "organic interrelationship and interaction", which they sought to "construct scientifically from the individual elements".

[29] In the German original, Kant (1790/1922, p. 236) wrote: "*Soll aber ein Ding als Naturprodukt in sich selbst und seiner inneren Möglichkeit doch eine Beziehung auf Zwecke enthalten, d.i. nur als Naturzweck und ohne die Kausalität der Begriffe von vernünftigen Wesen außer ihm möglich sein, so wird zweitens dazu erfordert, daß die Teile desselben sich dadurch zur Einheit eines Ganzen verbinden, daß sie von-einander wechselseitig Ursache und Wirkung ihrer Form sind. Denn auf solche Weise ist es allein möglich, daß umgekehrt (wechselseitig) die Idee des Ganzen wiederum die Form und Verbindung aller Teile bestimme: nicht als Ursache — denn da wäre es ein Kunstprodukt —, sondern als Erkenntnisgrund der systematischen Einheit der Form und Verbindung alles Mannigfaltigen, was in der gegebenen Materie enthalten ist, für den, der es beurteilt*". See also Gambarotto (2017, p. 332) on Kant's definition of "system" that was closely tied to the idea of organism.

Held had indeed suggested a long list of consequences that could be drawn from comparing society to an organism.[30] Another example that supports van Krieken's claim is Roscher's attempt to detail the organism metaphor to gain more clarity about overproduction. Roscher (1880, pp. 529–530) argued that the "steady development of production and consumption was an essential condition for the prosperity of any economy". Roscher based his claim on French economist Nicolas-François Canard's (1801, pp. 107–124) comparison between production and consumption on the one side, and "corresponding" arteries and veins in the animal body on the other.[31] Yet, in the same paragraph, Roscher suggested that in order for the economy to grow, production always had to surpass consumption in the same way that an animal had to take up more food than it excreted. Whether such analogies remained an appeal to nature, or whether they were worked out in order to draw consequences for economic research was up to the author who used the insights from biology. What is clear, however, is that depending on what aspect of an organism was linked to what aspect of the economy, different consequences could be drawn. With the first of Roscher's comparisons, one could support Say's Law and deny that overproduction was possible, because laboring consumers (veins) and commodities (arteries) had corresponding ramifications. With the second, one could argue that overproduction was to some extent necessary for the growth of the economy.

It may not surprise that Roscher (1854, p. 18) remarked that "organism" belonged "without a doubt to one of the most obscure [terms]". The term was simply "the shortest common expression of many

[30] Hence, van Krieken (1873, p. 13), a little known German-speaking jurist, claimed that the "organic theory" was a "great error, an error of which the most excellent minds of the most enlightened ages have been susceptible". Van Krieken's work was partly a response to a list of possible interpretations of the term organism that Joseph Held had drawn up in 1861. In his *State and Society*, Held (1861, pp. 576–578) included a long discussion "on the concept of the organism and its application to society" in which he hoped to find answers to whether "organism" can be applied to "entities composed by human beings" like societies, communities, and the state. Held argued that comparing the state to an organism permeated "the whole modern political literature" in most of which the organism is understood as a composite (*zusammengesetzt*) body that is alive, autonomous, able to preserve, develop, and reproduce. From these characteristics, Held drew such diverse consequences for the analysis of state and society that van Krieken's critique seems justified. To only mention the most striking of the 32 consequences Held distilled from the literature: the organism metaphor stood for natural laws (p. 583), a gradual development (p. 584), organized and interconnected estates (p. 585), the interplay between state and man (pp. 587-588), the possibility for pathologies and disturbances of equilibrium to arise (pp. 588-596), and a secrecy-free public (p. 594). See also Kaufmann (1908) for a critical review of Held's work.

[31] In the French original, Canard (1801, p. 109) stated: "*Le système des artères par où le sang s'écoule en s'éloignant du cœur, forme une ramification analogue et correspondante au système des veines par où le sang revient au cœur*". Canard (1801, pp. 111–112) then used the metaphor to argue that there existed arterial "branches of commodities" (*ramifications de marchandises*) that corresponded to the "branches of work" (*ramification du travail*).

problems". Roscher (1854, pp. 18–19) believed that if one wanted "to operate with the term", one should investigate the *General Physiology of the Body* (1851) by German natural philosopher and physician Rudolf Hermann Lotze (1817-1881). What was needed, to speak with Mary Morgan's (2012, p. 173) account of how metaphors in economics work, were "substantive analogies" formed from the "raw material" of metaphors. Somebody had to establish positive, neutral, and negative analogies, and adapt and refine them to the problem at hand.

It would be tempting to portray Schäffle as the one who followed Roscher's suggestion to look more closely into Lotze's *General Physiology*, committed to biological metaphors, and created substantial analogies. Were the ideas of interplay and the notion that individuals interlinked into groups not suggestive of adopting images and theories from biological organisms for clarification? Was it not possible to think of emerging groups with retroaction on individuals in terms of organs within a structured organism that put the common interest above private interest? Was it not straightforward for Schäffle to combine "organic" development with the growth and evolution of plants and animals?

Historian of sociology and economics Michael Hutter suggested so. Hutter (1994, p. 300) claimed that within the "organicist tradition" that spanned from Adam Müller (1779-1829) to Othmar Spann (1878-1950), Schäffle ushered in "a new generation of the organic paradigm". Schäffle tried to "emulate biological patterns" and compare the "complexities of an industrializing society […] to anatomical structures and their morphology". Within this "organic school of economics", Schäffle marked the "high point and the failure of a research program relying strongly on biological analogy" (Hutter, 1994, p. 295).

I hold in contention Hutter's manner of portraying Schäffle's use of biological analogies. In particular, I have three concerns with Hutter's account. The first concern stems from the above description of the ambiguity of the term organism. As has been known to Schäffle and his contemporaries, the term organism did not indicate what detail of a biological organism was to be used in analogy to economic phenomena. Aware of this ambiguity, Schäffle (1875, p. VII) claimed that he had made an effort to avoid the terms "organism" and "organic" in *Structure and Life*. In my view, it is therefore too broad to inquire into how German economists like Müller, List, Roscher, Schäffle, Sombart, and Spann used "organism as a metaphor" (Hutter, 1994). As a result, Hutter did not go beyond the broad claim that organism has been used by an "organicist school" that opposed "mechanistic interpretations of social and economic action"—a juxtaposition that we have already recognized during this thesis by the example of Roscher.

A second concern I have with Hutter's portrayal of Schäffle is his dismissive stance towards biological analogies. Despite Hutter's claim to have chosen authors that "drew implications" from "organism as an economic metaphor", he does not clarify what Schäffle tried to work out by applying explicit analogies like tissues and the nervous system. Hutter concluded that Schäffle's "contributions to economic theory are quite independent of his organic paradigm", which explains to Hutter why biological metaphors as a whole "have been considered a failure".

My third and last concern is that Hutter suggested a linear development from the "vague" uses of "organism" by Adam Müller to the concrete invocations of biology by Schäffle. From this high point onwards, the line turns negative until it reaches the proto-fascism of Othmar Spann. Hutter's account masks that Schäffle was no adherent to biological analogies before *Structure and Life*, despite using "organism", and "organic" in his economics. Only two years before publishing *Structure and Life*, Schäffle (1873a, p. 49) argued that the "worst kind" of "empirical methods in the social sciences" was the "anatomical-physiological analogy".

The last point, in particular, suggests that Schäffle did not begin to use biological analogies because he stood in an "organicist tradition". Thus, I suggest not examining deeply the works by Müller, Savigny, Mohl, or Roscher to seek out Schäffle's starting points to detail the organism metaphor. Rather, I believe Schäffle when he claimed that he turned to biology during the analysis of certain types of commodities that he called "goods of presentation and communication".[32] I argue that the start of Schäffle's interest in these types of goods can be traced back to a rather reductionist idea of a "process of interaction" (*Wechselprozess*) between individuals and an economic circuit of production and consumption. Through this investigation, Schäffle became aware of the great variety of commodities in the economy but stood at an impasse because existing theory was unable to explain such variety.

2.1.2 The economic circuit and the limits of subjective valuation

Remember that Schäffle (1861, p. 5) was fascinated by the unfolding (*Entfaltung*) of humanity into different personalities, commodities, firms, organizations, and associations. The source (*Quellpunkt*) of this unfolding was the "secret workshop of the infinitely manifold inner personal life". The production of commodities was only a result of individual needs and had to be constantly renewed and refined to support the unfolding. The unfolding was only possible through the consumption of commodities by which individuals gained strength to continue reproduction. Commodities circulated

[32] In a retrospective defense of his biological analogies, Schäffle (1903a, pp. 299–300) explained that he was "pushed to the venture of a draft of sociology" (*gedrängt zu dem Wagnis eines Entwurfes der Soziologie*)—his *Structure and Life*—through his investigation of the "commodities of presentation and communication" (*Sachgüter für Darstellung und Mitteilung, für Herstellung der geistigen Bänder der Gesellschaft*).

in a never-ending circuit of production, consumption, and reproduction: in an "eternal chain [*Verkettung*] of cause and effect" external means (*äussere Mittel*) turned into personal forces (*persönliche Kräfte*) and personal forces into external means (Schäffle, 1861, p. 9).

In contrast to Roscher (1854, p. 381), Schäffle considered consumption not the "destruction of value", but rather the production of personal force. Commodities did not "go up in smoke" but contributed to the unfolding by enabling individuals to increase their morals (*Sittlichkeit*) and labor power. Unlike Marx's notion of reproduction, Schäffle's emphasized that spiritual reproduction was just as valuable for the renewal of the economic process. Such interpretation can be found in Lorenz von Stein's (1858) work, but Schäffle's (1861, p. 90) immediate reference was to German economist Bruno Hildebrand (1812-1878).

In a short remark, Hildebrand (1848, p. 77) argued that in the economy "cause and effect" could not be disentangled because human labor produced food, and food produced labor. Similarly, the "spiritual forces" created science and education, which in turn created new spiritual and economic forces.[33] Schäffle (1861, p. 88) fleshed out this circular process by claiming that the inner life of the individual stood in a "inseparable interaction" to external commodities through a "process of interaction" (*Wechselprocess*), or "transubstantiation" (*Transsubstantiation*). The circuit idea could easily be linked to the eucharistic prayer of the Catholic Church in which transubstantiation signifies the change of the substance 'bread' into the substance 'Body of Christ', and the change of the substance 'wine' into the substance 'Blood of Christ' (Schäffle, 1861, pp. 12–13, 35).

In Schäffle's (1861, p. 88) eyes, labor income was transformed into "material" capital and "personal" capital like education. Bread served the development of the body and the spirit, looking at a piece of art, or going to the opera promoted spiritual, but indirectly also bodily development.[34] After being processed in the "secret workshop" of the individual, a consumed good returned to the economic

[33] Hildebrand used the "circuit" (*Kreislauf*) argument to criticize German economist Friedrich List's (1789-1846). proposition to advance a nation's "productive forces" by protective tariffs (*Schutzzölle*). Hildebrand (1848, pp. 76–78) noted that tariffs made consumer products more expensive for a certain time. As consumer products were not just used up, but fostered the productive forces, higher tariffs also hampered the advancement of the productive forces. In short, the productive forces (agriculture, manufacture, trade) could not be analyzed separately from the exchange values as List proposed (Hildebrand, 1848, pp. 62–97). The idea of a circuit between material and spiritual goods can already be found in the work of Austrian state scientist Johann Schön (1802-1839). Schön (1835, p. 145) described the economy as a "transition from bodily to non-bodily commodities" (*Hingabe körperlicher Güter gegen unkörperliche*).

[34] As German statistician Ernst Engel (1857, pp. 153–157) noted, at the time, especially French economists like Joseph Garnier (1813-1881) and Charles Dunoyer (1786-1862) reflected on whether "immaterial commodities" (*immaterielle Güter*) could be consumed.

sphere of production in the shape of “spiritual, or bodily productive force” (Schäffle, 1861, pp. 35–36, 90). To uphold this circuit, the “moral core” (*sittlicher Kern*) of an individual had to be maintained or refined. If the moral core of the individual, family, or association deteriorated, for example by food that weakened the strength of the body, the process of reproduction collapsed, which jeopardized the whole economy.

In the next step, Schäffle tried to combine the circuit idea with his previous findings that individuals joined together to form collectives. Schäffle (1861, p. 88) maintained that most transubstantiation happened within the family, but that in a modern economy, individuals also consumed commodities within businesses and associations. Yet, Schäffle never went clearly beyond an individualistic perspective and underlined that every consumption should only serve the development of the “spiritual-moral” (*geistig-sittlich*) personality. Similarly, he never detailed how consumption and reproduction differed between a modern business and the “natural” (*ursprünglich*) institution of the family.

Schäffle did not stick to the idea of transubstantiation and the economic circuit for long. I suggest that the main reason for his reluctance to invest more time in clarifying the economic circuit was an obstacle that he encountered with an individualistic perspective on the economy. Certain commodities that were supposed to circulate in Schäffle’s circuit, were not only stationary, but also what modern economists would call non-rivalrous. Especially those institutions that were organized by the common interest like the opera, the museum, education, but also structures like streets, and the railway could be used by many without reducing the ability of others to consume them simultaneously. These goods were not exhausted when consumed and transubstantiated by individuals, making Schäffle’s circuit unable to explain how they came into existence.

In his *Social System*, the second edition of *General Economics*, Schäffle (1867a, pp. 46–51) thus refrained from detailing the circuit idea, but instead expanded his discussion on how the common interest established the “public sphere” (*Öffentlichkeit*).[35] Now, Schäffle clarified that only exchangeable commodities (*Tauschgüter*) were processed in a circuit. He then highlighted that there existed “public goods” (*öffentliche Güter*) that were incapable of exchange.[36] The stock of public goods increased with civilization and billions were invested in public goods, such as streets, buildings,

[35] On the wide dissemination of the term “public sphere” (*Öffentlichkeit*) in the 19th century, see Rühl (1999, p. 184).

[36] Schäffle (1867b, p. 345) defined the public good as a “commodity, or service that serves many and the individual at the same time”. In modern economics, a public good is defined as “one whose consumption benefits more than one person or firm” (Leach, 2004, p. 5). Pickhardt (2005) traced back the origins of public goods to Schäffle’s student Emil Sax (1845-1927), but forewent that Sax learned about them from Schäffle.

canals, museums, and churches. Yet, these public goods were left aside by economists because they were not exchangeable.

To counteract the neglect by economists, Schäffle now distinguished sharply between a private (*Privatwirthschaft*) and a public economy (*Gemeinwirthschaft*) with different characteristics, functions, and laws.[37] In the private economy the private interests came to the fore. Self-interest, competition in production, exchange, and consumption "organized" commodities (*Sachgüter*) and services (*Leistungen*) through the market. The private economy only produced commodities with a demand that resulted from subjective valuation (Schäffle, 1867a, p. 345). In the public economy, the common interest (*Gemeininteresse*) was dominant and established several public forms of civil society like groups, autonomous organizations, and cooperatives, but also municipalities, the church, and the state (Schäffle, 1867a, p. VII, 347). The common interest organized public goods like education, religion, sciences, transport, and public order. As the basic community, the family also belonged to the public economy and fulfilled the needs of care and education.

In his *General Economics* of 1861, Schäffle had difficulties to distinguish between what type of organizations were formed from pure public interest, and which ones from pure private interests.[38] To solve this issue, Schäffle (1867a, pp. 344–345) now argued that the two sides of the economy were both "organisms" (*privatwirtschaftlicher und gemeinschaftlicher Organismus*) that were interconnected. The family, the church system, or the state, despite being part of the public economy, were also private economies, because they participated in the exchange of goods and services. Schäffle explained the interconnection between the two economies as follows:

> "The total of individuals who, in the private economic exchange of labor, capital utilization and finished consumer goods, fight the rough battle of competition in isolation, belong as members (organically)—partly as protégés, partly as protectors of others—to the various societal associations from the family to the state; only through reciprocal

[37] Schäffle's student Emil Sax (1887, p. 3) argued that with this distinction, Schäffle was one of the first to spread the idea amongst economists that there existed a "social system" next to the private economy.

[38] For example, Schäffle (1861, p. 267) had to admit that also a family, or an association had private interests and he maintained that "none of these forms is a completely pure organ of the common interest".

> limitation and development between the private-economic system of competition and the public economic system, harmony of the economic life of society becomes possible.[39]

Schäffle's description of the private economy as a "battle of competition in isolation" hides the fact that he also considered the private side as an interconnected system or "historical tissue" that consisted of "millions of threads" (Schäffle, 1867a, p. 49). Yet, for Schäffle, the two economies had different characteristics. Schäffle (1867a, pp. 332–333) argued that in many ways, the public economy was more economical than the private one, because human needs were fulfilled with fewer sacrifices than when each individual tried to fulfill them privately. Another benefit of the public economy was that certain satisfactions of needs (*Bedürfnisbefriedigungen*) could be made exclusive by law—a task that could not be attained by the private sphere. The postal and transportation systems were exclusively organized by the public economy (Schäffle, 1867a, pp. 343–346). A patent, for example, created an economic benefit, but was enforced by the state (Schäffle, 1867a, pp. 194–195, 367, 379). Especially patents drew Schäffle's attention because they were a sign that the public sphere reached over to the private sphere. A patent was both a public, and a private good, or neither of them. But then, what kind of good was it?

Inquiring into the economic nature of patents, Schäffle used a classification of commodities by German economist Friedrich von Hermann (1795-1868). Hermann (1832, pp. 2–8) had argued that next to consumption goods, means of production, and services, there existed a fourth category of "relations" (*Verhältnisse*), for example, the relationship to customers, a business, or a patent. For Schäffle (1867a, p. 48), relations were also economic goods, but were of "odd character" (*eigenthümliche Art*), because they were neither means of production (*Erzeugungsgüter*, or *Kapitalien*), nor consumption goods (*Genußgüter*). Relations were rather expectations for surplus income and thus similar to rent.

To inquire into the character of these odd relations, Schäffle wrote two articles in which he presented an "economic theory on the exclusionary sales conditions" (*Die nationalökonomische Theorie der*

[39] In the German original, Schäffle (1867a, p. 63) claimed that: "*Die sämmtlichen Individuen, welche im privatwirthschaftlichen Tausch der Arbeitsleistungen, Kapitalnutzungen und fertigen Genußgüter scheinbar isolirt den rauhen Kampf der Concurrenz kämpfen, gehören als Glieder (organisch) – und zwar theils als Schützlinge, theils als Schützer Anderer – den verschiedenen geselligen Verbindungen von der Familie bis zum Staate an; erst mit der wechselseitigen Schachhaltung, Begrenzung und Entwickelung des privatwirthschaftlichen Concurrenzsystems und des gemeinwirthschaftlichen Systems ist die volle Harmonie des wirthschaftlichen Lebens der Gesellschaft möglich*". See also Schäffle's (1867a, pp. 401–406) inquiries into the ratios of, and interplay between the "private and the public system".

ausschliessenden Absazverhältnisse).[40] In his theory, Schäffle (1867b, p. VI) interpreted relations as some form of "capitalized rent" that went beyond rent on land and property.[41] Relations like the customer base, the business, patents, but also author rights, designs, and trademarks were exchangeable things, but not as tangible as commodities (*Sachgüter*), or as clearly defined as services (*Leistungen*).[42] The "common character of these things of colorful variety" was that they created a source of income by excluding others (Schäffle, 1867b, p. 6)—they created monopolies and exclusive relations. In some sense, they were the opposite of public goods. Paradoxically, some of these goods like literature and new inventions, needed artificial protection by the public institution of the state to turn them into economic goods, that is, goods that allowed to make a private profit.

The reason for this "oddity" (*Eigenthümlichkeit*) was that relations that originated directly from the human spirit were easy to reproduce. Through modern technology, new inventions, and literature, or how Schäffle later called them "ideal goods" (*ideale Güter*), could be easily reproduced, and disseminated without incurring much cost. Their content was non-expletive and non-exclusive, yet they were no public goods. What is more, the protection of ideal goods created a contradiction to general welfare. New ideas and literature were all the more valuable if many used them—the contrast to "common (physiological) goods" like consumption goods and the means of production could not be greater (Schäffle, 1867b, p. 141).

Schäffle's deeper inquiries into patents and author rights must not concern us here.[43] What is more important is that Schäffle discovered with time that there existed plenty of other non-expletive and reproducible commodities that nobody paid attention to. Next to author rights and patents, there

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[40] I quote here from the separate print that combined the two essays in one book (Schäffle, 1867b).

[41] In his *General Economics*, Schäffle (1861, pp. 134–148) defined "rent" (*Rente*) along the lines of Ricardo's "rent theory" as the excess, or surplus *(Überschuss*) over profit that flowed to land ownership (*Grundbesitz*) like agricultural land, or rental property. Schäffle (1861, pp. 139–140) argued that other types of rent could result from individual ability (*persönliches Geschick*), or the business cycle (*Konjunktur*), but they were not worthy of a more detailed investigation. In his *Social System*, Schäffle (1867a, pp. 192–202) still defined rent as excess profit (*Extragewinne*) of many different forms.

[42] Schäffle (1867b, pp. 8–9) also included the "news agency" (*Zeitungsunternehmen*) in the category, by which he probably wanted to refer to the "relations" of the enterprise. Schäffle also remarked that only in some cases, the "relations" were exchangeable (*tauschfähig*). A person's talent, for example, could not be transferred to somebody else.

[43] In short, Schäffle argued that rents should not be prohibited, because they were a motivation for researchers and enterprises to further technological and societal progress. Monopoly rents, which arose from new ideas were the justified reward for the improvement and progress of society. Yet, new inventions did not need artificial protection through patents as former allowed firms to profit from rents due to the first-mover advantage. An author, however, needed protection through author rights, because books and articles could be easily replicated (Schäffle, 1867b, pp. 174–178).

existed paintings, performances, letters, telegrams, and many more of what Schäffle called "symbolic goods".[44] To a large degree, symbolic goods were the material expression of the abovementioned ideal goods like patents, new ideas, and literature. But Schäffle also found that there existed symbolic goods that could be defined as "goods of presentation and communication" (*Güter der Darstellung und Mittheilung*). Individuals not only amassed goods of presentation like art, but also communicated with letters, telegrams, bills of exchange, and storage vouchers. In one of his first articles after his stint as a minister of trade, Schäffle thus investigated the "odd nature" (*eigenthümliche Natur*) of such goods.

One can infer from Schäffle's remarks at the end of the article, that he stood at the forefront of economic research with his interest in symbolic goods. Schäffle (1873c, pp. 69–70) pointed out that he merely wanted to draw attention to the "economically and technically odd nature" of symbolic goods, and deliberately tried to avoid details to not disturb economic research in the "new field" that he opened up. However, of the economists who learned most from Schäffle, only one followed him into the new field much later.[45]

Schäffle's successor at the University of Vienna, Carl Menger (1840-1921), even went in the opposite direction by isolating the consumer goods and by denying any other commodities their importance. To find what he called "exact laws", Menger entrusted the procedure of isolation by physicists. Referring to German physicist Hermann von Helmholtz (1821-1894), Menger (1871, pp. 54–55) claimed that human needs and the formation of prices had to be analyzed on basis of the "isolated subject", or "isolated individual". From the isolated individual, Menger (1871, p. 106) then made inference to the whole population. For Menger, investigating the variety of commodities was to no avail as the value of the means of production and other goods of "higher order" could be explained in a bottom-up manner through the subjective valuation of the commodities of the "first order"—the consumer goods.[46] Menger neglected the existence of other type of goods like public, ideal, and symbolic goods. Only later, Menger (1883, p. 143) shortly remarked that man, despite following only one "purpose" (*Zweck*), made use of a "great variety of means".

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[44] As Schäffle (1873c, p. 11) later remarked, he became aware of the category of symbolic goods through his studies on the excluding sales conditions. This shift of Schäffle's attention to symbolic goods has been overlooked by historians of economics. It is likely that many, like Hutter (1994), thought that the category of ideal, or symbolic goods was too broad of a collection of miscellaneous objects that were somehow related to economics.

[45] To Schäffle's students, one can count Emil Sax, Adolph Wagner (1835-1917), and Karl Bücher (1847-1930). Only the latter investigated symbolic goods with a focus on the press system of the early 20th century. See Schefold (1988).

[46] This idea was later intensely pursued by Menger's successor Friedrich von Wieser (1884, 1889) under the name "imputation" (*Zurechnung*). On imputation, see also Schumpeter (1909).

Having overcome the idea that subjective valuation could explain the existence of all types of commodities already in the late 1860s, Schäffle probably did not think that Menger's work was worth mentioning.[47] Instead of isolating the consumer good, Schäffle emphasized the great variety of symbolic goods. Symbols appeared in the "most manifold shapes" as they resulted from the "inner creation of the soul that had the urge for external representation". There existed presentations, books, calculations, estimates (*Voranschlag*), directories (*Leitfäden*), instructions, journals, labels (*Etiketten*), brands, addresses, art, drawings, models, sculptures, music, comedy, poetry, sermons, protests, newspapers. In all cases, symbolic goods were material "expressions" (*Aeusserung*) of ideas (Schäffle, 1873c, pp. 1–5).

Schäffle (1873c, p. 8) speculated that economists did not pay attention to symbolic goods, because they were preoccupied with the production and consumption of consumer goods that served the material, or "organic" satisfaction of human needs. In economics, the spiritual (*geistige*) needs were thus underrepresented despite the importance of presentations, letters, telegrams, and advertisements.[48] Another reason for the neglect of symbolic goods was that they were often seen as "personal" goods like a presentation, or a piece of art, or that they seemed of "auxiliary character" like letters.

In stark contrast to his contemporaries, Schäffle (1873c, p. 9) came to believe that the "traffic of thought" was just as important for the functioning of society as the traffic of the commodities that were consumed by the final consumer. For daily business and any sort of communication, symbolic goods were not auxiliary, but indispensable. A good illustration of the validity of Schäffle's claim is the famous painting *Der Kaufmann Georg Gisze* by Hans Holbein (1497-1543) of Figure 5 in which the Renaissance tradesman is surrounded by all sorts of symbolic goods like correspondence, sealing strips, notes, and books. Assigning these symbolic goods value by calculating their costs of production or estimating their ability to satisfy human needs by observing the price of blank paper on the market, would not do justice to the important role they played in enabling trade.

[47] Schäffle only mentions Menger once in his theory of taxes, referring to a detail on tax progression (1895, p. 284).

[48] Schäffle not only criticized economists' hesitation to investigate symbolic goods, but also took issue with their neglect of the variety of consumer goods. Schäffle believed that Hermann's theory of value, for example, lacked the subjective perspective. According to Schäffle (1870b, pp. 149–151), a lower income of an individual also lowered the use value of non-essential goods (*entbehrliche Güter*). In contrast, a lower income increased the use value of essential goods (*unentbehrliche Güter*). This distinction is still made by the terms "normal" and "inferior" goods in modern microeconomic theory (Mankiw, 2000, p. 68).

Figure 5: Der Kaufmann Georg Gisze (1532) by Hans Holbein. Source: Gemäldegalerie der staatlichen Museen zu Berlin – Preußischer Kulturbesitz.

By the 19th century, Schäffle (1873c, p. 9) witnessed that trade alone possessed an almost infinite variety of "accompanying symbolism" (*Begleitsymbolik*). Trade could simply not exist without the "symbolizing work and the means of presentation": catalogs, directories, inscriptions, registers, warehouse vouchers and receipts (*Lagerscheine*), premium notes (*Prämienscheine*), insurance policies (*Policen*), bills of freight, maps, stamps, bills of lading (*Connossamente*), signals, schedules, receipts, timers (*Zeitmesser*), telegrams, letters, circulars (*Circulare*), offers, labels, companies, brands, declarations of tare weight, other declarations, invoices, banknotes, bills of exchange, bank instructions (*Anweisungen*), current account statements (*Contocorrentauszüge*) and price quotations.

Schäffle (1873c, 1905a, p. 45) indicated that his interests in symbolic goods dated back to his student days when he became acquainted with Richard Rothe's ethics and Friedrich Schleiermacher's hermeneutics.[49] Yet, his extensive list of symbolic goods in trade also suggests that Schäffle knew

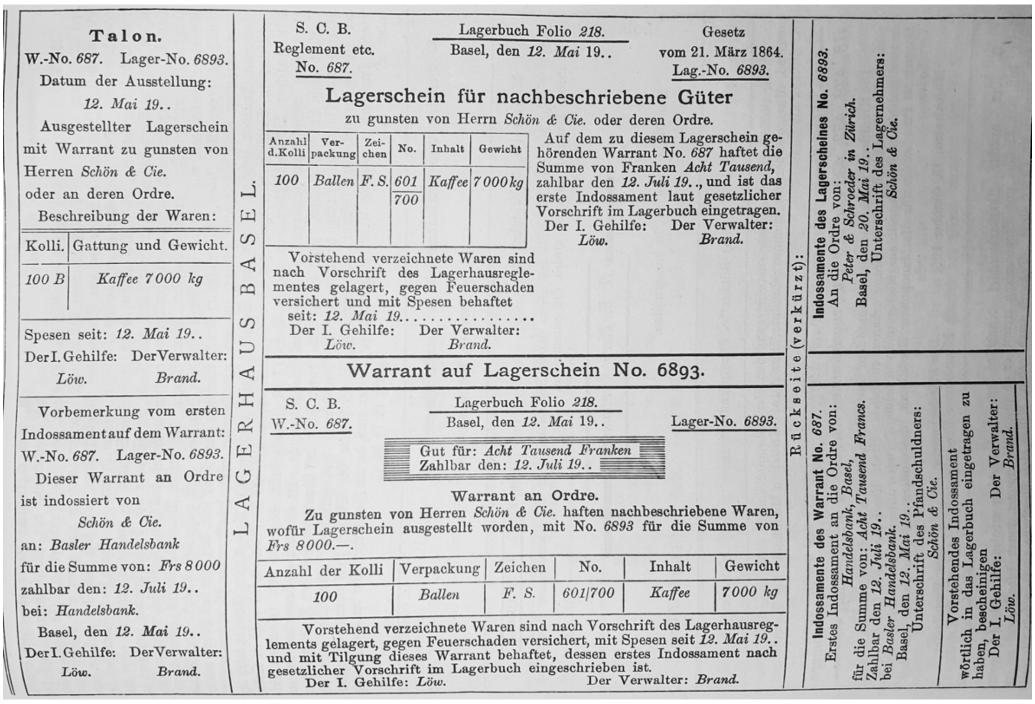
[49] Another inspiration for Schäffle might have been Adam Müller (1809a, pp. 49–50) who accused Smith of concentrating too much on materialistic commodities (*handgreifliches Produkt*).

well about contemporary business practices. The abovementioned “storage vouchers” are an illustrative example of how symbolic goods attained great value for trade in the 19th century, be it for international traffic, or for the efficient organization of trade within the Habsburg Monarchy.

Remember that Schäffle moved to Vienna in the autumn of 1868, just after he had turned his attention towards ideal goods like patents and author rights. Shortly after taking up the position as professor at the University of Vienna, Schäffle joined the Viennese *Economic Association* (*Volkswirthschaftlicher Verein*), which brought him into contact with influential bankers and businessmen (Schäffle, 1905a, pp. 164–165). Through the association, Schäffle became one of the founding members of *The Austrian Economist (Der oesterreichische Oekonomist)*. Skimming through the first editions of the journal of late 1869 reveals that the dominant topics in the journal were communication, law, new inventions, and the organization of trade. Exemplary of the wide variety of topics covered is a set of four articles by one of Schäffle’s students, Emil Sax (1845-1927).[50] Through the imminent opening of the Suez Canal in November 1869, and possibly through Schäffle’s impetus, Sax became interested in storage houses and storage vouchers (*Lagerscheine*).

Sax argued that storage houses and vouchers were essential for the efficient organization of trade as they replaced the circulation of commodities, which resulted in time and cost savings. Vouchers also facilitated speculation by opening wholesale trade to smaller investors and allowed for commercial credit. Vouchers were like bills of exchange backed by “real securities” (*Realsicherheit*) and allowed the “mobilization and hypothecation of commodities” (Sax, 1869, pp. 688–704). The double voucher system (*Doppelscheine*) of voucher and warrant as it existed in England, France, Belgium, and Switzerland, proved to be beneficial for trade. In Figure 6, I reproduced a teaching example of a double voucher from Basel, published in a textbook (*Lehrbuch)* about commercial correspondence by Swiss forerunner of business economics (*Betriebswirtschaftslehre*) Johann Friedrich Schär (1846-1924). The middle section of Figure 6 shows that the voucher was divided into a storage voucher (*Lagerschein für nachbeschriebene Güter*) and a warrant (*Warrant auf Lagerschein*) that could be cut apart and circulated individually. This simple alteration of a symbolic good like the storage voucher could facilitate trade enormously since it enabled the owner of the goods to sell his property (by handing over the voucher) and take up a credit (with the warrant) independently (Sax, 1869, p. 703).

[50] As Hennings (1989, p. 178) remarked, Sax was Schäffle’s student in Vienna. I was not able to verify this claim. However, Sax was based in Vienna and that he developed many of his ideas in interaction with Schäffle’s work. See Schmoeckel (2009) and Ludwig (1994) on Sax’s studies about state regulation and transportation that he developed through his reading of Schäffle and Wagner.



Talon.
W.-No. 687. Lager-No. 6893.
Datum der Ausstellung:
12. Mai 19..
Ausgestellter Lagerschein mit Warrant zu gunsten von Herren Schön & Cie. oder an deren Ordre.
Beschreibung der Waren:

Kolli.	Gattung und Gewicht.
100 B	Kaffee 7000 kg

Spesen seit: 12. Mai 19..
Der I. Gehilfe: Der Verwalter:
Löw. Brand.

Vorbemerkung vom ersten Indossament auf dem Warrant:
W.-No. 687. Lager-No. 6893.
Dieser Warrant an Ordre ist indossiert von Schön & Cie.
an: Basler Handelsbank
für die Summe von: Frs 8000
zahlbar den: 12. Juli 19..
bei: Handelsbank.
Basel, den 12. Mai 19..
Der I. Gehilfe: Der Verwalter:
Löw. Brand.

LAGERHAUS BASEL.

S. C. B. Reglement etc. No. 687.
Lagerbuch Folio 218. Basel, den 12. Mai 19..
Gesetz vom 21. März 1864. Lag.-No. 6893.

Lagerschein für nachbeschriebene Güter
zu gunsten von Herrn Schön & Cie. oder deren Ordre.

Anzahl d. Kolli	Verpackung	Zeichen	No.	Inhalt	Gewicht
100	Ballen	F. S.	601/700	Kaffee	7000 kg

Auf dem zu diesem Lagerschein gehörenden Warrant No. 687 haftet die Summe von Franken Acht Tausend, zahlbar den 12. Juli 19.., und ist das erste Indossament laut gesetzlicher Vorschrift im Lagerbuch eingetragen.
Der I. Gehilfe: Der Verwalter:
Löw. Brand.

Vorstehend verzeichnete Waren sind nach Vorschrift des Lagerhausreglementes gelagert, gegen Feuerschaden versichert und mit Spesen behaftet seit: 12. Mai 19................
Der I. Gehilfe: Der Verwalter:
Löw. Brand.

Warrant auf Lagerschein No. 6893.

S. C. B. W.-No. 687.
Lagerbuch Folio 218. Basel, den 12. Mai 19..
Lager-No. 6893.

Gut für: Acht Tausend Franken
Zahlbar den: 12. Juli 19..

Warrant an Ordre.
Zu gunsten von Herren Schön & Cie. haften nachbeschriebene Waren, wofür Lagerschein ausgestellt worden, mit No. 6893 für die Summe von Frs 8000.—.

Anzahl der Kolli	Verpackung	Zeichen	No.	Inhalt	Gewicht
100	Ballen	F. S.	601/700	Kaffee	7000 kg

Vorstehend verzeichnete Waren sind nach Vorschrift des Lagerhausreglements gelagert, gegen Feuerschaden versichert, mit Spesen seit 12. Mai 19.. und mit Tilgung dieses Warrant behaftet, dessen erstes Indossament nach gesetzlicher Vorschrift im Lagerbuch eingeschrieben ist.
Der I. Gehilfe: Löw. Der Verwalter: Brand.

Rückseite (verkürzt):

Indossamente des Lagerscheines No. 6893.
An die Ordre von:
Peter & Schroeder in Zürich.
Basel, den 20. Mai 19..
Unterschrift des Lagernehmers:
Schön & Cie.

Indossamente des Warrant No. 687.
Erstes Indossament an die Ordre von:
Handelsbank, Basel,
für die Summe von: Acht Tausend Francs.
Zahlbar den 12. Juli 19..
bei Basler Handelsbank.
Basel, den 12. Mai 19..
Unterschrift des Pfandschuldners:
Schön & Cie.

Vorstehendes Indossament wörtlich in das Lagerbuch eingetragen zu haben, bescheinigen
Der I. Gehilfe: Der Verwalter:
Löw. Brand.

Figure 6: Double voucher consisting of storage voucher (*Lagerschein*) and warrant (*Warrant*) for 100 bales of coffee at the storage house Basel. Source: Schär (1909, p.115).

Schär (1909, pp. 107–113), who was also a professor at the Berlin *Handelshochschule*, confirmed that double storage vouchers simplified the organization and were “an essential factor” in the development of trade. One could argue, therefore, that Schäffle’s interest in symbolic goods, despite not having had a great effect on economists at the leading universities of his time, wandered off into the neighboring discipline of business economics.[51]

Yet, Schäffle’s interest was not in businesses economics, but in what function the symbolic goods had in the whole economy. The existence of symbolic goods, and especially those used for communication, invalidated an atomistic, individualistic, “pile of sand” understanding of the economy. Symbolic goods gave concrete substance to what Schäffle had previously depicted as threads that connected individuals into a community organism. Individuals were not only concerned with themselves but acted within a social body in which they connected to other members of society. For Schäffle (1873c) symbolic goods proved that societies did not form only by the division of labor and the “invisible hand”; people consciously connected through symbols, customs, and traditions that manifested themselves in the shape of letters, books, and pamphlets.

[51] On the German *Handelshochschulen*, see Tribe (1995, pp. 95–139), who also sheds light on the relation between economics and business economics in the 1910s.

The increased production and use of symbolic goods in society was an effect, but also an enabler of the "unfolding of the ethical community". Progress, argued Schäffle (1873c, p. 6), manifested itself by the "increasing need for symbols" and with the evolution of society, "an increasing variety of symbolizing arts and uses of symbols made itself apparent". Symbols became more essential as with increasing division of labor each creation was the product of many, and possibly countless individuals dispersed in space and time. In such a "thousandfold" (*tausendgliedriger*) process, verbal exchange was not capable of organizing the flow of commodities but needed symbolic goods that helped to describe values and quantities (Schäffle, 1873c, pp. 9–10, 1873a, p. 56).

It is only at this point that Schäffle, in his third edition of the *Social System* (Schäffle, 1873a, 1873b), began to take over arguments from psychologists, biologists, and natural philosophers. From German natural philosopher Rudolf Hermann Lotze (1858, p. 254), one of the most read philosophers at the time, Schäffle (1873a, pp. 10–11) learned that the defining character of human "culture" was that it profited from historical groundwork (*Vorarbeit*) or accumulated capital in the shape of knowledge and education. Accumulated knowledge was a sign that society was much more highly developed than the "undeveloped souls of the animal lives". Lotze (1858, p. 210) also claimed that human beings possessed a soul, but one that stood in a "mechanistic interplay with the body". By highlighting a mechanistic interplay, Lotze not only opposed vitalist explanations of the soul by German idealists but also attacked purely materialistic explanations of the human psyche. Like his friend Gustav Theodor Fechner whom we will encounter in the next chapter, Lotze stood for a non-reductive materialism in which spirit and matter of the body stood in an interplay, but neither could be reduced to one or the other.[52]

Such propositions about the interplay between spirit and matter fit Schäffle's view that symbolic goods were the materialistic expression of inner ideas. Symbolic goods proved to Schäffle (1873a, p. VI) that society as the highest of all organisms was still capable of spiritual refinement (*Vervollkommnung*):

[52] On Lotze's materialism, see Beiser (2013, pp. 193–281). On Lotze's popularity in the 19th century, see Woodward (2015).

> "In human society as the highest and richest organism, the organically structured accumulation of wealth and education attains the highest degree, it increases to a wealth of ideal and real goods, to a magnificent apparatus of external and personal goods."[53]

Schäffle (1873b, p. 101) made further attempts to apply biological concepts in his research and claimed that organizations, be it families, firms, cooperatives, or other associations progressed from a "vague embryonal shape" to the "highest unfolded shapes". The manifold shapes of economic collectives "followed each other historically", but also existed "side by side" in a highly developed society—the family did not disappear with the development of new forms of associations like businesses and cooperatives.[54] From his reading of German botanist Hermann Karsten (1817-1908), Schäffle (1873a, p. 24) suggested that some forms like guilds and families developed like "crystals", because they closed themselves off to the exterior, while other forms like free associations, and cooperatives grew like cells because they were expansive. Finally, from German chemist and economist Karl Marlo (1810-1865), Schäffle (1873a, p. 118) learned that the "great variety of the world of plants results from the fact that individual plants limit each other in their propagation".[55]

Yet at this point of his writing, Schäffle's borrowings from psychologists and biologists remained unprocessed. Schäffle knew van Krieken's work and the surrounding debate about the term "organism" that also touched upon whether transferring biological analogies to the social sciences was valid. In a paragraph on economic methodology, Schäffle (1873a, p. 14) even explained that the "anatomic-physiological simile" was the "worst kind of a seemingly empirical method". In Schäffle's eyes, state theorists like Swiss jurist Johann Kaspar Bluntschli (1808-1881), and to some degree Lorenz von Stein were guilty of comparing the state with the human body too explicitly. Bluntschli (1844, pp. 189–190, 225), for example, compared the human organs to the state organs and likened

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[53] In the German original, Schäffle (1873a, p. 11) stated that: "*In der menschlichen Gesellschaft als dem höchsten und reichst gegliederten Organismus erlangt die organisch gegliederte Anhäufung von Vermögen und von Bildung den höchsten Grad, sie steigert sich zum Reichthum an Ideal- und an Realgütern, zu großartigen Apparaten äußerer und persönlicher Güterausstattung*".

[54] There are no references to this passage, but it is likely that Schäffle had been reading Ernst Haeckel's (1866a) *General Morphology*, to which he referred in his *Structure and Life*.

[55] Karl Marlo is a pseudonym for Karl Georg Winkelblech (1810-1865), who was a professor of economics at the University of Kassel. Marlo published extensively on the division of labor, guilds, and cooperatives, but also on botany and chemistry. See Biermann (1909).

the ears (*Gehör*) to the public institutions of the state body (*Staatskörper*). Memory (*Gedächtnis*) and the sense of smell (*Geruch*) were the ministry of the interior and of the exterior.[56]

Schäffle (1873a, p. 14) maintained that the social sciences could not attain any results when trying to explain "the highest organism, society, in terms of analogous processes of much lower organisms".[57] Hence, he left Lotze's (1851) *General Physiology* untouched, despite Roscher's suggestions to investigate it more closely, and placed his hopes in the further advancement of statistics. Two years later, however, Schäffle presented *Structure and Life*, in which he did exactly what he now sharply condemned. Despite his refutation of biological analogies, Schäffle seemed to have been fascinated by the possibility to use biological insights in the social sciences as is evidenced by his brief insertions of biological and psychological concepts. More important to understand Schäffle's path towards using biological analogies in *Structure and Life* was that the symbolic goods, despite being its own category next to consumer products, means of production, and public goods, remained odd. Their prices were low or inexistent as they had only little subjective value and were easily reproducible. Yet, they possessed a fundamental function for the unfolding of society into a great variety.

2.1.3 A great variety in nature and society

Only months after the publication of the third edition of his *Social System*, Schäffle (1873d) reviewed two works by economists who sought to emphasize the "similarity between nature and human society". U.S. economist Henry Charles Carey (1793-1879) and Baltic German sociologist Paul von Lilienfeld (1829-1903) had both claimed that the shared characteristic of the natural and the social was their "variety".

[56] Schäffle only accused Lorenz von Stein of inadequately comparing the human body to the economy in later years (Schäffle, 1903a, p. 299).

[57] For the sake of clarification, I provide here the German original: "*In der That kann keine Disciplin der Gesellschaftswissenschaft Ergebnisse erlangen, wenn sie glaubt, dadurch Naturwissenschaft zu werden, daß sie den höchsten Organismus, die Gesellschaft, nach analogen Vorgängen viel tiefer stehender beseelter Organismen erklären, d. h. das Höhere durch das Tiefere, das majus durch das minus ausdeuten will*".

Carey's opened his work *Unity of Law* by explaining that "variety is unity in perfection".[58] From his reading of Herbert Spencer, Carey (1872, p. XV) learned that in the "inorganic world the variety in the manifestations of force is but very small", but reached an "almost infinite variety" in "both the vegetable and animal world, from the bramble to the oak, and from the ascidian to the horse, the dog, and the almost-speaking elephant". Carey (1872, p. 95) pointed to Goethe's finding that "the more imperfect a being is […] the more do its individual parts resemble each other, and the more do the parts resemble the whole. The more perfect a being, the more dissimilar are the parts."

This observation was "as true of societies as it is of the plants and animals". Carey's insights from Goethe were probably nothing new for Schäffle, for he could read in Lotze's *Microcosm* (1858, pp. 67–99) that the higher the variety in an animal, the higher developed it was.[59] Schäffle (1873d, p. 236) thought that Carey was not making much use of Goethe's ideas other than using them to justify "tariffs", and a "variety of cultural centers". In Schäffle's eyes, it was merely Carey's "American-federalist antagonism against the English world domination" that came to the fore in his emphasis on variety.

In contrast, Lilienfeld, in his *Human Society as a Real Organism* (*Die menschliche Gesellschaft als realer Organismus*), worked with "scholastic rigor" in order to prove the "real analogy" between human society and the "structures" of the organic and inorganic world (Schäffle, 1873d, p. 236).[60] From Darwin, Lilienfeld (1873, p. 25) knew that man was the "last chain" of the organic world and

[58] There is not much room here to discuss Carey's economics. It is clear, however, that Carey was in the second half of the 19th century a strong opponent of what he called the "Ricardo-Malthusian doctrine" and its worshipping of reductionism (Carey, 1858, p. 36). Carey's (1872) opening quote "Variety is unity in perfection" is a direct reference to Swiss-American geographer Arnold Henri Guyot (1807-1884), an author who emphasized the "diversification" in "organized nature" (Guyot, 1849, pp. 74–80, 89–93). Another, still unexplored, inspiration for Carey's interest in biology, is German economist Eugen Dühring (1833-1921), to whom Carey's *Unity of Law* is dedicated. Dühring, with whom Carey frequently corresponded, is today mostly remembered because of Friedrich Engels' vicious attacks in his *Anti-Dühring* (1878).

[59] Moreover, Schäffle (1873d, pp. 301–302) argued that Carey's emphasis on the individual as a member (*Glied*) of a community was not a novel idea as already Aristotle had considered society as a (non-allegorical) organism in which the individual was a "member of society".

[60] As Lilienfeld's book was published under the acronym "P. L.", Schäffle (1873d, p. 233) first thought its author to be the "deep and independent thinker Lavergne-Peguilhen". German sociologist and state scientist Moritz von Lavergne-Peguilhen (1801-1870) could indeed have been the author. Only a few years prior, Lavergne-Peguilhen (1868, 1870) published a two-volume book called *The Conservative Social Theory* (*Die conservative Sociallehre*), divided into *Competition and the Structure of States* (*Die Concurrenz und die Gliederung der Staaten*) and the *Organic Theory of the State* (*Die organische Staatslehre*). On Lavergne-Peguilhen and his work, see Stender (2005).

he wondered if this chain could be extended to “social organic groups”. From his reading of Spencer and Haeckel, Lilienfeld claimed that the “essential difference” between the inorganic and the organic nature was that latter possessed “a more vivid and manifold interplay”. Society was only relatively different to biological organisms as it was the “highest among all existing organisms” and therefore the most manifold (Lilienfeld, 1873, pp. 57, 122).

Because society was a mere continuation of nature, Lilienfeld claimed that the same (positive) methods used to understand natural organisms could be applied to the social world (Schäffle, 1873d, pp. 233–234).[61] And like biologists, sociologists should focus on gauging the interrelationships between parts, instead of searching for the origin of life (Schäffle, 1873d, pp. 240–241). From popular German physician Hermann Klencke (1813-1881), Lilienfeld (1873, pp. 51, 291) took up the idea that the only difference between natural and social organisms was that the latter was a spiritual organism, while the former was connected through matter. That cells, or individuals, of the social organism connected through spirit, was a sign of a higher development, a triumph of purpose over causality and of spirit over matter. The social organism exercised greater control over matter than natural organisms by processing food and accumulating stocks. Society “capitalized” material in the form of buildings, storages, and tools (Schäffle, 1873d, pp. 239–244). Then again, human society was, like any other “body of nature” (*Naturkörper*), a “majority united into a whole by the striving of all parts to a common center, animated by a common will” (Schäffle, 1873d, p. 239).

Lilienfeld depicted the economic process as a metabolism that distributed its products to the cells through veins that were similar to the canals and roads—the immovable capital of society (Schäffle, 1873d, pp. 250–255). From the popular *The Wonders of the invisible World revealed through the microscope* (*Die Wunder der unsichtbaren Welt enthüllt durch das Mikroskop*) by German biologist Gustav Jäger (1832-1917), Lilienfeld (1873, pp. 175–176) knew that higher organisms possessed more “intercellular substance” than the lower ones. The fact that individuals of the social organism accumulated an ever richer and manifold collection of materials, proved that society was the highest of all organisms. Lilienfeld (1873, pp. 171–173) also learned from Jäger (1867, pp. 24–27) that organisms were a “network of cells” (*Zellennetze*). Individual cells connected and “communicated” through the “fine threads” within the intercellular substance that seemed like the “network of telegraph lines” depicted in Figure 7. That individuals in the social organism were also

[61] Lilienfeld (1873, p. 300) used the term “real analogy” because he considered society to be a “real organism”—a “continuation of natural organisms” (*Fortsetzung der Naturorganismen*). U.S. botanist and sociologist Lester Frank Ward (1841-1913) took issue with the term and argued that Lilienfeld had better used “homology”: the anatomical similarity irrespective of function (Ward, 1897, p. 260).

communicating through telegraph lines that interconnected every individual was further proof of the "real analogy" between the organic and the social. Lastly, from Emanuel Hartmann's *Philosophy of the Unconscious* (1869), Lilienfeld (1873, pp. 185–186) knew that the nervous system consisted of organs of greater or lower independence. Lilienfeld likened these organs to associations (*Vereine*) of individuals that were set into a harmonic vibration.

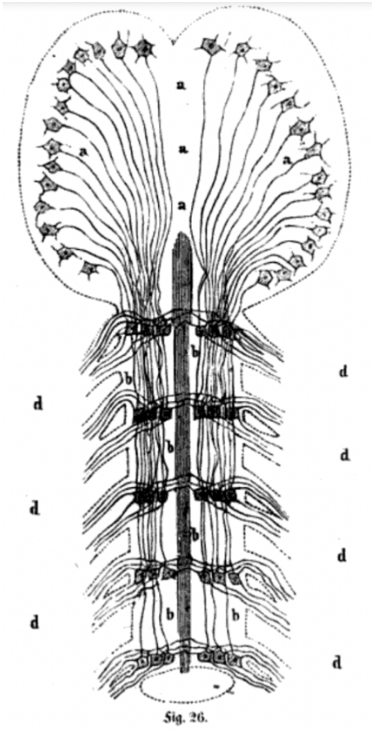

Figure 7: The "network of telegraphs lines" (*Telegraphennetz*) in an animal body, with the nervous threads in the brain (a), the spinal cord (b), and the limbs (d). Source: Jäger (1867, p. 25).

Schäffle (1873d, p. 304) questioned whether there were benefits to substitute social terms like "person", "state", "capital", and "community" with the biological terms "social nerve cell", "organism", "intercellular substance" and "organ". There was danger, argued Schäffle (1873d, pp. 303–304), that Lilienfeld succumbed to "materialistic allegory".[62] Particularly bothersome for Schäffle (1873d, p. 293) was Lilienfeld's claim that nothing else than real analogy was needed in the social sciences. Instead, Schäffle thought that the "real analogy from the lower to the highest organism does not single-handedly fill the whole range of inductive research". Despite his reservations,

[62] Schäffle (1873d, pp. 300–302) argued that Lilienfeld had "exaggerated expectations from the method of real analogy". In contrast, for the "historical schools in politics, economics, and jurisprudence" the idea of a "moral organism" that made up society "was not merely allegorical" but had to be understood as a "unity of diverse but organically harmonizing moral professions" and as an "indivisible moral community".

Schäffle added that he was eagerly awaiting Lilienfeld's announced second volume. Before Lilienfeld could complete it, however, Schäffle had already published the first volume of his *Structure and Life*.

2.2 The Five Layers of Tissue

In early 1875, Schäffle published *Structure and Life of the Social Body*. The book was a major methodological turnaround as Schäffle now availed himself of explicit biological analogies in his investigation of society. Schäffle decided to embrace biological concepts, images, and theories in his magnum opus because of Lilienfeld's analogies to the nervous system. In Lilienfeld, Schäffle (1873d, p. 297) read that the "connection between the cells in an organism in space and time was not a conscious circulation of molecules, but a traffic, transport, and storage of material goods." Lilienfeld (1873, p. 197) had not only suggested depicting communication in society as a nervous system but had also claimed that with "progressive development of humanity […] the means of communicating thoughts and will become more manifold". The invention of the printing press allowed communication throughout the body and facilitated the accumulation of imponderable spiritual forces. Lilienfeld (1873, p. 198) explained that in the social organism, thoughts, feelings, opinions and beliefs obtained "external expressions" through movements, symbols (*Zeichen*), words, art, writing, and print, distributed among different groups and organs.

Schäffle (1873d, p. 297) could therefore directly tie his research on symbolic goods to Lilienfeld's claims about the existence of a social nervous tissue. What Lilienfeld had seen as "indirect nerve reflexes" of society were the symbolic goods that individuals used in society for communication. In *Structure and Life*, Schäffle, therefore, made it his main claim that symbolic goods were the material substrate of the social nervous system. Seeing symbolic goods as part of a nervous system made them lose their "oddity" because they fulfilled the important functions of establishing communication, storing information, and tying society together.

Yet, to fit the idea of a social nervous system into his previous analysis of the economic system, Schäffle's distinction between the public and the private economy was not sufficient anymore. Remember that Schäffle had argued in 1867 that the two mainsprings of private and common interest created two different kinds of organisms, or systems: the private economy that was home to production, circulation, and consumption, and the public economy, home to associations, groups, and collectives. Schäffle did not visualize the two systems, but over the course of his *Social System*, he developed the idea that the two economies ran "parallel" as "tissues" (*Gewebe*).[63]

Individuals were part of the private tissue where they acted out of self-interest. By establishing businesses, individuals were like "floating bodies" (*schwebende Körper*) moving toward profit opportunities and freely attracted and repulsed labor and capital. As laborers, individuals sought out opportunities to make more income by switching between businesses (Schäffle, 1873b, p. 31) Nevertheless, Schäffle (1873a, p. 14) asserted that the private sphere was an "intertwined colorful tissue" (*verschlungenes buntes Gewebe*) due to increasing traffic and the use of money and credit. The very same individuals who acted within the private tissue were tied to families, associations, and the state. They created a public tissue that was of a different kind than the private one.

As I indicated before, Schäffle could not separate the two tissues entirely. Schäffle remarked that public collectives like the family, the church, or cooperatives, were dominated by the forces of the private sphere: they needed to calculate cost and benefit in their households. I believe that the final blow to Schäffle's private and public tissue was afforded by his attempts to integrate the social nervous system into his idea of two tissues of the economic system. Symbolic goods circulated and accumulated in the private sphere, for example in businesses, but also in the public sphere, for example in the organization of associations and the state.

In consequence, Schäffle dissolved his strict distinction of the private and public economy and re-arranged his whole classification of society. Without the distinction between private and public economy, however, Schäffle lost the two categories that he had previously established for the different types of commodities in the economy. What to do with the consumer goods, machines, and labor force that were previously located in the private economy? What about public institutions like museums and libraries, what about the streets and the transportation systems of the public economy?

In *Structure and Life*, Schäffle therefore proposed to work with five basic tissues (*Grundgewebe*) in which all commodities and institutions that previously belonged to the private and public sphere could be classified. Schäffle only mentally evoked the five tissues and did not provide any graphical representation. I think, however, that making the tissues visible is necessary to be able to follow

[63] In the original, Schäffle (1873b, p. 103) indicated that: "*Durch diese vielseitige in immer freieren Formen erfolgende, der individuellen Freiheit parallel gehende Verflechtung in das gesellschaftliche und volksw. Gewebe gehört Jeder immer mehr dem Ganzen an*".

Schäffle's arguments.[64] I believe that Schäffle thought about the tissues of the social body in terms of "layers" (*Schichten*) or "planes" (*Flächen*). This is evidenced by his use of the two terms when describing the five tissues and by his later reference to topographic anatomy.[65] Schäffle's contemporary topographic anatomists sought to visualize how different elements, tissues, and organs of the human body lay next to and on top of each other. Early visualizations of topographic anatomy can be dated to the late 1860s, but the most vivid ones can be found in German anatomist Nikolaus Rüdinger's (1832-1896) colored photographs of 1879, one of which I reproduced in Figure 8.[66]

[64] When prompted to think of interplay within a human body, one is likely to think about organs next to each other, similar to how Roscher (1854, p. 18) claimed that interconnection within an organism has to be understood as interaction (*Wechselwirkung*) between the respiratory system and the spinal cord. One has to suppress such mental imagery because they suggest some sort of organogram with different parts and possibly in a hierarchical order. It is even less helpful to think of an abstract "whole made up of interdependent parts" as has been suggested by Spiegel (1983, p. 421) in his description of German economic thought, because it gives too many degrees of freedom about how to imagine the parts and their interdependencies.

[65] Schäffle (1875, p. 799) referred to "tissue layers" (*Gewebeschichten*) once. In another paragraph, Schäffle (1875, p. 837) indicated that the social body consists of "layers and zones" (*Lagen, Schichten, Betriebszonen*). When introducing the tissue analogy, Schäffle (1875, pp. 37–38) referred to "planes" (Flächen). Most of the time, Schäffle (1875, p. 216) used the term layers to refer to social classes like the "proletarian classes" (*die proletarisierten Volksschichten*), or "privileged classes" (*bevorzugte Volksschichten*). What complicates things is that Schäffle also thought about layers, or hierarchies, within the individual tissues, especially within the nervous tissue. Symbols, for example, were "exchanged between the different layers of spiritual work" (Schäffle, 1875, p. 399). In a later article, Schäffle (1878d, p. 48) referred to "topographic anatomy" (*topographische Anatomie*) to describe his investigation of social tissues.

[66] Other (topographical) anatomists like J. F. Schedler (1860, p. 24), and Carl Heitzmann (1875, pp. 157, 160–161), also referred to "layers" (*Schichten*) and "planes" (*Flächen*) to describe the combinations of cells.

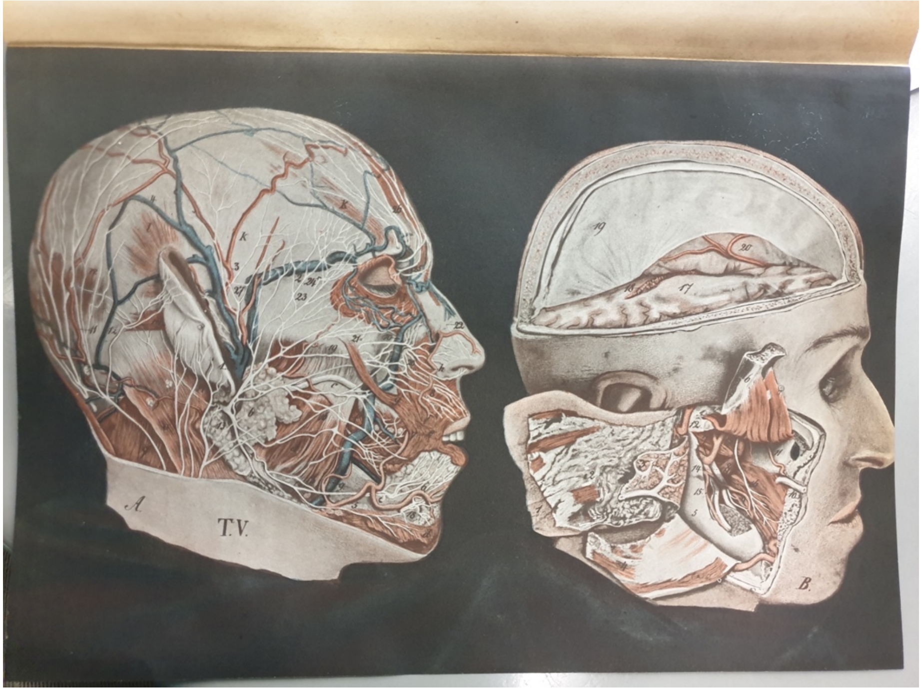

Figure 8: Rüdinger's Table V in which he reveals how different "tissues" (*Gewebe*), or "surfaces" (*Flächen*) of the human head lie on top of each other. Source: Rüdinger (1879).

It is likely that Schäffle visualized the tissues stacked on top of each other similar to how Rüdinger (1879) folded over the different layers of tissues that he dissected from the human head (right-hand side in Figure 8). In Figure 9, I created a stacked 'tissue model' consisting of the five basic tissues that Schäffle took over from Rudolf Virchow's *Cellular Pathology* (1871).[67] Yet, instead of merging the five tissues together, I visualized the tissues on top of each other as planes, similar to what modern anatomists call an 'exploded view' of the human body. [68]

[67] Starting from the bottom, the five tissues are the bone tissue (Virchow, 1871, p. 110), the epidermal tissue (Virchow, 1871, p. 32), the vascular tissue (Virchow, 1871, p. 59), the muscle tissue (Virchow, 1871, p. 51), and the nervous tissue (Virchow, 1871, p. 312). I turned the individual tissues into a layered model and modified them to attain the explosive view. See Appendix 1 for the original (non-warped) images.

[68] One can also find evidence in *Structure and Life* that Schäffle mentally visualized the planes to be stacked on top of each other. Schäffle (1875, p. 66) argued, for example, that the "collective will (of the authorities)", which was located in the nervous tissue, gave orders to the "lower tissues of mechanical power" like the muscle tissue. The "institutions of settlement and construction" (*Niederlassungs- und Bauwesen*)—the bone tissue—was the "lowermost basis of all social organizations" (1875, p. 78), and the "lowest cellular basic requirement of social health" (Schäffle, 1875, p. 233).

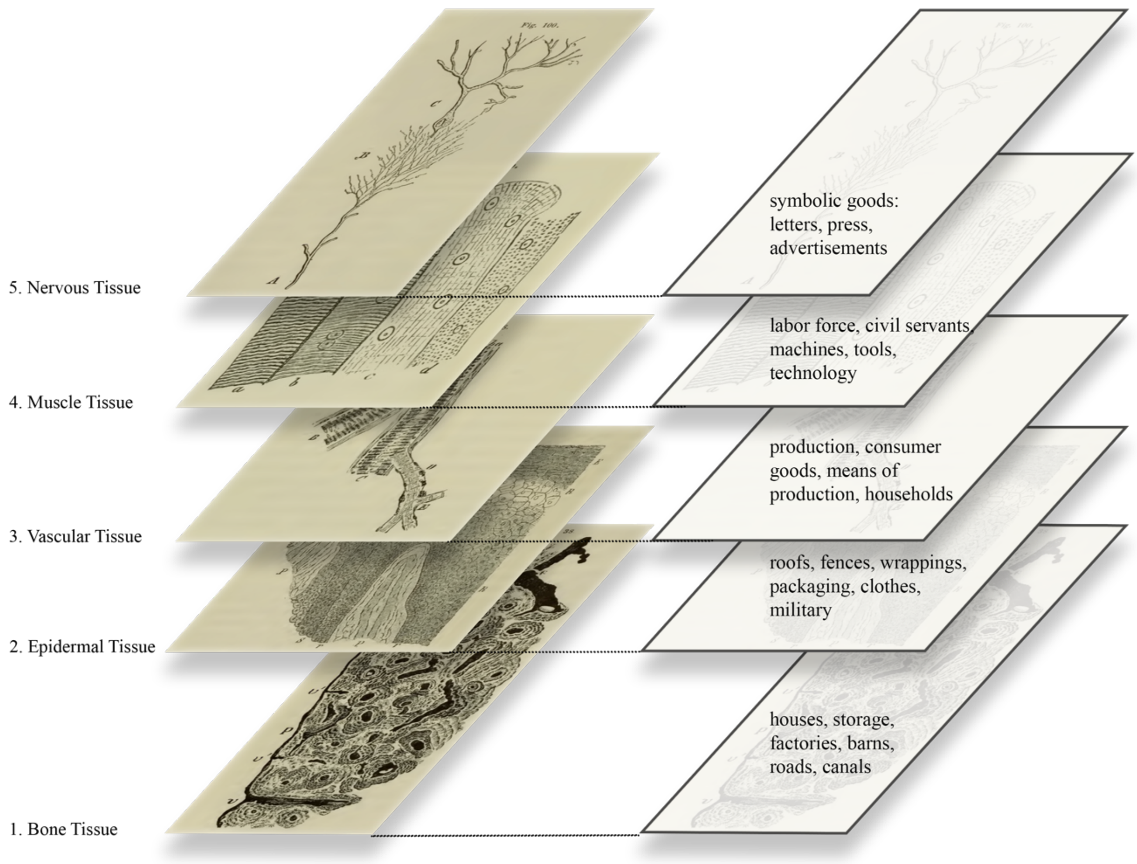

Figure 9: The 'tissue model'. My interpretation of how Schäffle imagined the social body to consist of five layered tissues. The left-hand side depicts the five tissues of Virchow's (1871) *Cellular Pathology* that Schäffle referred to. The right-hand side shows how Schäffle interpreted the five tissues as "social tissues".

Schäffle (1875, p. 272) argued that in the same way as Virchow (1871) "dissected" (*zergliedern*) the tissues of the human body according to their functions, he could separate social phenomena, that is, the institutions and commodities, based on their five functions in society.[69]

1. Starting from the bottom in Figure 9, Schäffle (1875, pp. 326–329) claimed that the first base tissue (*Grundgewebe*) was the "bone tissue" (*Skelett, Knochen- und Knorpelgewebe*) with the function of "tying society to the soil". It consisted of houses, barns, factories, pubs, schools, public buildings, churches, and temples. Furthermore, streets, bridges, telegraph lines, railway tracks, canals, walls, and even "mobile parts" like tables and chairs were part of it. It was a patchwork of private and public supporting organs (*Stützorgane*).

[69] Schäffle (1875, p. 37) noted that he quoted from the third edition of Virchow's *Cellular Pathology* (1862). However, his direct quotes from Virchow cannot be found in the third edition of 1862, but rather in the fourth edition of 1871.

2. The second layer was the epidermal- and epithelial tissue (*Epidermal- und Epithelialgewebe*) and had the function of protection (1875, pp. 329–331). In this broad category, Schäffle included roofs, protective walls, wrappings, packaging, cashiers, folders and briefcases, armored ships, and other objects that provided protection against nature and individuals. It included firefighters, the military, and any institution for the inner or external protection of wealth, body, health, and morals (*sittliche Bewahrung*).
3. The third layer consisted of the metabolism tissue (*Stoffwechselgewebe*), or vascular tissue (*Gefässgewebe*). Its function was the nutrition of the social body (Schäffle, 1875, pp. 331–345).[70] Following Virchow (1871, p. 101), Schäffle claimed that the tissue consisted of the exterior and interior metabolism. The exterior metabolism started with the primary sector of production (*Urproduktion*) and ended with the disposal of waste. Between those two extremes Schäffle located the inner metabolism which, again in analogy to the human body, was divided into a progressive and regressive phase. In the progressive phase, commodities were produced by the industry and transported to family households, institutions and industry. In the regressive phase, or "tissue metabolism" (*geweblicher Stoffwechsel*), commodities were consumed within the households (Schäffle, 1875, p. 799). Schäffle did not distinguish between the circulation of commodities and the circulation of money. Income thus circulated within the same "capillary network". Consequently, the heart had an ambiguous role of pumping commodities, but also income through the social body. Banks, insurance providers and credit institutions were also part of the metabolism tissue. Schäffle remarked that he wanted to illuminate the interrelationship between the income and the commodity circuit in the second volume of *Structure and Life*, although he never did this. The ambiguity of Schäffle's economic metabolism remained an issue throughout the three editions of *Structure and Life*.[71] Moreover, Schäffle left out many details of the human metabolism and did not discuss the functions of the heart, arteries, veins, lungs, or the digestive system.
4. With the fourth layer, Schäffle (1875, pp. 345–351) depicted the muscle tissue (*Muskelgewebe*) which had the function of "executing work". It consisted of the labor force, but also the means of production (*Werkmittel*), tools, and machines—everything that was

[70] The term "*Gefässgewebe*" was coined by Schäffle himself. Virchow (1871) only used the term "*Gefässe*".

[71] As we will see in Chapter 7, a more fruitful way to think about the commodity and income stream in an economy is to imagine them as the double blood circuit of the human body. Wagemann committed to the actual anatomy of the human blood circuit by depicting income and commodities as circulating within two interconnected circuits. Schäffle never invoked the image of two circuits in his work.

"creation and doing" (*Schaffen und Machen*).[72] Like in human anatomy, Schäffle divided the muscle tissue into the smooth involuntary muscles (*glatter Muskel*) and striated muscles (*quergestreifte Muskulatur*) under voluntary control of the nervous system. Involuntary muscles were mostly found in non-public businesses (*Geschäfte, Unternehmen*) within the digestive organs of the vascular tissue (the production of commodities). Striated muscles were the force (*Macht*) of control and command in the public sphere (police, and civil servants).

5. Finally, the fifth layer was equal to the nervous tissue (*Nervengewebe*) and had the function of spiritual work (*geistige Leistung*) and communication (Schäffle, 1875, pp. 351–380). It was the "spiritual guidance" that permeated every layer with accounting, planning, consulting, and controlling. As we will see in more detail later, the nervous system was also divided into a voluntary (conscious) and involuntary (unconscious) system. In both the voluntary and involuntary nervous system, communication was established with the help of the material expressions of ideas—the symbolic goods. The tissue consisted of nerve cells (individuals) and nerve fibers that interconnected every individual cell. Most nerve cells "bundled" into "social ganglia": individuals that created groups and organizations. Within the nervous system, the cells were the active part, while fibers were passive and consisted of the "institutions of communication" (*Anstalten der Ideenmittheilung, Kommunicationsanstalten*) that allowed the transfer and accumulation of symbols. To these institutions belonged language, traditions, libraries, museums, concert venues, and most importantly, the press. These institutions transferred and stored all the "real symbols": the symbolic goods like letters, prints, storage vouchers, models, accounting books, literature, plans, and art.

To take Rudolf Virchow's (1871) tissue classifications for the task of dissecting society was not a coincidence. The German histologist was not only a highly popular cell theorist and politician at the time, but Virchow also made it his main claim that organs were compiled from basic tissues. Virchow explained that prior to him, biologists like French anatomist Xavier Bichat (1771-1802) had classified the human body into 21 different tissues. These classifications were unnecessary manifold and fewer types of tissue were enough to describe the accumulation of cells. Many of the tissues described by Bichat were in fact combinations of tissues that should rather be called organs—the combinations of several tissues into one entity. Instead of 21, Virchow distinguished between three broad categories of "cell tissue" (cells bordering cells, for example the skin tissue), "connective tissue" (cells with

[72] Schäffle (1875, p. 383) also included "technology of schooling" (*Technik des Schulwesens*) or "administrative technology" (*Verwaltungstechnik*) in the muscle tissue, which is difficult to reconcile with his claim that education and administration were part of the social nervous tissue.

intercellular substances, for example the bone tissue) and "tissue with specific formations" like nervous, muscle, and vascular tissues (mainly found in animal bodies). This classification, argued Virchow (1871, p. 62) was based on the functions of the tissues in the body, and not based on "age", "lifespan" (*Lebensdauer*), or "kinship" (*Verwandtschaft*).[73]

From Virchow's three categories, Schäffle extracted the five basic tissues described above and claimed that they had "social analogues". In the social body, they consisted of a "substance" made of individuals and commodities (*Personal- und Gütersubstanz*) and compiled any social organization from the family household to the state (Schäffle, 1875, p. 323). The "mainspring", or "driving force", argument that Schäffle used to separate society into a private and public layer, now gave way to a functionalist thinking. The private and common interest was active in all the functional layers of society in different gradations. There existed private and public housing (firms, but also libraries), and protection was predominantly organized by the common interest (police, social welfare), but also private firms organized packaging and protective walls. The progressive metabolism (production and distribution of commodities) was the realm of private interest. The regressive metabolism, however, was also guided by the common interest as food was distributed within the family. The labor force and machines could be found in private firms, but also among the civil services. And finally, symbolic goods circulated and accumulated in the public (education, state organization) and the private spheres (bills of exchange, storage vouchers). What held society together were mainly three tissues: the streets and roads, the metabolism, and the nervous tissue supported by various "connective tissues" (*Bindegewebe*) like language, religion, nationality, occupation, and the family (Schäffle, 1875, pp. 194, 288–323).[74]

Comparing Schäffle's classification in *Structure and Life* with his previous work seems at first as if the tissue analogy was superfluous. Schäffle merely attributed commodities and institutions that he had described in his earlier work to each of the tissue categories. Already in his *General Economics*, Schäffle (1861, pp. 81, 171–172, 243) remarked that there existed "economic protections" like protective walls, and lightning rods. He also mentioned that the economy was a metabolism (*Stoffwechsel*) from income to capital and highlighted the importance of the means of communication

[73] Virchow (1871, p. 62) also offered different classifications of the tissues based on the life span of elements, time of formation and death of tissues, or relationship and descent.

[74] In contrast, Schäffle (1875, p. 797) argued that the protective tissue was not a coherent system: "*Doch sind die Schuzgewebe auch im socialen Körper so wenig als im organischen Leibe Ein Einziges zusammenhängendes System. Je nach dem Ort und der Art der Gefahr werden besondere schüzende Veranstaltungen getroffen, von der Verwahrung einzelner Güter bis zum Grenzvertheidigungssystem*".

like the newspapers, the mail, and telegraphs. He did not discover that the economic realm consisted of a variety of commodities because of the tissue analogy. Hence, one is at first inclined to accept Gustav Schmoller's (1888a, p. 230) verdict about *Structure and Life* in which he reproached Schäffle for replacing economic terms with biological ones, which often appeared "as an end in itself". Schmoller saw Schäffle merely arranging "old material into new systematic orders". However, re-ordering, or reshuffling was not what Schäffle intended with the analogy in the first place. How did Schäffle therefore justify the tissue analogy?

2.2.1 Dissecting society

In the introduction of *Structure and Life*, Schäffle (1875, p. V–VI) presented his work as a "systematic dissection" (*systematische Zergliederung*) of the main institutions of society. The impulse to do so was his realization that symbolic goods possessed a function in society separate from consumer goods. In a later defense of the tissue analogy, Schäffle (1878c) pointed out that this "dissection" was a systematic analysis of all the "forms and functions" (*Form und Functionserscheinungen*) of the social body.[75] Schäffle seemed to have gained confidence that symbolic goods had a function in society from the nervous tissue analogy and from there expanded his investigation of the functions of buildings, consumer goods, and protective commodities.[76] But why did he stick to the tissue analogy and did not discard it after he had established the finding that society could be dissected into five layers?

As indicated before, Schäffle knew very well of the resistance against using biological insights in the social sciences. Part of the controversy about biological analogies and the term organism was even fought out in his journal *ZgS* while he was writing on *Structure and Life*.[77] One might think that Schäffle could have suppressed the analogies to gain more acceptance amongst contemporary social scientists. However, Schäffle argued that he needed the tissue analogy in order to investigate the interrelationships (*Correlationen*) between social institutions—the five tissues. The goal in science, argued Schäffle (1878c, pp. 505–506), was to "advance from the known to the unknown". In the social body, the "interrelationships between different social institutions and their systematic unity"

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[75] Despite his critical stance, von Neumann-Spallart (1878, p. 16) accurately described how Schäffle was "dissecting [society] along the lines of analogies" (*er zergliederte in Analogien verlaufend*).

[76] See also Schäffle's (1898, p. 753) later explanation that he started to analyze the economics of the "social institutions with spiritual impact" with the help of biological analogies, which led him to attempt an "unified systematization of all social phenomena".

[77] See Otto Gierke's (1874) defense of the "organic state theory" in which he was skeptical of using explicit biological analogies..

were unknown. In the "animal body", however, the "interrelationships between organs" was known due to biologists' efforts in "histology and physiology".

How Schäffle worked out interrelationships between social institutions will become clear in the next section and in Chapter 3, where I will also detail why thinking in tissues had advantages over thinking in the two mainsprings (common interest and private interest). Here, I want to emphasize first how important the image of layered tissues was. Without it, claimed Schäffle, he could not have proceeded to investigate interrelationships in the way he did in *Structure and Life*. Schäffle (1903a, p. 299) argued that through the tissue analogy he was finally able to *see* society, or in his words, the analogy provided him with "visual power" (*Anschauungskraft*) and "pictorial representation" (*Anschaulichkeit*). The social whole, by which Schäffle (1878c, p. 481) meant the all-encompassing human civilization, was "in development and unfinished". As a result, it was difficult for the social scientist "to put the whole above the parts". By contrast, a natural organism like the human body was "completed" and could be grasped as a whole, because of the work of biologists who had already dissected the organism into its parts. Social scientists could therefore use the "[biological] analogy as a powerful means to view the whole". The tissue model attained epistemological value, because it reduced the complexity of the growing and unfinished social body into a whole that consisted of five visible tissues.

Schäffle (1878c, p. 506) thought that social scientists were justified to borrow from biology because biologists had "barely resisted" the urge to use social analogies. Henri Milne-Edwards (1800-1885) and Ernst Haeckel (1834-1919) used the idea of the division of labor to explain how organisms formed. Darwin referred to Malthus in his theory of evolution and struggle for existence. Schäffle wondered why social scientists could not do the same by "exploiting biological knowledge for a systematic dissection [*Zergliederung*] of society!?". Any opposition against the use of "analogies of organic biology" to analyze the "manifestations of form and function in the social body" was therefore unfounded.

In stark contrast to his previous work, Schäffle (1875, p. VIII) now assured his readers that a "full reference to biological analogies offers great charms". With reference to Goethe, Schäffle avowed his faith that "all living, from the plant cell to the social body was a multitude (*Mehrheit*)". Like any organism, the more imperfect the social body, the more its individual parts resemble each other, and the more the parts resembled the whole. The more perfect a being, the more dissimilar and subordinated its parts.[78] Schäffle's fundamental belief that society was the most manifold of all organism was much like those of Carey, Herbert Spencer (1820-1903) and Lilienfeld. Nevertheless, Schäffle (1875, p. V) felt the need to emphasize that he was no follower of Lilienfeld, Spencer and neither of August Comte (1798-1857). Lilienfeld's claim that society was a mere continuation of nature was too strong for Schäffle.[79] Instead, society was a body of "spiritual nature" (*geistiger Natur*), connected through the spiritual ties of symbolic goods (Schäffle, 1875, p. 33). In Schäffle's eyes, Comte and Spencer were predominantly occupied with "social evolution", which was only a secondary concern for him.[80]

Schäffle (1875, pp. 15–20) agreed with Spencer's "first principles" that matter concentrated, differentiated, and reintegrated in the whole universe and that the same principles could be observed

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[78] Schäffle (1875, p. VIII) did not quote from Goethe directly, but most likely from Haeckel's (1866a) *Morphology*: "*Je unvollkommener das Geschöpf ist, desto mehr sind diese Theile einander gleich oder ähnlich, und desto mehr gleichen sie dem Ganzen; je vollkommener das Geschöpf wird, desto unähnlicher werden die Theile einander. Je ähnlicher die Theile einander sind, desto weniger sind sie einander subordinirt*".

[79] In is also too strong to claim, like German pastor Ernst Wyneken (1840-1905), that Schäffle believed that the "organic-social" adhered to the "same natural laws" as the organic (Wyneken, 1881, p. 63). As we have already seen and will further witness in the course of this thesis, Schäffle always adapted biological claims and theories to the social and only claimed that the natural laws applied to society with reservations.

[80] In light of the pioneering studies in sociology by Auguste Comte, Schäffle at first seems to be a latecomer. The six volumes of Comte's *Le Cours de philosophie positive* were fully published in 1842. The last tome of his *Système de politique positive* followed in 1854. However, Schäffle did not know these works and incorporated them only shortly before the publication of the first volume of *Structure and Life*. The similarities to Comte are nevertheless striking. Like Comte, Schäffle divided social theory into anatomy, physiology, and development. Comte also argued that in order to understand the complexity of society, one had to investigate the human organism and its nervous system as "the chief seat of the biological interconnection" (Martineau, 1893, p. 80).

in the social organism.[81] However, Schäffle (1875, p. 9) argued that the process of social differentiation (division of labor) was "well-known" already and that economists had long realized that the social whole concentrated, differentiated and integrated. Spencer had therefore accomplished only little with the "general assumption" that society possessed a "higher integration and differentiation than inorganic nature".

For the same reason, Schäffle (1878a, pp. 34–35) later argued that he could neither make use of Haeckel's (1866a) concepts of ontogenesis (the development of an individual organism), nor his phylogenesis (the development of species). Phylogenesis was not applicable to the social, because "society was not the result of the division into species [*Artenspaltung*], but differentiation (division of labor) combined with the establishment of a community [*Gemeinschaftsbildung*]".[82] Even Haeckel's ontogenesis built on "sociology" as it had borrowed its "fundamental image" of the division of labor such that "no yield can be expected from the genetic discussion about organic division of labor".[83]

Instead of entrusting "first principles", Schäffle (1875, p. 9) proposed step-by-step to "dissect [*zerlegen*] the empirical phenomena" until they were "gradually paired back to their simplest components": the cells and the five basic tissues. We will see further below how Schäffle ran into contradictions when defining the cells of the social body which is why I will focus on the five tissues here. The question arises what Schäffle could work out with the tissue analogy and what consequences he drew from committing to a system that classified social phenomena according to

[81] Herbert Spencer (1857, p. 446) learned from "the Germans" that evolution went "from the simple to the complex". By the Germans, Spencer meant Caspar Friedrich Wolff (1734-1794), Johann Wolfgang von Goethe (1749-1832) and Karl Ernst von Baer (1792-1876). Spencer claimed that the "progress which individual organisms display in the course of their evolution" went "from homogeneity to heterogeneity of structure". The first stage of this development was "the appearance of a difference between two parts of substance; or, as the phenomenon is called in physiological language, a differentiation." Accordingly, the development of a seed into a tree, or an ovum into an animal, constituted an advance from homogeneity to heterogeneity of structure. Spencer further advanced these ideas in his essay *The Social Organism* (1860/1891) and in his *First Principles* (1862). Like Spencer, Schäffle (1875, p. 17) claimed that societies were first mere "aggregates" (*Aggregatszustand*) of sovereigns—an "anarchic pile of folk", or "horde without organization". Societies were still fragmented in feudal times and even more atomized in the competitive period of liberalization. Schäffle believed that only in the large "collective economies" (*Collectivwirthschaften*) of modern times, the divided parts re-integrated again.

[82] As we will see in Chapter 4, Sombart applied the idea of phylogenesis fruitfully to the development of capitalist firms.

[83] Schäffle (1878a, p. 46) argued that transferring the idea of biological "selection" to the social world was similarly unfruitful as Darwin took inspiration from Malthus' population economics to form his ideas on selection. However, Schäffle himself made great use of the term "selection" in the three later volumes of *Structure and Life*.

their functions? We can certainly not be satisfied with Schäffle's assurance that biological analogies were helpful "crutches" in his research to claim that analogies played an epistemological and heuristic role in his economics. In the following, I will inquire into the effect of the tissue analogy on Schäffle's research by investigating three new research paths that the biological analogy opened: social pathologies, a re-interpretation of statistics, and social psychophysics. I will discuss Schäffle's research on social pathologies and his re-interpretation of statistics in the following two sections and will elaborate on his social psychophysics in Chapter 3.

2.2.2 Social pathologies

Referring to Virchow's scientific breakthroughs through the investigation of pathologies of the human body, Schäffle (1875, p. 503) remarked that "biology owes a large share of its progress to pathology". There was hope, argued Schäffle, that the social sciences could be similarly advanced by researching "social pathologies". In his ground-breaking *Cellular Pathology*, Virchow (1871) had shown that most diseases could be explained by disturbances to the cells and their functions. Instead of trying to search for the origin of a disease like purpura (red spots due to bleeding underneath the skin), in the "humors" (*Dyscrasien*), Virchow (1871, p. 164) suggested "localizing" the source of the disease in tissues and organs. With a cell and tissue theory, Virchow (1871, p. 512) could also explain the degeneration of certain tissues and how abnormal developments of their ratios could lead to diseases.[84]

Especially Virchow's suggestion that the ratios (*Verhältnisse*) of tissues played an important role in the development of diseases, raised an interesting line of thought for Schäffle's social pathology. What happened if social tissues degenerated, or when they were unbalanced, or misaligned? Yet, adopting Virchow's pathology proved to be more challenging than Schäffle anticipated. According to Virchow, the cells of the human body were like "high officials, servants and masters, the great and the small"—they were like individuals within a "republic of cells".[85] If Schäffle had fully committed to applying Virchow's insights to the social body, he would have needed to treat the individual members of society as the cells of the social body. Yet, Schäffle was unwilling to locate social pathologies within individuals and deviated from Virchow's suggestion to equate individuals with cells. To circumvent this mismatch, Schäffle combined Virchow's insights with the theory of the plant cell by German botanist Hermann Karsten (1817-1908). In contrast to Virchow, Karsten (1849,

[84] Virchow (1856, pp. 10–11) had long claimed that all biological phenomena can be reduced to the activities of cells—a view that was "mechanistic" and one that opposed the "old vitalists".

[85] I quote here from Wise (1987, p. 397).

p. 363) described the cell as consisting of a "mother" and "daughter" cell, suggesting to Schäffle that the cell could be considered the family of the social body.

In consequence, Schäffle (1875, pp. 264–269, 1878b, pp. 5–10) started his investigation of social pathologies with the diseases of the family, which he located in misguided education and squandering of income.[86] Yet, Schäffle believed that most diseases of the family did not originate from within the family, but resulted from the "degeneration of the economy". The "seats" (*Krankheitssitze*) of these degenerations either lay in the ratios *within* the tissues (Schäffle, 1875, p. 288, 1878a, p. 82), or in the ratios *between* the tissues (Schäffle, 1875, pp. 383–384).

The ideas that Schäffle formed from investigating the ratios *between* tissues provide insightful examples of how the tissue analogy allowed him to draw conclusions about the formation of social pathologies. Schäffle claimed that most social pathologies were in fact atrophies (*Verkümmerungen*), or hypertrophies (*Uebertreibungen*) of "normal" structures. They were not completely new and alien to the morphology and physiology, but rather a "disturbance of the ratios" (*Verhältnißstörungen*). According to Schäffle (1878c, p. 504), pathologies were local, or temporal aberrations, and could be classified into Virchow's (1871) "heterotopia", the presence of a particular tissue at an anatomically non-typical site; "heterometria", an increase or decrease in the size of an organ compared to the rest of the body; or "heterochronia", the difference in the timing of the development of a certain organ.[87]

Schäffle's plan of a complete social pathology along Virchow's classifications remained unfinished, but there were many ways in which he applied the idea of ratios to the investigation of social pathologies.[88] Applied to the social body, Schäffle (1875, pp. 328–329, 383) argued for example that a firm could invest too much in the factory and forgo building housing for its employees. In lower stages of economic development such pathologies could not occur as the family was the center of production and the family home was the workshop—the bone and muscle tissue were balanced. With the growth into "collective large-scale enterprises [*Grossbetriebe*]", however, the construction of

[86] In the following, I will quote from a wide variety of paragraphs, since Schäffle had scattered his social pathology over all four volumes of *Structure and Life*.

[87] See the English definitions in *Stedman's Medical Dictionary*: "heterotopia": "In neuropathology, displacement of gray matter […]", or synonymous "ectopia": "Congenital displacement or malposition of any organ or part of the body" (Stegman, 2006, pp. 886, 610); "heterometric": "Involving or depending on a change in size" (Stegman, 2006, p. 885); "heterochronia": "Origin or development of tissues or organs at an unusual time or out of the regular sequence" (Stegman, 2006, p. 884).

[88] Schäffle (1896b, pp. 5–6) noted that even in the third edition of *Structure and Life,* he did not develop his social pathology much further. In contrast, Lilienfeld (1896) worked out a much more elaborated "social pathology".

family residences fell behind the growth of the workforce. With the help of the 'tissue model' in Figure 9, one can imagine the bone tissue being too narrow compared to the muscle tissue. This misalignment resulted in the pathologies of housing misery (*Wohnungselend*), usury, and alcoholism (*Wirtshaus- und Kneipenexistenz*) that could endanger the whole social organism.[89] Schäffle (1875, p. 233) argued that by the "dissection" of the social body into its tissues the "tremendous importance of normal living conditions" appeared "self-evidently in front of the eyes".

Schäffle (1875, p. 384) claimed that misaligned tissues could cause problems all over the social body. A state could direct too much money into its defense and neglect education. A firm was likely to assign much money to its directors, while technology and machines lagged behind. A farm (*Urproduktionsgeschäft*) was only complete when all its tissues were firmly developed and came together in the correct ratios. The soil had to be cultivated, but also the roads, and fences had to be built. The sales channels (*Absatzwege*) needed to be established, and the tools, as well as fertilizers needed to be organized. The organization was only complete when the guiding spiritual work for the "inner bonds" was established and the different parts were connected to an "overall institution" (Schäffle, 1875, p. 822).

Schäffle (1875, p. 731) believed that by thinking about the ratios of the tissues, he could form a new "social theory of organization" (*sociale Organisationslehre*). Remember that in his previous work, Schäffle considered organizations as being formed by the "mainsprings" of the private and the common interest. Now, Schäffle argued that any organization, or "social organ", consisted of "housing, protection, household (*Haushaltseinrichtungen*), capital and labor (*Geschäftsvorkehrungen*), and […] guiding spiritual activity (*leitende geistige Tätigkeit*)". If any organization is viewed as a collection of functional tissues, Schäffle could inquire, for example, which type of housing was most connected with what other tissue. A building of a manufacture was closely interwoven with the economic metabolism tissue, was permeated with the autonomous (smooth) muscle tissue, and organized through the autonomous nervous system (Schäffle, 1875, pp. 377–378). A church, or university, however, needed less muscle tissue (the executive force) as such organizations were not strongly interwoven with production.[90]

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[89] Polish-British anthropologist Bronislaw Malinowski (1884-1942) came to a similar conclusion in his analysis of social institutions. Malinowksi (1939, p. 962) claimed that "every institution contributes, on the one hand, towards the integral working of the community as a whole, but it also satisfies the derived and basic needs of the individual".

[90] Schäffle (1875, pp. 323–326) emphasized that every individual layer of tissue consisted in itself of a variety of different forms. The social bone tissue, for example, appeared in the shape of the family home, but also in the shape of sheds and manufactures, or as institutional buildings like schools, churches, and universities.

In another paragraph, Schäffle (1875, pp. 722–725) pointed out that many social diseases did not originate in excesses, but rather in the fact that certain parts of society lagged behind. The decline of the petty-bourgeois middle class (*kleinbürgerlicher Mittelstand*) was owed to their antiquated mode of production that did not change since their “great-grandfathers”, while other areas of society had already moved on. As a result, the products of the bourgeois handicraft did not meet the requirements of style, quality, quantity, and cost of the more advanced areas of consumption. In earlier times, their mode of production was suited to the small and local market but now seemed pathological in light of the large international markets.[91]

In some of his last articles before his death, Schäffle (1902a, 1902b, 1903a, 1903b, 1904) emphasized the importance to analyze the German agricultural crisis on a sociological basis.[92] While many at the time, and especially those who promoted grain tariffs, reduced the origins of the agricultural crisis to technological progress (steamships, railroads) that cheapened imports, Schäffle adhered to a multicausal approach. By the time, Schäffle (1904, p. 203) had suppressed his biological analogies due to his critics, but still argued that “disturbances” to German agriculture had to be analyzed based on “basic components” like technology, settlement and transport, cultural institutions, protective institutions, education, art and literature among many others. Schäffle (1903a, pp. 292–293) argued that by focusing solely on technology, economists neglected the substantial transformation in the organization of trade in the wheat market. By the late 19th century, the whole organization of delivery, payment, imports, and storage had changed in an interplay with urbanization and population growth. Lower prices and the crisis in agriculture were therefore not only a result of technological progress but the result of a variety of factors.

It is obvious that Schäffle did not discover that the lack of housing could lead to social issues through the tissue analogy, and similarly, that efficient organization of markets contributed to lower prices. Schäffle had opposed *laissez-faire* and championed state intervention throughout his life and was

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[91] The machine problem was no longer a social pathology. Had Schäffle (1873a, pp. 41–43, 1873b, pp. 199–202) investigated the positive and negative effects of the replacement of labor by machines, he did not see machines as contributing to a social pathology in *Structure and Life*. In the tissue model, machines and labor were located in the same “muscle tissue”. Machinery was “consciously increased potency” of the “vital mechanism of the organic body” (Schäffle, 1875, p. 815).

[92] The German agricultural crisis at the turn of the 20th century was a result of a worldwide fall in grain prices due to cheap grain imports from the U.S. and Eastern Europe. The resulting misery of German farmers led to the demands for higher tariffs, which Schäffle (1902a, 1902b) opposed.

aware of the inefficiencies produced by limitless competition long before *Structure and Life*.[93] But his emphasis on ratios (*Verhältniß*) of different layers brought to the fore that social pathologies like crimes could be explained by a lost "coordination of the tissues" (*gewebliche Coordination*). External "shocks" (*Erschütterungen*), or "new coordination of the elements" could affect the "molecular position" of individuals, cause them to deviate from their occupation and make them turn to crime (Schäffle, 1875, p. 210).

Schäffle was not alone in his interest in social pathologies. Many of the so-called moral statisticians of the second half of the 19th century tried to identify regularities in statistics on crime, suicides, and other social phenomena. For Schäffle, however, regularities were only the "external" expressions of internal issues. What he needed were statistics that brought each layer of the social body to a "sharp image" in order to explain where social pathologies originated from. As we will see in the following section, by such ideas, Schäffle not only deviated from many of his contemporaries' statistical work in which law-like regularities played the dominant role but also altered the course of new statistical investigations.

2.2.3 Statistics as the "sharp image" of variety

As philosopher of science Ian Hacking (1987a, p. 53) has elaborated, there existed a widespread "faith in the regularity of numbers" by 19th-century statisticians and empirical economists. In his early career, Schäffle had faith in regularity and committed himself to finding recurring patterns in statistical times series. Impressed by the periodically recurring crises, Schäffle (1858, 1859, 1861, p. 296) tried to work out how grain prices, banking data, and marriages showed regular patterns that coincided with each other. In his *Social System*, Schäffle (1873a, pp. 48–49) therefore claimed that statistical investigations could lead to "excellent exact results" in economics when applied to banking data and commercial crises. Schäffle also welcomed the new findings by moral statisticians who unveiled regularities in crime, suicides, and marriages. For Schäffle (1873a, p. 49), these regularities were not "natural laws" (*Naturgeseze*), but rather the expression of the moral nature (*sittliche Natur*) of society and a result of the free will (*freie Bestimmung*) of individuals.

Schäffle emphasized free will and his opposition to natural laws to counter the dominant practice of equating regularities to natural laws in his time. Influential Belgian astronomer and statistician Adolphe Quetelet (1796-1874) claimed that regularities were "statistical laws" and even general truths akin to "natural laws". Studying Quetelet's work of the 1840s and 1850s, historian of statistics

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[93] Schäffle (1861, pp. 263–264) had long argued that the need for charity was proof of the invalidity of *laissez-faire* and an urge to solve social issues by state intervention.

Theodore Porter (1986, pp. 9–10) argued that Quetelet believed that regularities would continue into the future because they arose from an underlying state of society independent of governing authorities. From observing aggregate data in tables and charts, Quetelet concluded that seemingly independent from country-specific circumstances, societies exhibited uniformity from year to year. Births, deaths, but also voluntary acts like marriages, crimes, and suicides showed regular patterns.

Quetelet, who spearheaded the French school of statistics, was fascinated by "the possibility of subjecting ostensibly uncontrolled social phenomena to scientific order" (Porter, 1986, p. 49). The regularity of theft, murder, and suicide from year to year proved that the action of man was restrained in such a "circle" that the "great laws of nature are forever exempted from his influence".[94] However disordered the acts of the human free will, in the aggregate, they produced regular effects, which indicated general causes. As Porter (1986, p. 54) remarked, however, Quetelet gave only vague indications as to what the general causes were and simply referred to the "state of society".

Another celebrated contribution by Quetelet was "*l'homme moyen*", or the "average man". This abstract construct was the summary, representative, or "type" of a nation's population. It was the average of all human attributes in each country and was comparable to the center of gravity in physics. One could also argue that Quetelet's average man discarded variety in the same way as Schleiden's primal plant. Quetelet had shown that with large amounts of data, the individual deviations from the mean canceled each other out and unveiled a constant measure of an average person in each nation. Next to average physical properties (height, weight, dimensions), the average man could be assigned penchants for crime, marriage, and suicide by calculating the aggregate number of criminal acts divided by the population.[95]

Schäffle's friend Adolph Wagner (1835-1917) was one of the first subscribers to Quetelet's work. Like the Belgian astronomer, Wagner (1864) thought that regularities could be considered laws, but

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[94] I quote here from Porter (1986, p. 52). Quetelet (1835, p. 5) explained the law of great numbers by invoking the mental image of a circle drawn on a plane, or on a blackboard. Zooming in on individual particles of this circle, Quetelet argued that their orientation was arbitrary. When viewed from a distance, however, the particles formed the regular shape of the circle: "[*C*]*elui qui examinerait de trop près une petite portion d'une circonférence très grande, tracée sur un plan, ne verrait dans cette portion détachée qu'une certaine quantité de points physiques, assemblés d'une manière plus ou moins bizarre, plus ou moins arbitraire, et comme au hasard, quel que fût d'ailleurs le soin avec lequel la ligne aurait été tracée. En se plaçant à une distance plus grande, son œil embrasserait un plus grand nombre de points, qu'il verrait se distribuer déjà avec régularité sur un arc d'une certaine étendue*".

[95] Ascribing every individual with a certain propensity to crime did not mean that the aggregate phenomenon of criminality was an effect that originated in the will of individuals. Rather, Quetelet argued that crime should be attributed to customs, and the state of society (Porter, 1986, pp. 52–54).

they were mere “statistical laws”. A statistical law did not “govern” regularities like a natural law, but only showed “in what uniform way [various] causes govern a phenomenon”.[96] Wagner claimed that he could prove the existence of “lawful interdependencies” (*gesetzmässige Abhängigkeiten*) of individual acts on external circumstances. One of Wagner’s prominent examples was the fluctuation of marriage rates in relation to grain prices. Despite the various causes that decided why people married, Wagner (1864, p. 16) claimed that there existed an “exact causal nexus between the grain price and the rate of marriage”. The marriage rate went up when grain prices fell and vice versa. As it was unlikely that marriages had an effect on harvests, it seemed plausible that grain prices caused the marriage rate to fluctuate.[97]

German statistician Ernst Engel (1821-1896) shared the fascination with Quetelet for the “typical”, or “type”. Engel was affiliated with the Royal Saxon Statistical Office in the 1850s and became director of the influential Prussian Statistical Office in 1860. One of Engel’s (1857, pp. 170–174) methods was to build “types” and “averages” (*Mittelmass*) of family household budgets in order to find typical consumption behaviors. Through aggregated household data, Engel (1857, p. 170) claimed to have found the “law” that the “height of the expenses for food increases with the reduction of wealth in a geometrical progression”—the law that is known to this day as Engel’s law.[98]

The statistical investigations by Quetelet, Wagner, and Engel spurred resistance among German economists and statisticians who subscribed to the idea that society was a “great variety” of interdependent, but unequal parts. Amongst them, as Porter (1986, p. 8, 1987) noted, statistics underwent a “redefinition”. Economic thinkers like Gustav Rümelin, Georg Friedrich Knapp, and Alexander von Oettingen were irritated by the fact that Quetelet saw human actions as a result of forces external to individual will. If lawlike regularities seemingly deterministically dominated the social world, how can one still believe in the free will of individuals? Their opposition to Quetelet also amounted to resistance against English historian and Quetelet’s admirer Henry Thomas Buckle (1821-1862), who claimed that regularities proved that mankind was no exception to the universal reign of the natural order.

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[96] In the German original, Wagner (1864, p. 66) stated: “*Die Gesetze beherrschen nicht, sondern sie zeigen nur, in welcher gleichförmigen Weise die Ursachen die Erscheinungen beherrschen*”.

[97] Wagner had a similar fascination for Quetelet’s *homme moyen*. In his statistical studies, Wagner (1864, pp. 8–9, 77) maintained that there existed an average man (*Durchschnittsmensch*), who was the physical, spiritual, and moral “type” of a nation. This typical man remained constant over the years as the deviations from the average canceled each other out.

[98] On Engel’s law, see Zimmerman (1932). On Engel and the Prussian Statistical Office, see Schneider (2013) and Hacking (1987b).

For Rümelin, Knapp, and Oettingen, a better guide into the field of statistics was German natural philosopher Rudolf Hermann Lotze, whom we have encountered in Schäffle's writings above. Opposing Buckle's and Quetelet's renunciation of free will, Lotze (1864, p. 78) questioned the method of lumping together various crimes into one statistic to reveal regularities.[99] Furthermore, Lotze (1856, p. 161) attacked authors who "longed for unity" by trying to summarize variety under one dominating principle. The three economists also took issue with the construct of average man and adopted the view that only little could be learned from statistics so long as attention was focused on mean values and not on variety.

Württemberg pastor and politician Gustav Rümelin, in his alternative approach to statistics, invoked vivid metaphors that we have encountered before. Rümelin reminded his readers that only in nature the single is "typical": individual grains of sand and blades of grass (*Grashälmer*) are never the same, yet their "variations are negligible compared to their similarities". When it came to society, however, the single is "individualistic".[100] As a result, constructions like the *homme moyen* were a "fiction" (*Fiction*), because they reduced variety to a typical that did not exist (Rümelin, 1863, pp. 682–683). Similarly, constructing a typical household like Engel was counterproductive, because it "blurred" (*verwischen*) the characteristics of a region, city, or socio-economic class.[101] In essence, statistical investigation fared better when they reflected the "eternally flowing and the great variety" (Rümelin, 1863, pp. 666–667).

With a similar recourse to vivid metaphors from mechanics and biology, economist and statistician Georg Friedrich Knapp (1871, pp. 244–245) spoke out against Quetelet's statistical methods. First, Knapp doubted if statistics was even able to discover regularities. Taking up Lotze's remark about the classification of crime, Knapp argued that when separating the category "crime" into its parts, many regularities disappeared. Even the "theft of bread" (*Brotdiebstahl*) was a different crime than

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[99] On Lotze's criticism of Buckle, see also Porter (1986, pp. 62–63).

[100] Rümelin (1863, p. 657) did not provide any explicit sources, but it is likely that knew from Goethe that the "higher we ascend, the more numerous the factors of organic life become, [and] the more manifold their combinations". Schmoller (1907, p. 597) remarked that Rümelin was fond of Goethe and noted that he always kept the New Testament on his desk. Hence, the divide between nature and man that Rümelin emphasized was possibly owed to his religious convictions.

[101] For example, when different households were lumped together into a typical, one could not investigate the factors that caused "fertility of marriages" anymore (Rümelin, 1867, p. 173). Likewise, absolute numbers about the growth of the whole population were unsatisfactory. Statistics had to detail which and why certain regions, or classes contributed differently to population growth (Rümelin, 1869, pp. 192–226).

the "theft of wood" (*Holzdiebstahl*) because it was motivated by different reasons.[102] But the classification of "crime" left one with a collection of individual acts (*Aeusserungen*) that created a noise similar to the tick-tocking when "entering a store of a watchmaker".

Yet even if one accepted that regularities existed, their interpretation remained open. Referring to Quetelet's circle analogy and his use of classical mechanics, Knapp (1871, pp. 241–242) reproached French statisticians for either thinking of human beings as chained dogs, or falling stones.[103] Knapp invoked the German philosopher Moritz Wilhelm Drobisch (1802-1896) to explain that regularities could also stem from willful decisions instead of being caused by "external laws", and they could be less exact than the regularities of celestial bodies. Based on a metaphor by German statistician and theologian Alexander von Oettingen, Knapp (1871, p. 247) argued that one has to view society as a "coral reef" (*Korallenstock*), instead of a "pile" (*Haufen*)—an organism instead of "independent monads in space".[104]

The coral reef metaphor gave regularities a different interpretation. Knapp (1871, p. 248) claimed that the "constancy of phenomena in time" proved that society was a "whole" interlinked by innumerable bonds (*unzählige Bande*). Within this "net" (*Netz*), the individual was only a "connecting node" (*Masche*). In short, the social structure gave society its regularities and constancy, and not regular impulses from external sources like grain prices. Numerical data thus attained a new purpose (*Lebenszweck*). Statistical numbers were the "quantitative side" of "all phenomena" and could draw into the realm of measurement what had been inaccessible before.

The re-interpretations of statistical regularities by Rümelin, Knapp, and Oettingen show that Schäffle was in good company when claiming in *Structure and Life* that social pathologies and their regular patterns could result from the "coordination" of the different tissues. And like Knapp, Schäffle did not uniformly discard statistical research but made the interpretation of statistics compatible with his philosophical tenets. As an empirical economist, Schäffle assigned statistics an important role in

[102] According to Knapp (1871, p. 243), Quetelet and Buckle were culpable of neglecting that the individual had an effect on the whole. In his eyes, the "German school" explained from the interior to the exterior, while Buckle did the inverse. On Knapp's argument about the different nature of certain crimes, see also Porter (1986, pp. 170–171).

[103] Knapp (1872, pp. 94–95) took issue with Quetelet's idea that impediments to population growth could be calculated in the same way as resistance, or drag on a falling object (by its dependence on the square of velocity). Why would the population behave in the same way as a falling object? Alluding to Quetelet's background as an astronomer, Knapp thought that the Belgian's statistical methods were an "ugly dream of a sleeping astronomer".

[104] Similarly, Drobisch (1867, p. 55) remarked that individual acts were dependent on "social conditions". The "whole structure and organization of society" was a non-stationary "organism" that was always subject to change.

economic research, but the reductionist approach by Quetelet and Wagner did not match his belief that society became more differentiated and manifold over time. A main issue for Schäffle was that Wagner had argued that with the progress of time, societies showed higher degrees of regularities. With respect to marriage and deaths, Wagner (1864, pp. 87, 112) also claimed that the deviations from the average decreased over time, indicating that people became more uniform. Both observations indicated that societies became more stable, but also more uniform with higher development.

In Schäffle's understanding, however, uniformity was a sign of underdevelopment. In a first line of argument, Schäffle (1875, pp. 201–209) therefore claimed that only in the "absolute", underdeveloped societies were more uniform than highly developed ones. Members of underdeveloped societies were like "cells in the uniform mass of lower animal and plant species". In this "wild state", individual deviations from the mean were smaller than in a civilized society and their actions were "infinitely more monotonous, similar and typical". However, "relative" to its high variety, a civilized society showed a great deal of regularity.

To understand what Schäffle meant by "relative" it is important to keep in mind that Schäffle (1873a, p. 112) thought that the unfolding of society led to an "ever higher accumulation of homogenous specialized work [*Sonderarbeit*]". With a higher degree of division of labor, the work of individuals became more repetitive and homogenous within their occupations. Schäffle (1875, p. 209) could therefore claim that the "regularity of individual actions of homogenous [*gleichartig gestellter*] individuals can nevertheless increase". Within such interpretation, more regularity was a sign of a higher "ethical coordination of specialized work".

In a second line of argument, Schäffle (1873a, pp. 48–49) claimed that the results of the "exact empirical research" on marriages, crimes, and suicides by Quetelet and Wagner were the expression of homogenous cases (*gleichartige Fälle*) of a community (*Gemeinschaft*) that was inherently manifold. Even though society was a "whole of […] differentiated units and processes, its parts were still comparable". Despite the variety of individuals within families, educational institutions, private associations, corporations, and institutions of different branches, and with different endowments of goods, individuals had originally been "homologous". Treating them within the "mass observations" by statistics was therefore justified (Schäffle, 1878c, p. 493).[105]

Whether Schäffle placed more importance on the first or on the second argument was of little relevance, as his focus was not on the regularities themselves. Instead, Schäffle (1878c, p. 493)

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[105] Schäffle (1878c, p. 488) argued that "social-psychological averages" only served as a first indication of an epoch.

wanted to inspect the deviations from regularities more carefully. A strong upwards deviation of the crime rate, for example, indicated that society was not yet a perfectly coordinated whole. If an external shock like a bad harvest led people to deviate from their freely chosen occupation and resort to crime, it was likely that the tissues were not aligned. One could imagine with the help of Figure 9 that if the housing tissue (the bone tissue), or the vascular tissue (including the insurance systems) were underdeveloped in a region, higher grain prices would lead to a spike in crime. To understand where social pathologies originated it was therefore not enough to highlight regularities, because “not the whole social life is mass movement [*Massenbewegung*]”. Instead, Schäffle believed that statisticians would fare better if they redrew the manifold phenomena of the social world:

> “[t]he more civilization leads to a great variety among a mass of originally equal social parts and events, the more these varieties need to be brought to a sharp image by statistical figures”.[106]

Schäffle (1878c, p. 494) argued that adding variances (*Schwankungszahlen*), and maxima and minima to the average numbers was only a first step to take variety into account. Statisticians also had to individualize the numbers (sex, age, nationality, marital status) and subdivide the statistics geographically. Like his contemporary Rümelin, Schäffle expected that new statistical research would fracture the population into subgroups and he hoped that refined statistics would be expanded to the “whole variety of the physical and spiritual individuality, commodities, and all organizational forms” and let any of these groups be “effected on each other by all known differences”.

One of the ways in which Schäffle advanced statistics that paid heed to variety was to give quantitative expressions to the five tissues. Sticking to his prior claim that biological analogies alone are not enough in empirical research, Schäffle (1878c, p. 495) argued that the dissection and description of the single parts of the social body like the tissues was only the preparatory work to a statistical survey that allowed to quantify interrelationships. To be able to statistically gauge interrelationships between tissues, statistics had to be a fine-graded collection of all the manifold

[106] In the German original, Schäffle (1878c, pp. 493–494) argued that: “*Je mehr die höhere Civilisation Mannigfaltigkeit unter einer Masse von ursprünglich gleichwerthigen Socialbestandtheilen und Socialereignissen herbeiführt, desto mehr muß diese Mannigfaltigkeit durch Gliederung der statistischen Zahlenwerte scharf zur Anschauung gebracht werden*”.

forms of each tissue.[107]. What if statistics could quantify the different forms of each of the five tissues and show how they spread out geographically? If such statistics was possible, one could derive the ratios of the tissues in each region, draw conclusions about their development, and possibly explain from where social pathologies arose.

Schäffle took only first steps in this direction by an in-depth investigation of the housing tissue. In an article, Schäffle (1878d, pp. 45–46) suggested to analyze and statistically quantify the "social skeletal organs" (*soziale Stützorgane*), like the housing tissue. Schäffle (1878d, pp. 48–49) argued that in the same fashion as "topographic" anatomists separated the skeleton from other tissues in order to gain more insight about the pathways (*Leitungsbahnen*) and interconnections of the body, the social researcher had to separately investigate the variety within the social skeleton. Only in the next step, the social scientist gauged how the various parts of the housing tissue connected to other tissues—a prime example of an economist who wanted to study "parts in order to see wholes" (Morgan, 2009, p. 5).[108]

In the social body, argued Schäffle, the housing tissue was a conglomerate of private and public buildings, storage spaces, harbors, but also temples, social venues, gardens, political meeting spots, schools, lecture halls, and sports arenas. Many of these parts were only indirectly involved in the creation, manufacturing, and transferring of commodities. They were connected to the economic metabolism but did not have a function within it other than consumption (Schäffle, 1878d, pp. 49–53). To be able to judge how closely these different forms of the housing tissue were connected to other tissues, one needed to know the quantities of the various forms of settlements (*Niederlassungen*). Such statistics were so far only recorded by the Prussian state in a survey of 1869, which distinguished between religious, and educational buildings and between nursing homes, prisons, barns, stables, and residential homes (Schäffle, 1878d, p. 66).

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[107] Schäffle (1878c, p. 494) argued that he was setting up a "system of organs and function" (*Organ- und Funktionssystem*) which could eventually serve to "structure statistics and "reap the full rewards of the numerical methods for the social sciences". Remember that Schäffle had argued that every social organization was composed of the five tissues in a different mix. A party organization, for example, did not need fixed housing, while religious and commercial institutions could not thrive without it. A church needed mainly "spiritual elements", while a factory needed much muscle tissue like labor and machines.

[108] Morgan (2009) has drawn attention to the difficulties that arise when trying to apply the existing conceptual framework of national accounting in new areas. In non-Western countries, for example, economists encountered great difficulties in measuring the parts and, as a result, could not put them together to see the whole.

Yet, Schäffle did not go further than attempting to quantify the different forms of housing tissue. It is likely that Schäffle did not possess enough statistical data for a large-scale quantitative comparison of the five tissues.[109] Not being tied to a university, or to the *Verein für Socialpolitik*, his call to expand the collection of fine-graded data on the respective tissues remained unanswered. Even authors like Oettingen, who agreed with Schäffle to locate social pathologies like crime in the coordination of the social structure, did not embrace his tissue analogy.[110] Yet, I believe that Schäffle offered a much more detailed image than his contemporaries about how the coordination or interrelationship of the social body could be visualized. The social body consisted of five tissues that tended to grow at different paces. With such analogies in mind, Schäffle gave new impetus to how statistics could be used in social sciences. Instead of teasing out law-like regularities, quantitative data should redraw the image of the five tissues and provide Schäffle with a sharper view of where the tissues were misaligned.

Schäffle (1875, p. 109) claimed that while moral statisticians like Quetelet and Wagner were only able to grasp the external expression of pathologies by unveiling regularities, he had the means to locate pathologies by investigating the inner interrelationships. Schäffle's juxtaposition of internal and external sides of social phenomena was also motivated by the newest trends in psychophysics to which he subscribed. Schäffle described moral statistics as the external side of "social psychophysics". It studied how "inner syntheses" led to quantifiable "external actions of the masses". However, the inner synthesis still had to be determined by a complete quantification of the different tissues. We will see in the next chapter, how the inner life of the social body also played a key role in Schäffle's social psychophysics.

2.3 Conclusion: a step too far on biological crutches

In this chapter, I have argued that it is not enlightening to depict Schäffle within an organicist tradition in which the term "organism" was used to describe society as an interconnected, ever-changing, evolving entity that was difficult to pin down by economic laws. If Schäffle merely wanted to oppose a mechanistic, or individualistic understanding of the economy, as suggested by Hutter (1994), he

[109] As Sybilla Nikolow (2001) has shown, German cameralist economists of the 19th century were among the earliest adopters of statistical methods. However, their statistical tables and diagrams were mostly used to denote total strength of a state and not to reveal the inner hidden structure and dependencies between parts. Adam Tooze (2001, p. 33) argued that only in the 1920s, Germany "set the stage for the sudden explosion of statistical innovation". During the 19th century, the German State lacked the national structures of economic intervention as well as detailed economic statistics.

[110] See Oettingen's (1878) dismissive review of *Structure and Life.*

could have used the organism metaphor in the same way as his teachers Roscher and Mohl. Instead, Schäffle avoided the term organism and investigated the details of Virchow's teachings about the tissues of the human body to try to find its analogies in the social world. I have therefore suggested scrutinizing Schäffle's path towards explicit borrowings from biologists more closely. By looking in more detail at Schäffle's motivation to use his tissue analogy, I unveiled how Schäffle was trying to make sense of the great variety of symbolic goods in society. Schäffle was acutely aware of the important role of these "odd" (*eigenthümlich*) goods in the organization of production, exchange, and consumption, but they were neglected by other economists because of their lack of subjective value and their seemingly auxiliary character.

When framed by the biological analogy of the nervous system, symbolic goods lost their "oddity", because Schäffle could assign them a function in the social body. Symbolic goods communicated and accumulated knowledge in society. I have shown that from this insight, Schäffle was convinced that society could be dissected into five functional layers of tissue similar to Virchow's dissection of the human body. The tissue analogy made society visible and provided Schäffle with a new way of ordering society. The tissue analogy not only re-ordered his social system, but also allowed him to explore social pathologies, reinterpret statistical findings, and suggest new ways to collect statistical data. I could therefore find evidence that the tissue analogy not only had epistemological but also heuristic value in Schäffle's economics.

The question remains, however, why Schäffle's tissue analogy did not find much acclaim among economists and early sociologists. One reason for the neglect of the tissue analogy is that Schäffle was not tied to a university or the *Verein für Socialpolitik*. As *Privatgelehrter* and editor of the *ZgS* he could not designate students to do research in specific fields, but only suggest them. Another reason can be found in Schäffle's difficult and tedious writing style. Even Karl Bücher, who took much inspiration from Schäffle explained that "Schäffle's systematic works" were "bulky and heavy". Bücher thus refrained from developing Schäffle's biological analogies and restricted himself to the publishing of Schäffle's last manuscripts.[111]

There are also two further reasons why the tissue analogy did not find much recognition among economists and sociologists. They are to be found in the inconsistent use of the analogies as noticed by many reviewers of *Structure and Life*.[112] These inconsistencies come to the fore when we turn to

[111] See Bücher's foreword in Schäffle (1906).

[112] See, for example, Schmoller's (1888a, p. 225) critique of Schäffle's use of biological analogies. Neumann-Spallart (1878, p. 15) explained that many of his colleagues put the book aside because Schäffle "used biological analogies to obfuscate rather than to illuminate".

the cell analogy that Schäffle used throughout *Structure and Life*. Schäffle remained undecided as to what a cell should represent. In some instances, the cell was the family, in other instances it was the individual in society. If the reader of *Structure and Life* decides to conceive of the individual as the cell of society and turn a blind eye to the family, one is still met with the difficulty of making such imagery compatible with the tissue model. Put simply, if one is pushed by Schäffle to think of cells in society, one loses the pictorial representation that he created with the tissue analogy.[113] Schäffle was aware of this issue and tried to mitigate it by explaining that the interconnections within society were "spiritual" (*geistig*) to circumvent the negative analogy that resulted from the fact that the social body was not held together by the same matter as organic bodies. However, on such a reading, the pictorial representation of the tissue analogy was completely lost.

A similar problem arose amongst the early French sociologists who were impressed by the works of Comte, Spencer, Lilienfeld, Schäffle and continued to use biological concepts in sociology. Schäffle's tissue analogy was acknowledged by sociologists like Ludwig Gumplowicz (1838-1909), Gabriel Tarde (1843-1904), and René Worms (1869-1926) who met in Paris at the *International Institute of Sociology* (*Institut International de Sociologie),* which Schäffle presided over in 1895. Among them there existed agreement that society consisted of cellular elements that grouped into tissues, and organs. However, as French sociologist Charles Letourneau (1831-1902) remarked, when it came to tissues, the comparison to the organic body was rather poor.[114] There seemed to be no agreement on how to identify which individuals belonged to the nervous tissue, and which ones were part of the muscle tissue. Lilienfeld (1897, p. 46), who thought about how graphical methods could be applied in sociology, argued that biological images of tissues did not enlighten much about the individual functions of cells.[115] Thinking both in tissues and cells at the same time did not create a coherent picture.

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[113] In an organic body, individual cells are to be found in every type of tissue and they are bound to their locality. However, in Schäffle's "social body", the protective tissue and the housing tissue, for example, do mainly consist of immovable capital and not of individuals. Furthermore, individuals in society are not bound to their locality.

[114] In the panel at the institute's meeting of 1895, Letourneau commented: "*Si nous passons aux tissus, appareils et organes, la comparaison cloche de plus en plus*" (Worms, 1896, p. 273).

[115] Lilienfeld (1897, p. 46) stated that: "*Les dessins qui, en biologie et en embryologie, servent d'illustration aux organes et aux tissues des plants et des animaux ne reproduisent toujours aussi que des collectivités de cellules, la reproduction de chaque cellule séparément étant impossible sous le point de vue technique*". In a later article Lilienfeld (1898) published an illustration within the text. The illustration called "*Organogramme synthétique*" shows different circles on a two-dimensional plane but did not include tissues. On Lilienfeld's illustrations, see Bauer (2016, pp. 270–273).

What can be learned from Schäffle's *Structure and Life* is that building an all-encompassing and coherent system in which every social phenomenon is assigned an anatomical representation is not feasible. Mapping every part of a human body to the social body was a step too far. Despite this somewhat dismissive verdict about the usefulness of his attempt to build a social anatomy, physiology, and psychology, Schäffle held on to the idea of the family cell and the tissue analogy in the third edition of *Structure and Life* (Schäffle, 1896a, 1896b). A possible explanation for this commitment is that Schäffle was able to switch between biological images depending on what aspect of the economic system was analyzed. When thinking about social pathologies, Schäffle imagined five tissues that could grow at different paces. When thinking of family pathologies, he pictured the family cell that could accumulate too much or too little intercellular substance. Schäffle did not always think holistically in the sense of an encompassing totality of social phenomena. Like Marshall, and Fisher after him, Schäffle used analogies as tools, or in Schäffle's words, as "crutches", depending on what economic problem was to be scrutinized. We will see in the next chapter that with respect to the symbolic goods and social psychophysics, Schäffle also excelled in switching between images, from ganglia to thresholds, and from circles to waves.

Chapter 3 Social Psychophysics

We have seen in Chapter 2 that Schäffle was convinced that the economic process cannot be understood without an analysis of human interaction, especially when mediated through symbolic goods. Yet, symbolic goods did not fit easily into Schäffle's analysis of the economic process. They had no consumption value, were almost costless to reproduce, and were non-exhaustible. However, through his reading of Paul von Lilienfeld, Schäffle conjectured that the nervous system could be used as an analogy for communication and the transfer of symbols. The nervous system analogy offered him a way to visualize how symbolic goods ran parallel to the metabolism, or vascular, tissue on the layer of the nervous tissue.

After having established that the social body consisted of five tissues, Schäffle went on to explore what details could be learned from biologists about the structure of the different tissues. As his initial interest in biology was sparked by the nervous tissue analogy, Schäffle focused most of his attention on the nervous system. Not only did Schäffle find many equivalences to the symbolic goods in the newest breakthroughs in neurology, but he also applied the neurological theories on stimulus, sensation, and thresholds to communication through symbolic goods. Next to Virchow's studies on the nervous system in *Cellular Pathology*, Schäffle's could draw from English psychologist Henry Maudsley's (1835-1918) neurology, German physiologist Wilhelm Wundt's (1832-1920) psychology, and especially Gustav Theodor Fechner's (1801-1887) psychophysics. Through their works, Schäffle established what he called a "social psychology", or "social psychophysics".[1] Applied to the social world, neurological analogies proved to be powerful heuristics and opened various new research paths. Schäffle further pursued these paths in the third edition of *Structure and Life* (1896a, 1896b) and they were taken up by 20th-century social scientists who studied communication.

I believe that in Schäffle's social psychophysics, his anti-reductionist research agenda comes to the fore most prominently. In the introduction to his first volume of *Structure and Life*, Schäffle (1875, p. 1) argued that the social body metaphor served him to connect the individual "soul" (*Seelenleben*) to the "folk body" (*Volkskörper*). The two were connected like the "action of the organic cell to the whole organic body". What connected them was the "social nervous system". But Schäffle warned already at the outset that one should not go too far in borrowing from the "natural sciences". Reducing

[1] Horst Gundlach (2017, pp. 150–152) assigned Schäffle an important role in disseminating the term "social psychology". Other German social psychologists like Wundt and Wilhelm Windelband (1848-1915) preferred to use the term "folk psychology" (*Völkerpsychologie*).

cells and their interconnections to the “atomistic level” would instantly nullify an analysis of interconnections. Physicists, argued Schäffle (1875, pp. 6–7), tried to understand attraction and repulsion of the atoms by unknown and metaphysical ideas of “energies” and “quantums” that came close to religious beliefs of an “eternal force”. Instead of “materialistic metaphysical rambling”, Schäffle proposed to investigate the interconnections, or “empirically perceptible correlations” of the “external phenomena”.

Despite this positivist approach, Schäffle investigated the “perceptible correlations” of the social body with the support of his biological “crutches”. As I will show in the first section of this chapter, biological images of the nervous system gave Schäffle pictorial representation. They made communication visible. In the second section, I will redraw how Schäffle deepened his studies of Fechner’s psychophysics and will investigate how he tried to apply Fechner’s notions of thresholds, and stimuli to the interactions of economic actors. What makes Schäffle’s analyses based on the social nervous system much more palpable than the tissue analogy of Chapter 2, is that he investigated specific details about communication between parts of society and did not try to map every social phenomenon to a biological one. Furthermore, in his analysis of social interactions, he switched between images much more distinctively than with his tissue analogy that encompassed the whole social body.

3.1 Making Communication Visible

Schäffle’s borrowings from “organic neurology” are scattered across several chapters and paragraphs in the first and fourth volume of *Structure and Life* (Schäffle, 1875, 1878c). His deeper investigation of the nervous system likely started again with his reading of Virchow’s (1871) *Cellular Pathology*. Schäffle (1875, pp. 352–353) read in Virchow that the nervous system consisted of nerve cells, and “nerve fibers” (*Nervenprimitivfasern*). Nerve cells often appeared “bundled” (*gebündelt*) or grouped in “ganglia” (*Nervenknoten, Nervenhaufen,* or *Ganglien*) as shown in Figure 10. As cells or ganglia, they connected to other cells and to the brain through fibers.

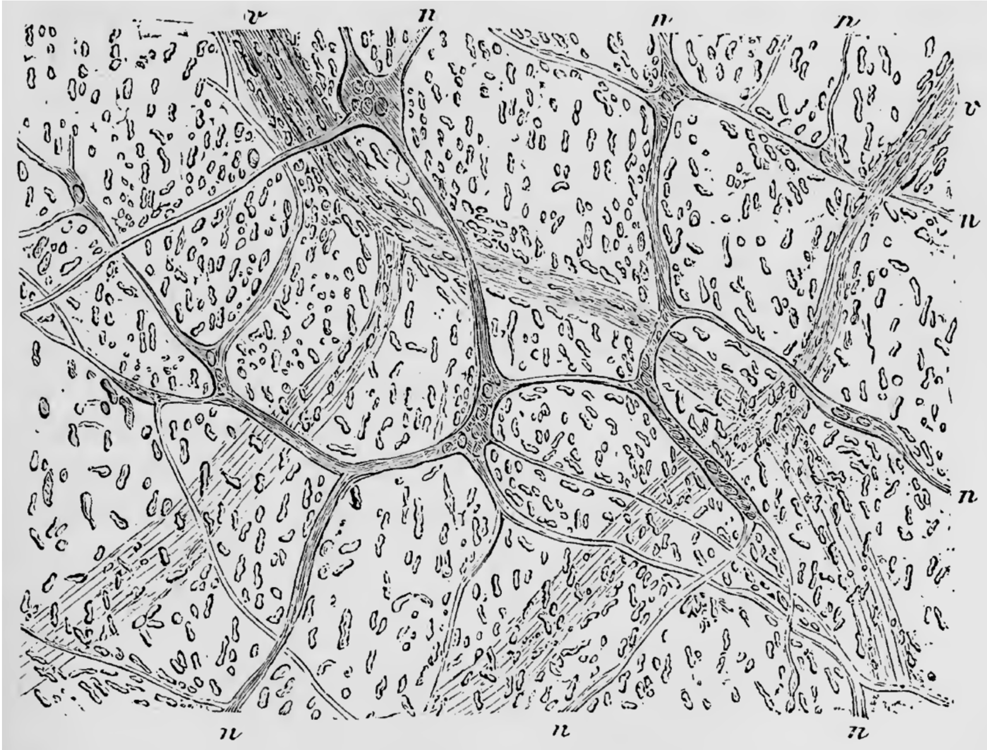

Figure 10: Nerve plexus (*Nervenplexus*) from a child's intestine with nerves that connect into a net with ganglia at the intersections of the nerve fibers. Source: Virchow (1871, p. 297).

From Maudsley (1867, pp. 54–64), Schäffle (1875, p. 45) knew that the nervous system was a great variety of individual cells with different shapes, colors, and sizes. From English neurologist J. Lockhart Clarke (1817-1880), Schäffle learned that "between an infinite multitude of cells of all varieties of shape" there existed an "infinite number of communications in all directions" (Clarke, 1863, p. 55).[2] Finally, through his reading of Wilhelm Wundt's (1874) *Physiological Psychology*, Schäffle (1875, p. 353) became convinced that also ganglia came in various shapes and sizes as depicted in Figure 11.

[2] Maudsley and Clarke did not visualize the shapes of the nerve cells, but Clarke referred to the German histologist Joseph Gerlach (1820-1896), who published several lithographic prints of his dissections (Gerlach, 1858).

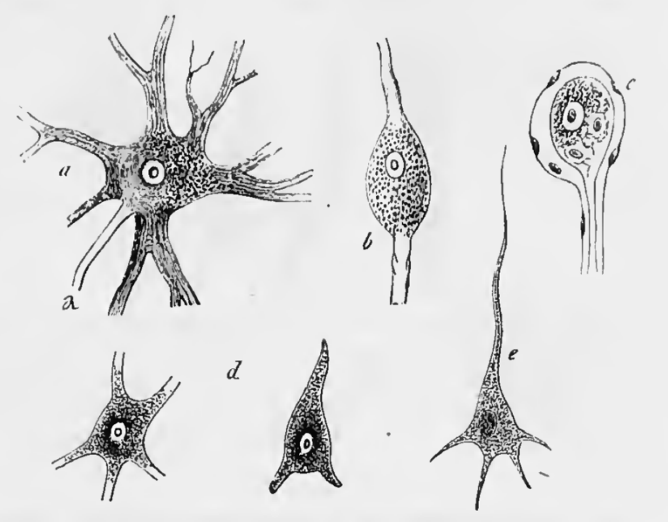

Fig. 3. Nervenzellen von verschiedener Form. *a* Vielstrahlige Zelle aus dem Vorderhorn des Rückenmarks, mit einem Axenfortsatz (α) und zahlreichen sogen. Protoplasmafortsätzen. *b* Bipolare Ganglienzellen aus dem Spinalganglion eines Fisches. *c* Zelle aus einem sympathischen Ganglion. *d* Zellen aus dem gezahnten Kern des kleinen Gehirns. *e* Pyramidalzelle aus der Grosshirnrinde.

Figure 11: Nerve cells and ganglia of animal spinal cords and brains. Source: Wundt (1874, p. 29).

As in the case of the tissue analogy, Schäffle (1875, p. 353) adapted his insights from neurology quite freely to the social body in order to gain more pictorial representation (*Anschaulichkeit*). In the social body, the nerve cells represented individuals—the active part of the social nervous system. Like the cells that combined into ganglia in the organic body, the social cells formed into groups, associations, and communities—the "social ganglia". These groups created knowledge, controlled individuals, determined values, and communicated their knowledge through the fibers to other cells and ganglia. Schäffle argued that most "spiritual work" happened within these social ganglia of manifold compositions (*Gestaltung)*. Throughout the social body, there existed boards of directors (*Vorstandschaften*), managements (*Directionen*), public authorities (*Behörden*), and military commandos (*Commandos*). What is more, there existed institutions like public libraries, the stock exchange, and the press, which did not only do spiritual work but could be described as "institutions of communication of ideas" (*Anstalten der Ideenmitteilung*).

Following the logic of his tissue analogy, Schäffle (1875, pp. 353–370) argued that all these institutions needed the help of other tissues—the "supporting institutions" (*Hilfsanstalten*). A library, for example, needed muscle tissue (librarians), a regular metabolism (*geregelter Unterhalt*), and a residence for protection (*Schutzvorkehrung)*. Even the daily press needed a building and machines (the bone and muscle tissue). But Schäffle did not dwell too long on explaining how the institutions of communication were assembled from the five tissues. Instead, he aimed to understand what part of "spiritual work" was done on an individual and on a collective basis.

Schäffle (1875, pp. 64, 375) went as far as to claim that in society only three types of spiritual work were done individualistically: observing and logical work (*logische Verarbeitung*), determination of value (*Werthbestimmung über das Nützliche und Schädliche*), and advice and consideration (*Berathung und Erwägung*). Yet, Schäffle (1875, p. 136) came to believe that with the progression of society, the second individualistic spiritual work—the determination of value—receded into the background. Schäffle (1875, pp. 527–528) arrived at this conclusion, because he claimed to witness that the valuation by collectives, or "social valuation" (*soziale Werthbestimmung*) ever grew stronger in society. Collectives (social ganglia) determined values and crowded out "individual valuation" by stimulating and inhibiting the social cells, that is, individuals' tastes (*Geschmack*), fashion (*Mode*), culture and education (*Sitte*).[3] Collectives like the state, the family, or businesses determined values within their circle and increasingly tried to take effect on individual valuation through the "social nervous system".

The social nervous system consisted of a "nervous current" (*Nervenströmung*) that mediated the "communication of ideas" (1875, p. 86). This "social nervous current" consisted of the passive symbolic goods (*sachliche Symbole*) that were set in motion by the active individuals and collectives. The symbolic goods were letters, books, telegrams, vouchers, laws, and other material expressions of ideas that we learned about in the previous chapter. Due to the material character of symbolic goods, ideas could be altered, disseminated, collected, and passed on to future generations more easily than by direct oral exchange. Hence, Schäffle (1875, p. 708) claimed that symbolic goods could "sediment" (*ablagern*) and build "some kind of social nerve fibers [*Nervenleitung*]".

Thus, in Schäffle's (1875, pp. 351–353) interpretation, symbolic goods had a dual character. On the one hand, they flowed through the nervous system as the "social nervous current". On the other hand, they created the social nerve fibers. A letter, for example, created a one-dimensional connection between two nerve cells like the bipolar nerve cell *b* in Figure 11. A book, however, created a multipolar connection like cell *a*. A book was able to establish hundreds of new connections by providing the same insights to numerous individual cells.[4] Even more so, an article in a newspaper

[3] Schäffle (1875, pp. 132–133) justified this analogy by claiming that also biological cells decided about the "useful" (*Nützliche*) and "harmful" (*Schädliche*).

[4] The book-cell analogy contradicts Schäffle's previous claim that individuals were the nerve cells of the social body and conflicts with his assertion that the symbolic goods were part of the nervous current. However, the analogy works if the book is considered to be the creator of the nerve fibers.

was able to link up millions into a “society of the same thought” (Schäffle, 1875, p. 369). The press, with its numerous interconnections (*Verflechtungen*), linking up individuals, groups, and the state, was able to “unite the whole nation in one direction of will”, and also provided various different collectives with the means to interconnect and influence each other (Schäffle, 1875, pp. 363, 457–458). Therefore, Schäffle (1875, p. 463) argued that the most powerful institution of the social nervous system was the press. Any sort of pathology of the nervous system like press corruption by state centralization, or monopolization by plutocratic speculators was just as harmful to society as disturbances to the economic metabolism.[5]

In this manner, Schäffle now had a much more concrete image at hand of how the differentiated society interconnected than on a mere analogy of society with an “organism”. Remember that in his earlier works, Schäffle had simply claimed that due to the division of labor, individuals re-integrated through the public “mainspring”, and formed associations, municipalities, and cooperatives—a new and freer social organism emerged. Based on the tissue analogy, Schäffle (1875, p. 816) could now claim that the differentiated parts of society (individuals and collectives) were not only interconnected through the metabolism tissue but also through the social nervous system. Modern society that had disintegrated through the division of labor was brought back together through the “current” of symbolic goods in the social nerve fibers.

Similar to biologists who investigated the organic body, Schäffle (1875, pp. 177–180) believed that he was able to observe the division of labor and the reintegration of parts in the social body by “positive methods”. Schäffle observed how individuals, families, firms, and associations chose specific occupations (*Berufsarbeiten*) but remained connected to a “whole” (*Gesamtwerk*) through the “nervous currents of the manifold symbolic goods” (*Nervenströmungen der mannigfaltigsten Symbolik*). Through the “nervous currents” of journalism, assemblies (*Versammlungswesen*), pulpits, public lectures, and events, every member of society “remained susceptible to the performance of other members”. Yet, for the “living use” of the symbolic goods, the population had to be educated and the means of communication, correspondence, and the press had to be well developed.

Schäffle (1875, p. 361) used the image of the nervous system with its fibers and ganglia (Figure 10) to locate where symbolic goods accumulated. On the one hand, symbolic goods were storages of ideas

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[5] Schäffle (1875, p. 465) argued, for example, that if the press only printed advertisements commissioned by companies or the stock exchange, its function would be “reduced to the one of the metabolism tissue” (*auf reinen Stoffwechselbetrieb herabgesetzt*). The press would become a mere profit-seeking organization. Likewise, state centralization of the press as envisioned by German socialist Ferdinand Lassalle (1825-1864) was just as harmful as Comte’s notion of a “pouvoir spirituel” composed of positivist philosophers (Schäffle, 1875, p. 466).

of the public sphere. Books, patents, and maps were the materialized forms of spiritual work and piled up as "intercellular substance" in the social nerve fibers. In the intercellular substance, books, and patents outlived the lifespan of their creators, the individual cells. Stored spiritual work could always be transformed into "living work" (*lebendige Arbeit*) by active cells (Schäffle, 1875, p. 704). On the other hand, symbolic goods accumulated within the social ganglia like associations, collectives, and businesses. In these "places for the storage and accumulation" (*Sammel- und Stapelplätze*), knowledge was more private, that is, less open to the public sphere. Both within the intercellular substance and within the social ganglia, society "accumulated" (*anhäufen*) an apparatus of literature, presentations, and traditions that surpassed by far the capacity and memory of individuals.

An important question, for which Schäffle hoped to find answers in neurology, was which part of communication and accumulation of symbolic goods was organized centrally and willfully, and which part was left to autonomous and decentralized self-governance. As Schäffle knew, biologists like Virchow (1871) and Maudsley (1867) separated the nervous system into a voluntary (*animalisch*) and an autonomous (*vegetativ*e) nervous system. The voluntary nervous system controls willful movements like muscle contractions that originate from the nervous centers of the brain and spinal cord. The unconscious and unwilful vegetative system regulates the heartbeat, breathing, digestion, and metabolism. Its centers are distributed all over the body in the shape of ganglia. In the human body, these two systems work so well together that Maudsley (1867, p. 55) asked himself: "Were it not well if man in his social life could contrive to imitate this excellent organization?"

Schäffle (1875, p. 351) latched on to Maudsley's proposition and argued that the "state ought better to imitate the spiritual operations from the human body". Schäffle underscored that the majority of social interactions and communication in the social body took place in the autonomous social vegetative system and elapsed "without knowledge of the social consciousness [*Gesellschaftsbewusstsein*]" of the public or the central state.[6] Production, transportation, and consumption within the metabolism tissue proceeded without a central consciousness. The church, or the school system relied on much autonomy in order to function properly and even the state was built from autonomously acting provincial, and local authorities (Schäffle, 1875, p. 374).

Autonomy did not indicate the absence of hierarchies. As most autonomous work was organized through collectives that possessed an inner organization, hierarchies were a fundamental part of autonomy. Schäffle (1875, pp. 374–375) claimed that not only the state authorities possessed different

[6] Schäffle (1875, p. 351) claimed, for example, that most "spiritual work" within a particular factory, school, or stock exchange was only known to certain individuals, and did not enter the public consciousness of the whole nation.

instances (*Ueber- und Unterordnung*), but also that the “most simple production business” had a hierarchical order. Any decision that led to inhibitions (*Hemmungen*) and movements (*Bewegungen*) needed hierarchy. Every organization possessed internal and external communication, correspondence, recordings (*Aufzeichnungen*), accounting (*Buchhaltung*), hierarchies (*Abstufung der Oberleitungen und Aufsichtsstellen*), planning (*Planentwerfungen*), calculations, and controls (Schäffle, 1875, p. 816).

Through his reading of Virchow (1871, pp. 272, 332), Schäffle (1875, p. 377) claimed that the autonomous nervous system did not possess a recognizable central point, but consisted of a “multitude of particular provinces with specialized functions”. There existed no “anatomical center, from which all activity of the body was guided”. Only with the autonomy of the parts, the central authority was kept free for the central tasks, and was not “confused, disturbed, irritated and fatigued by things of merely particular concern”. Schäffle’s political convictions clearly showed their mark on how he assigned the central and willful nervous system only a secondary role in society. A lifetime adherent to self-governance of individuals, firms, cooperatives, and the German lands, Schäffle (1878c, pp. 240–241) emphasized the importance of peripheral autonomous organization independent of central control. Hence, there was no need for a “bureaucratic and clerical addiction of the central authorities” to enter the domain of the subordinated and local authorities.[7]

Yet, the division of the social nervous system into an autonomous and voluntary part went beyond Schäffle’s attempt to naturalize his political convictions. The neurological analogy also gave rise to new questions. What divided the two systems? Was the division strict, or a spectrum? And what bridged the two systems? From Maudsley (1867), Schäffle (1875, pp. 48–49) knew that there existed three ways of how a stimulus (*Reiz*) was diffused in the human nervous system. First, a stimulus could remain in the autonomous (sympathetic and reflective) centers. It found its analogy in the autonomous organization of the state and the economy. Second, a stimulus could enter the nervous centers of sensory perception where it triggered an involuntary action (closing the eyes in case of bright light, pulling a face when tasting something sour), but did not enter the central consciousness. Such involuntary actions suggested to Schäffle that there existed involuntary behaviors that had originally been conscious but became autonomous with time. Applied to the social body, Schäffle, therefore, argued that certain parts of society could be consciously trained until they took over a certain behavior autonomously. We will see in the last section, how Schäffle forged such ideas into arguments to justify mandatory education and, to some extent, mandatory membership of insurance.

[7] This analogy also became a core argument for corporatists like Austrian fascist Walter Heinrich (1902-1984), who promoted economic self-governance (Heinrich, 1932, pp. 33–36).

Most consequential for Schäffle's research was Maudsley's third proposition. Stimuli that originated from the autonomous system, could enter the central consciousness and were likely to trigger a voluntary response. As the newest psychological research in Germany had shown, to be noticed at the conscious center, stimuli had to surpass a "threshold" (*Schwelle*) that separated the conscious from the unconscious nervous system.

3.2 Social Thresholds

The concept of "threshold" has been coined by the German physiologist and psychologist Gustav Theodor Fechner (1801-1887). Taking inspiration from his psychologist friend Ernst Heinrich Weber (1795-1878), Fechner pioneered experimental psychology, which he called "psychophysics" (*Psychophysik*)—the scientific study of the relation between stimulus and sensation. From his experiments, Fechner (1860a, 1860b) inferred that there existed a threshold between the conscious and unconscious sensation of a stimulus. For a stimulus, like a source of light, or a noise, to reach central consciousness this threshold had to be surpassed. Once above the threshold, Fechner could measure that the relationship between stimulus and perception is logarithmic: if the stimulus increases geometrically, perception only increases arithmetically (the louder the noise, the more additional noise is needed for a person to hear a difference). In his ground-breaking *Elements of Psychophysics*, Fechner (1860b, p. 13) expressed the relationship as follows:

$$\gamma = k \log \frac{\beta}{b}$$

Where γ is the perception, k a sense-specific constant, β the stimulus and b the threshold stimulus. Note that the perception γ is only above 0 if $\beta > b$ (Only when the stimulus lies above the threshold, there is perception). The equation is known today as the Weber-Fechner law.

Despite reproducing Fechner's equation, Schäffle (1875, pp. 110–113) was not interested in the mathematical expression and in the characteristic logarithmic relationship between stimulus and perception. Rather, he put his entire focus on the concept of threshold. In Schäffle's (1875, p. 403) eyes the "threshold phenomenon" of individual psychology was "analogous in the tissue of spiritual life" of society. But what was the social consciousness (*Bewusstsein*) and how did the social threshold manifest itself?

Schäffle (1875, p. 403) argued that there existed a "consciousness of the central collective organs" like the state and the "consciousness of all individuals" like public opinion. Both possessed thresholds that separated them from unconscious activity. Most ideas and knowledge remained below the thresholds of these "organs of central consciousness" and circulated in the unconscious sphere of the autonomous nervous system. These thresholds were of utmost importance for the well-functioning of the state. If the central government possessed a low threshold, every sensory impression (*Sinneseindruck*) arrived at the central consciousness, and, as a result, the state was oversensitive and irritable. If the threshold was too high and no stimulus passed through, however, the state would dissolve because it lost its unity (Schäffle, 1875, pp. 376, 404). Oversensitivity also created an issue for new developments, innovations, and political agitation. If a novelty or deviation was noticed at the center, it would likely be suppressed by the authorities and make social, economic, and political change impossible. Only in certain cases, the “psychophysical movement” surpassed these thresholds and made previously hidden ideas known to the central authority, or the whole population (Schäffle, 1875, pp. 403–404).[8]

Before detailing what Schäffle understood by “psychophysical movement” in the social body, it is necessary to briefly glance at Fechner’s writings from which Schäffle borrowed the main concepts for his social psychophysics. Thinking of Fechner’s experiments, it may surprise at first why Schäffle applied the threshold analogy to the social body. Schäffle wanted to understand how stimuli *within* the social body are transmitted, while Fechner organized his experiments on the relationship between *external* stimulus and internal sensation. However, Fechner thought that the threshold phenomenon also existed inwardly between different levels of consciousness.[9]

In Fechner’s “inner psychophysics”, the exact functional relationship of the Weber-Fechner law was not applicable because he could not measure the internal stimuli and thresholds. In order to deal with the “inward” threshold phenomenon, Fechner deemed it necessary to expand his ideas to a lower and an upper threshold and to add the concept of “wave” (*Welle*). These two expansions are shown in Figure 12 in which Fechner depicted two thresholds and the main wave (*Hauptwelle*) of consciousness, with time on the (imaginary) x-axis and the level of consciousness on the (imaginary) y-axis.

By the lower threshold (*Hauptschwelle*, A-B) in Figure 12, Fechner demarcated the border between unconsciousness (sleep) and general consciousness (*Allgemeinbewusstsein*). Only when the whole

[8] Schäffle did neither distinguish between different types of stimuli nor did he pay much attention to the sense-specific constant *k*. One can easily imagine that within society certain types of stimuli are dispersed much more easily than others. Likewise, one can conjecture how an individual’s existing knowledge determines whether a stimulus surpasses his or her specific threshold.

[9] Fechner (1860b, p. 438) believed the idea of “threshold” to be of “fundamental importance” for “inner psychophysics”. Without paying attention to “thresholds”, psychophysics would be like an “organism without sections and incisions, without organs and segments”.

curve sits above the lower threshold, the individual is conscious. The upper threshold (*Oberschwelle* A'-B') separates general consciousness from "exceptional phenomena" (*Sonderphänomen*, or *besondere Bestimmung des Bewusstseins*). By exceptional phenomena, Fechner (1860b, pp. 448, 459) thought of "imaginations" (*Vorstellungen*) when awake or when asleep (dreaming), or when a loud noise attracted attention. Hence, the wave in Figure 12 depicts a fictional person who is awake (generally conscious) and paying more attention to certain phenomena (a,b,c,d,e) in chronological order (Fechner, 1860b, pp. 454–459, 540).

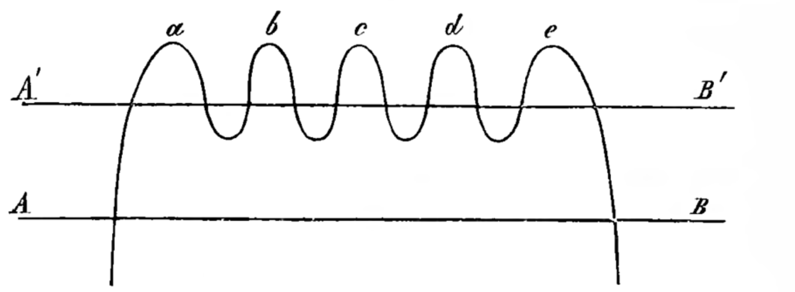

Figure 12. Fechner's "main wave" (*Hauptwelle*) with two thresholds A-B, and A'-B'. Source: Fechner (1860b, p. 540).

The "main wave" in Figure 12 is a compound of a lower wave that decides about the level of general consciousness and an upper wave that rises up in the case of increased attention towards an exceptional phenomenon (a,b,c,d,e). Increased attention to a special phenomenon decreases the level of the main wave shortly after, explaining the dents in the wave following the peaks (a,b,c,d,e). Fechner explained that the existence of thresholds can be proven by self-experimentation.[10] Yet, the "psychophysical movements" of the wave were "beyond direct experience" (Fechner, 1860b, p. 434). Fechner (1860b, p. 543) only speculated that the movements were tied to a special psychophysical substrate, or nerve ether (*Nervenäther*).

Schäffle (1875, p. 407) took up Fechner's claims and remarked that there was no possibility of observing the psychophysical activities within the human nervous system. By contrast, Schäffle argued that in "social psychophysics" one could "empirically observe" the "psychophysical substrate", the "upper and lower waves" and the "infinite branching off" (*unendliche Verzweigungen*) of the nervous system. Schäffle (1875, p. 114) claimed that social psychophysical phenomena could

[10] Fechner (1860b, p. 433) considered the following self-experiment as proof of the existence of inner thresholds: Being talked to while being absentminded suggests that what had been uttered was lost in the unconscious. However, one is able to suddenly gather oneself and lift what had been said "above the threshold". This example shows that Fechner also offered a non-chronological interpretation of Figure 12. The dents could also indicate that one was only able to pay increased attention to one special phenomenon, while attention decreased in other areas.

be grasped “empirically, and without visualization [*unbildlich*]”. Anybody could observe how letters, storage vouchers, books, and newspapers circulated in society. Hence, sociologists had an advantage over neurologists, because the “structure and functions of spiritual communication”, the “institutions of communication [*Ideenleitung*], valuation, creation of will [*Willensbestimmung*]” and “their active elements” unfolded in front of the scientist’s “eyes”. However, Schäffle did not live up to his claim of being able to capture the phenomena of social psychophysics without visualizations. He needed the concepts and the pictorial representation that he gained through Virchow and Fechner to think about communication and the accumulation of symbolic goods in society. Symbolic goods created the “nerve fibers” that branched off like in Figure 10, and they were part of the substance that made up the waves in Figure 12.

I can now come back to Schäffle’s definition of the social “psychophysical movement” that in certain cases surpassed the consciousness of the state, or of public opinion. On the one hand, the psychophysical movement consisted of the symbolic goods that circulated and accumulated in society. They were the substrate of, and current within the ganglia and fibers of Figure 10. On the other hand, the psychophysical movement could be visualized by the wave in Figure 12 that sometimes surpassed the upper threshold to arrive at the central consciousness.

Schäffle (1875, p. 352) found it “astonishing” that the social psychophysical phenomena had not yet been treated scientifically. With moral statistics, the social sciences already possessed an external social psychophysics that measured the movements on the surface of the social body (Schäffle, 1875, p. 109). What was needed now, argued Schäffle (1875, pp. 400–401), was an inner social psychophysics by “direct observation”. Having Virchow’s nervous tissue (Figure 10) in mind, Schäffle (1875, p. 727) claimed that there existed a “psychophysical basis” of the collective spiritual activity in the shape of an interconnected web of ganglia and fibers. Hence, the collective, or folk spirit (*Volksgeist*), was not abstract “spiritualism”. It was not acting “above all as a unity” and did not operate “outside of individuals without a tangible substance”. Schäffle also warned that the collective spirit cannot be understood as a "sum of equal atomic powers [*Atomkräfte*]" (Schäffle, 1875, pp. 420–424).[11]

Rather, Schäffle (1875, pp. 419–420) believed that the collective spirit was "an integrated whole of countless complementary professional intelligences, which nevertheless possess the same psychophysical technique […] through the same language". It was a "historically accumulated […] and variedly structured system", or a "sum of complementary tensions in the form of occupational, class, and family spirits spread through the psychophysical substrate and embedded in the districts and layers of the social body".[12] The collective spirit was "embedded" because it needed technical means of support (*Hilfsmittel*) from other tissues as it was only disseminated and accumulated in the material form of symbolic goods. This compound system of material parts (*zusammengesetztes System von Stofftheilen*) consisted of diverse cells, ganglia, intercellular substances, and fibers that connected to a great variety (Schäffle, 1875, p. 727).

Schäffle's definition of the folk spirit mirrored in some respects the folk psychology by German social psychologists Moritz Lazarus (1824-1903) and Heymann Steinthal (1823-1899). Lazarus and Steinthal emphasized in the 1870s that folk psychology had to trace the interplay between individuals and society as a whole (Klautke, 2013, p. 66). For both, the individual could only be grasped as a member of a whole that consisted of a great variety of talents and ambitions. Moreover, by the concept of "thickening", or "condensation" (*Verdichtung),* Lazarus and Steinthal also emphasized that societies profited from knowledge that accumulated over the epochs of civilization. From Herbart and Hegel, they knew that the "general spirit" (*Gesamtgeist*) of a folk was knowledge, art, and technology that accumulated over generations. Yet, like Wilhelm Wundt, the two social psychologists put most emphasis on language as the main medium of the folk spirit and less on the materialistic side of spiritual forces (Klautke, 2013, pp. 18–20, 121).[13]

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[11] By referring to the sum of equal atomic powers, Schäffle (1875, p. 420) suggested that the spirit was not equally present in all individuals, which when summed up, made up the folk spirit. Schäffle (1875, p. 424) also opposed the "reductionism of feeling and want" by German philosopher and psychologist Johann Friedrich Herbart (1776-1841). Herbart (1825, pp. 31–32) claimed that the "power of the state order" resulted from its citizens' "individual forces". In another paragraph, however, Herbart (1825, p. 17) maintained that society should be viewed as a composite of "larger and smaller groups", which explains why Schäffle (1875, p. 393) also praised Herbart for having recognized the actual "phenomena of the social spiritual life". On Herbart's reductionism, see also Wundt (1916, pp. 190–191).

[12] In German, Schäffle (1875, p. 420) explained that the folk spirit was: "*eine Summe einander ergänzender Spannkräfte, bzw. als Corps-, Berufs-, Standes-, Klassen-, Familiengeist, in die einzelnen psychophysischen Substrate, Bezirke und Schichten des socialen Körpers eingesenkt und über sie ausgebreitet*".

[13] See Klautke (2013, p. 67) on Wundt's definition of folk spirit.

In contrast, Schäffle maintained that the folk spirit was essentially of a materialistic character and not an intangible "mentality". Furthermore, Schäffle's claim that symbolic goods possessed both the functions of accumulating *and* communicating knowledge, separated him from Lazarus and Steinthal. One can therefore believe Schäffle (1875, p. VI) when he claimed that he developed his insights about social psychology independently of Lazarus and Steinthal. Instead, Schäffle claimed that Fechner's research on the "psychic mechanism", and psychophysical "substrate" gave him the confidence to venture out into the "difficult realm of psychology and philosophy".[14] Indeed, Schäffle's (1875, p. 403) claim that the psychophysical movement consisted of material symbolic goods, obeyed Fechner's anti-reductionist assertion that every movement (*Bewegungsform*) of nature can be turned into the psychophysical substrate.

Schäffle (1875, p. 404) maintained that every social process had a materialistic fundament, or "supporting movement" (*tragende Bewegung*). Like Fechner, who considered spiritual work to always be accompanied by a psychophysical substrate, Schäffle (1875, pp. 24, 727) argued that symbols were the accompanying facts (*Begleitthatsachen*) of the collective spirit. Reducing them to "mechanical atom vibrations" would be a "salto mortale" to the more unknown.[15] Schäffle (1875, pp. 727–728) emphasized that if every scientific, aesthetic, ethical, religious work of a people could be reduced to "nervous vibrations" and "atomic swings" in the ganglia and fibers, one would end up with nothing more than "moving matter" (*bewegte Materie*), and:

> "We would only have dismantled the immensely complex material foundations of the collective spiritual life, just as one can let the architectural idea, the aesthetic formal unity of the Gothic period perish into heaps of bricks by demolishing the Strasbourg Cathedral".[16]

The image of nerve cells, fibers, and ganglia was only one side of Schäffle's social psychophysics. In order to understand how the psychophysical movement surpassed thresholds, Schäffle also relied on Fechner's visualization reproduced in Figure 12. Through the wave in Figure 12, the psychophysical substrate could be understood as a mechanistic "force" that pushed certain ideas above the thresholds. Schäffle believed that in society the "psychophysical movement" that surpassed

[14] Schäffle (1875, p. VI, 1905a, p. 44) also remarked that the materialism of Lotze and Friedrich Albert Lange (1828-1875) provided him with the "proper epistemological perspective".

[15] Schäffle probably took over this expression from Lange's *History of Materialism* (1866, pp. 115, 453).

[16] In the original, Schäffle (1875, p. 728) stated that: "*Wir würden nur die ungeheuer komplexen materiellen Grundlagen des collectiven Geisteslebens zerlegt haben, wie man die architektonische Idee, die ästhetische Formeinheit der Gothik durch Abbruch des Straßburger Münsters in Quaderhaufen untergehen lassen kann*".

the threshold A'-B' were "alarming newspapers, a cry for help (*Hilferuf*), protests, and extraordinary reporting". A rally (*Kundgebung*) created an upper wave that pushed the main wave above the upper threshold. In the consciousness of the state, or the population, such special attentions created an "excitation" (*Erregung*), and especially when they surpassed the threshold of the state, they triggered a conscious reaction in those areas that are usually left to the (autonomous) reflective feedback (*reflectorische Rückwirkungen*).

Schäffle (1875, pp. 113, 402–403) explained that also the social psychophysical substrate had limited force. When paying attention to something specific by surpassing the threshold A'-B', society's potential energy was transformed into living energy that exhausted itself when used. To increase the likelihood that ideas surpassed and stayed above the upper threshold in Figure 12, the potential energy (the height of the lower wave) could be augmented. In Schäffle's eyes, society's potential energy consisted not only of organic nerve power and human voices but also of external tools (*Hilfsmittel*) like the electrical power of the telegraphs, printing machines and other means of reproduction or rapid dissemination. Society could therefore enhance its potential psychophysical energy by augmenting the "social-psychophysical substrate" in two ways. On the one hand, it could educate and train spiritual workers (*geistige Arbeitskräfte*), improve the organization of communication (*Communicationswesen, Correspondenz*), and boost basic education (*Elementarbildung*) of the population. On the other hand, it could augment the psychophysical substrate by inventing new machines and building telegraph lines.

It is noteworthy that Schäffle tacitly switched to an energetic framework by using physical analogies like "force" and "energy" in his description of social psychophysics. Yet, Schäffle made no secret of the fact that he admired Fechner's "psychological mechanism of the human body" (Schäffle, 1875, p. VI) and admitted that "nothing stands in the way of explaining the course of social movement according to the laws of mechanics" (Schäffle, 1875, p. 24). Schäffle's openness to physical analogies goes some way to support my claim that Schäffle's analogies were motivated by an epistemological and not an ontological commitment. When the 'tools' of physical analogies could be fruitfully applied to the understanding of society, Schäffle did not hesitate to make use of them.

So far, we have seen how Schäffle used the insights he gained through Fechner's psychophysics to clarify the interaction between society and the state. Only in a further speculative step, Schäffle combined his social psychophysics with his economics. Schäffle (1875, p. 406) claimed that while psychologists only used the concept of thresholds to delineate the "centrally conscious and the unconscious nerve processes", one could imagine with "our phantasy" that thresholds existed throughout the social body. Schäffle imagined that every individual cell and every group of cells possessed a threshold. Hence, any kind of organization was like a "concentric circle" imbued with the same "thoughts, feelings, and preferences [*Neigungen*]". I will show in the remaining two sections that by expanding the neurological analogies of threshold, stimuli, and social ganglia to his investigation of economic relations, Schäffle tried to gain an understanding of how collectives determined the values of consumption goods and symbolic goods. Social ganglia, or "authoritative circles" like businesses, or cooperatives tried to surpass individuals' thresholds to influence consumers' valuation of commodities. Other circles like schools, expert groups, or the state determined the values of ideal goods (or their material counterpart, the symbolic goods) and used the social nerve fibers (the press, laws, and the symbolic goods of the school system) to stimulate individuals and change their behavior.

3.3 Valuation through Authoritative Circles

Schäffle (1875, pp. 405, 465) made great efforts to combine his insights from psychophysics with his prior claims that individuals always formed groups and collectives. Framed again by Figure 10 and Figure 12, Schäffle explained that every social ganglion, or "circle" (*Cirkel*), and every individual cell possessed a threshold that had to be surpassed when an external stimulus wanted to enter. Any organizational "circle" (*Kreis*) had resilience (*Widerstandskraft*) and was not easily persuaded to take up new ideas. Even *within* an organization like a business, there existed different gradations of circles, with the result that not every piece of knowledge was known to everybody. Every "corporate layer" possessed a shared consciousness, custom, and conviction.[17]

Schäffle argued that in such an environment, ideas, or knowledge did not "diffuse" wavelike as Scottish psychologist Alexander Bain (1818-1903) had suggested. Bain (1873, pp. 52–58) had claimed that a stimulus, caused by a hand injury for example, diffused like a "spreading wave" throughout the whole body so that "bodily members everywhere are put in motion". Lotze (1856, p. 178) had similarly raised the possibility that through the interconnections of the psychophysical substrate, "the initially scattered impressions accumulate through mutual stimulation in each individual element". Schäffle (1875, pp. 425–427) thought that it was a "tempting analogy" to

[17] Schäffle (1875, p. 818) further clarified that within organizations, an "impulse of the highest leadership" (*Anstoss der obersten Leitung*) alone was not enough to make the enterprise work. Organization did not exhaust itself with a "change of direction", "new ministries", or a "new law, or constitution". Rather, proper organization needed "thousandfold retroaction from below to the top" and "between all personal elements of the body".

imagine that different impressions dispersed throughout the body.[18] Yet, in his eyes, such an analogy was misguided because in society there existed a "system of different impressions [*Eindrücke*]" and "mutual complementation" (*wechselseitige Ergänzung*).

Schäffle (1875, p. 351) contended that in the social body, most knowledge was local, and did not easily enter, or leave the concentric circles that existed in other areas of society. Not the "whole of Germany", for example, "observed the spiritual work in a factory or on a market". Organizations retained ideas within their circles and new ideas did not enter easily because of the thresholds.[19] All these circles were "authorities" that were responsible for collecting, condensing, and transmitting knowledge; they "innervated" the tissues and organs of the social body.[20] Similar to how Schäffle argued that the folk spirit was not a sum of individual spirits, he thought that knowledge did not accumulate in every single individual. Rather, knowledge was spread unequally among individuals and also accumulated between them in the social nerve fibers and other intercellular substances. Moreover, ideas did not spread in all directions but were transmitted through the network of the press system.

Schäffle (1875, p. 460) came to believe that the main goal of the authoritative circles was to use or abuse this network to take effect on other authorities or on the masses of cells, that is, the consuming individuals. Every authoritative circle, be it the stock exchange, speculators, political parties, or businesses, wanted to take effect on the "perception of cost and use value of the masses from which the exchange value emerges" (*Kostenwerths- und Gebrauchswerthvorstellungen der Massen, aus welchen der Tauschwerth hervorgeht*). That the exchange value of commodities resulted from the juxtaposition of sellers and buyers was not a new finding. Already in the 1860s and early 1870s, Schäffle had defined "exchange value" as the result of a match-up between "use value"

[18] According to Schäffle (1875, p. 425), the ideas of a "general diffusion" of impressions on other individuals could possibly better explain the social spiritual life than the "images of thresholds, waves, space, and limit of consciousness". Yet, such ideas were "phantasies".

[19] In light of Schäffle's close reading of Hermann, it is surprising that he did not link the threshold phenomenon to Hermann's (1832, pp. 107, 156) concept of "obstacles" (*Hindernisse*). Hermann argued, for example, that the influx of capital might be hindered by production secrets, but also guilds. Hermann forged the idea of obstacles into arguments against the price adjustment mechanism by Smith (1776, pp. 66–78) or Ricardo (1817, pp. 82–89). In contrast, Schäffle did not use the concept of "thresholds" to address why prices did not adjust quickly if they fell below or above the natural price.

[20] The importance of authoritative circles in the generation and transmission of knowledge meant that they could not be simply dissolved. Schäffle (1875, p. 441) maintained that "tissues could not be left to their own devices", but needed "innervation"—the supply of tissues with nerves.

(*Gebrauchswerth*) and the "cost of production" (*Kostenwerth*). The use value resulted from the subjective valuation of a scarce good[21]. The higher its ability to satisfy human needs, the higher its value.[22]

Throughout his earlier work, Schäffle had argued that individuals' needs changed substantially over time. Producers and sellers constantly speculated about the newest trends in fashion that resulted from individual needs (Schäffle, 1861, p. 128). When a salesman (*Kaufmann*) of a shop exhibited his goods and wrapped them conspicuously, he aimed to stimulate unsatisfied needs (*freie Bedürfnisse*) to create a higher demand for the goods at display. Yet, Schäffle did not claim that the salesman had an effect on individuals' perceptions. The subjective use value still originated from individual valuation alone. In his *Social System*, Schäffle began to suggest that there existed a mutual relationship between individuals and collectives with respect to the perception of value. Schäffle (1873a, p. 275) came to find that organizations like the fashion industry, for example, went to lengths to change individuals' perceptions through advertisements and magazines.

Yet, such ideas remained aside, as overall Schäffle considered values to result from subjective valuation independent of larger collectives and organizations. In *Structure and Life*, Schäffle (1875, p. 64) repeated his claim that the determination of the exchange value was an unconscious process in which different use values and costs of production faced each other on a market. This "convergence

[21] Schäffle (1861, p. 10) clarified that a commodity only possessed use value when it had utility (*Nützlichkeit*)—the ability to satisfy human needs. The amount of utility an individual saw in a commodity decided about its value. Use value was the driving force (*Triebfeder*) of production and steered its direction (Schäffle, 1861, pp. 91–94). In his *Social System*, Schäffle (1873a, p. 200) clarified that the "exchange value" fluctuated between the lowest use value (*Gebrauchswerth*) and the highest cost of production (*Kostenwerth*). With excess supply, the exchange value was equal to the "relatively lowest individual cost of production", with excess demand, the exchange value was equal to the "relatively highest individual use value (Gebrauchswerth)" (Schäffle, 1873a, p. 189). In *Structure and Life*, Schäffle pointed out that his definition of "use value" should not be confused with Marx's use of the term. Marx (1887/1996, p. 46) claimed that "[t]he utility of a thing makes it a use value", which was "limited by the physical properties of the commodity". In Schäffle's (1878b, p. 323) reading, Marx made no difference between the "existence of the commodity as use value and the physical existence of the commodity". Instead, Schäffle (1878b, p. 323) defined use value as "the value of the goods revealed in the size and urgency of the demand on account of their temporal and local utility" ([*D*]*as in der Größe und Dringlichkeit der Nachfrage sich offenbarende Geschäztsein der Waare wegen ihres Nuzens für zeitlich und örtlich gegebene Bedarfsgrößen*).

[22] Austrian economist Friedrich von Wieser (1851-1926) argued that Schäffle earned "the greatest merit through his insights into the subjective nature of economic value" (Wieser, 1884, p. 13). Schäffle has also been identified by historians of economics like Knut Borchardt (1961), Erich Streissler (1989, 1990), and Klaus Hennings (1989, pp. 176–179) as a forerunner to the subjective theories of value by Menger, Eugen von Böhm-Bawerk (1851-1914), and Wieser.

of individual cost values represented in supply, and of individual use values represented in demand" resulted in an "equilibrium price" (1875, pp. 535–536). Yet, unlike before, Schäffle (1878b, p. 279) reasoned that it was incorrect to see use values as resulting from purely "subjective and temperamental [*launisch*] evaluation". In Schäffle's new economic world of stimuli, thresholds, nerve fibers, and circles, there existed a variety of authorities that constantly tried to enter people's minds in order to change their perception of value.

Mediated through neurological analogies, Schäffle's reasoning underwent a major shift in causality and attribution of agency. In the determination of values, individuals lost much of their driving force as they were swayed in their perception by authoritative groups. Individual determination of value made room for the "social determination of value" (*sociale Werthbestimmung*). Schäffle (1875, pp. 539–548) claimed that businesses tried to alter individuals' perceptions by advertisements in newspapers. Consumer cooperatives decided about what products were of high enough quality to be offered to their members. Tastes, fashion trends, and aesthetic values were determined by authorities like scientists and artists, or authoritative groups like businesses, schools, publishers, and newsrooms. In order to disseminate their value judgments, these authorities made use of the "institutions of publicity" like journalism, technical journals, assemblies, and public speeches (Schäffle, 1875, p. 398).

By the time Schäffle published his third edition of *Structure and Life* in 1896, early forms of consumer protection had drawn his attention. Schäffle (1896b, p. 240) argued that institutions that prevented "food counterfeiting" and "unbridled luxury" should exclude or facilitate the satisfaction of certain demands. Governmental authorities also became more involved with the economic metabolism by interfering through education and taxation. By introducing taxes on what the state considered harmful, for example, champagne and sparkling wine, politicians tried to take effect on the determination of the exchange value.[23]

According to Schäffle (1875, p. 546), most authoritative circles had no malicious intent. In many ways, the authoritative determination of value was beneficial for society as a whole. When a factory could convince masses of individuals of the higher use value of a commodity through advertisement,

[23] Taxes on sparkling wine were in fact introduced in 1902. As the debate surrounding the introduction of the tax shows, the main argument in favor of the tax was not its influence on exchange value. Rather, the tax should finance the state expenses and the navy. Instead of being paid by all classes, which was the case for tobacco and beer taxes, sparkling wine taxes were considered to only affect citizens with higher incomes. See *Reichstagsprotokolle* 1900/03, 11, Aktenstück Nr. 127, p. 766-790, and *Reichstagsprotokolle* 1900/03,2, 44. & 45. Sitzung, p. 1217-1273, https://www.reichstagsprotokolle.de/Band_k10_bsb00002791.html (3.11.2023).

the business could produce larger quantities of the specific commodity and thus make it cheaper for consumers. Authoritative groups like businesses and consumer cooperatives were also more capable of collecting and processing knowledge than individuals. The latter had only indirect access to knowledge of the quality of consumer products, or the actual cost of production, and they possessed only limited brain capacity. In contrast, authoritative circles could specialize in specific tasks, which led to the "division of labor in spiritual work" in society (Schäffle, 1875, p. 438).

As we have seen in Chapter 2, Schäffle had always emphasized that individuals formed collectives with emergent properties that had retroactive effects on the very individuals that created them. Yet, Schäffle could not yet investigate in what way these retroactive effects manifested themselves. With the analogies of threshold, consciousness, ganglia, and nerve fiber, however, Schäffle could suggest that values were determined in circles and then transferred to the individual minds through the press and other means of communication (Communication). Schäffle could now offer concrete images that allowed the investigation of interrelationships between the nervous tissue and the metabolism tissue, the relationship between consumers and producers, and the relationship between local and public knowledge.

As with his interest in symbolic goods, Schäffle stood alone in the 1890s with his emphasis on communication mediated through neurological analogies like nerve fibers, and thresholds. At Schmoller's chair in Berlin, historical detail studies were paramount. In Leipzig and Munich, Lujo Brentano advanced the study of trade unions and cartels. Schäffle's disciple, Karl Bücher specialized on the economics of transportation and the science of the press rather than investigating how knowledge affected valuation. In widely disseminated works like Adolph Wagner's *Principles of Political Economy* (1892), or Eugen von Philippovich's *General Economics* (1893) the concepts of communication and knowledge play only subordinate roles.

As U.S. economist Joseph Stiglitz (1985) elaborated, the concept of knowledge, or what has then been called "information" only entered economic research with Friedrich von Hayek's (1899-1992) work, 60 years after Schäffle's *Structure and Life*.[24] Like Schäffle, Hayek (1937, p. 49) claimed that knowledge was local and that the division of knowledge was equally prominent as the division of labor in society. The consequences that Hayek drew from his analysis of knowledge in the economy, however, were quite contrary to Schäffle's. Hayek (1945, p. 526) concluded that prices condensed the "relevant" information in such a way that a market could allocate resources as if it was "one single

[24] Schäffle did not use the term "information". Instead, he referred to the terms "knowledge" (*Wissen*), "spiritual work" (*geistige Arbeit*) and "communication" (*Kommunikation*).

mind possessing all the information which is in fact dispersed among all people involved in the process".

Schäffle did not dispute the significance of prices for the allocation of resources. However, as the foregoing paragraphs have shown, Schäffle thought that an analysis of types of knowledge about commodities other than prices was necessary. The demand for, and existence of institutions like the state, consumer protections, cooperatives, and other associations showed that information about the quality of products did not necessarily reflect itself in prices. Put simply, if prices were enough to allow the economic process to run, why was there a need for authorities that provide information about the quality of food, or about the newest trends in fashion? Why did entrepreneurs read the economic reports in the newspapers and magazines? Why was there a great variety of symbolic goods that people used to communicate much more than only price quotations? (Schäffle, 1896b, p. 231)

Through his analysis of the interconnection between authoritative circles and individual use values, Schäffle became convinced that any type of organization, be it private, or public, could tinker with individuals' perceptions. Public institutions like consumer protection, cooperatives, schools, or the state could remedy where the "capitalist determination of exchange value" failed (Schäffle, 1875, p. 438). Schäffle (1878b, pp. 282, 311) asserted that interference with individuals' perceptions was needed, as in the current economy there existed a "mass of harmful goods" that were bought at high prices even though their "social use value" (*gesellschaftlicher Gebrauchswerth*) was doubtful. Schäffle (1878b, pp. 319–320) thought that these deficiencies could possibly be solved by autonomous organizations, or partial state intervention.

Yet, as I have indicated in Chapter 1, Schäffle lost faith in the capitalist economic order over the second half of the 1870s and came to believe that the fundamental problem of how values were determined in the economy could only be solved by a socialist organization. For Schäffle (1878b, pp. 280–283), the problem with the current economic order was not only that it created harmful goods, but also that it was unable to create exchange values that were beneficial for society. Schäffle (1878b, pp. 315–320, 352) argued that in the existing "economic determination of value", prices were set by the production cost of the "last producer" and the individual valuation of the "last solvent buyer". The result of this "random" determination of prices was that many businesses gained "surplus rents"

(*Extra-Renten*) while a large part of the population was not able to purchase commodities, because of their lack of purchasing power (*Kaufkraft*).[25]

Schäffle (1878b, pp. 281–283, 351–354, 469) asserted that in a future socialist system, prices could be fixed based on an evaluation of the "average cost of production" of commodities and the "average use value" of the population. This system also needed to be decentralized and had to find a way to gain insight into the individual production costs and individual use values. Schäffle's prospects of a future socialist system foreshadowed some aspects of the socialist calculation debate of the mid-20th century, which have been discussed elsewhere.[26] What is more important, is that Schäffle at this point in time did not think that average prices stood in contradiction to the great variety of the economy. Schäffle (1878b, p. 479) believed that average prices would alleviate "abnormal price increases" in the urban centers and prevent the desolation of the suburbs. Changes in prices would be distributed among all social classes and not only affect the population with lower incomes. Chances were that average prices allowed smaller firms to stay in the market (Schäffle, 1878b, p. 378). A new socialist economic order meant a "higher grade of differentiation and integration" and therefore a "true historical progress".

However, as Schäffle's subsequent work shows, his finding that the economy was a great variety could be forged into arguments that strictly opposed the idea of a socialist organization. In the new political environment of Bismarck's Anti-Socialist Laws, Schäffle retracted his bold claims about the possibility of a socialist future and appeased the authorities by claiming that Social Democracy was hopeless. In his *The Impossibility of Social Democracy* (*Die Aussichtslosigkeit der Socialdemokratie*), Schäffle (1885, pp. 25–29) argued that it was "impossible" to introduce a system that accurately calculated the share that labor contributed to the production in different industries. Calculating the labor share was infeasible because the economy was not "closed" in a large factory (*Grossbetrieb*). Instead, the economy consisted of a great variety of "uncontrollable small businesses" in production, services, reparations, and agriculture. For the well-functioning of the economy, argued Schäffle (1885, p. 56), this "variety of private type of businesses remains a necessity".

Schäffle (1885, pp. 48–49) further noted that due to the fact that humankind has become "increasingly manifold", the calculation of the "proportion of commodities" (*Güterproportionen*) was impossible. The differentiation of the individual members, professions (*Aemter*), institutions, businesses,

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[25] Schäffle knew about the concept of surplus rents long before Marshall (1890) coined the term. Hence, Schäffle (1892b) dismissed Marshall's *Principles* for not contributing more to economics than what the "classical school and the newer historical schools" had already offered.

[26] See Hutchison (1953, pp. 293–298), Hodgson (2010), and Chaloupek (2010).

cooperatives, associations, and families also opposed any political or economic leveling (*Gleichmachung*). The “extreme individualistic equality” of socialism stood in opposition to the maximum possible welfare (*Volksbeglückung*) afforded by individuals’ opportunities to make use of their unequal forces in different places and occupations.

Instead of envisioning a socialist economic order, Schäffle (1885, p. 64) banked on the possibility of advancing society with positive (non-prohibitive) reforms, while embracing the capitalist determination of value. Schäffle harbored hopes for the proliferation of credit or consumer cooperatives and syndicates (*Credit-, Waarenanschaffungs, und Absatzgenossenschaften*). Schäffle’s own efforts went into the establishment of an insurance system that covered the workforce against accidents and disability. As we will see in the following section, Schäffle’s plans to implement an insurance system matched his conviction that authorities were justified in modifying society.

3.4 Ideal Goods and the Modification of Society

In the previous sections, we have seen that Schäffle came to believe that most of the spiritual work in society was done through collectives. Even one of the few independent activities of individuals, the subjective valuation of consumer goods, was strongly determined by the decisions within the authoritative circles. The idea that collectives decided upon values also offered Schäffle a pathway into understanding how the value of ideal goods like education, inventions, or their material expression as symbolic goods like literature and patents came into being. Remember that ideal goods undoubtedly had a social function, but their values were not determined by a subjective valuation as was the case with consumer goods.

For Schäffle (1875, p. 485), education was a fitting example of an ideal good that had no subjective value. Institutions like the school were not created through individual valuation based on utility. Quite to the contrary, many considered education a burden that they would not have chosen voluntarily. Elementary schooling (*Elementarbildung*) like learning a language incurred much cost (*Mühe*) without immediate utility. It was therefore not possible to inquire into the individual utility of education from which a use value of schooling resulted. Similarly, through the lens of subjective valuation, ideal goods like art, aesthetics, fashion, trends, literature, science, politics, and religion were “odd”. Most of these goods were not homogenous, such that determining their value through a comparison of supply and demand was close to impossible (Schäffle, 1875, pp. 136–137, 537–539).

Despite their lack of subjective value, Schäffle (1875, pp. 483–489) did not doubt that education and other ideal goods possessed an important function in society. They enabled communication, stored traditions, and increased the “social psychophysical substrate”. In consequence, Schäffle (1875, pp.

513–537) proposed to investigate where the values of ideal goods originated and quickly concluded that their values were determined "collectively" by "public criticism", "convivial conversation", and, above all, by authoritative circles.

Collective valuation (*collective Werthbestimmung*) did not imply that a centralized authority controlled all valuation, but that there existed different circles in various areas of social life that determined and exchanged the values of ideal goods. Schäffle (1875, pp. 514–515) claimed that in any domain, be it in the school, the church, the court, or in the sciences, the valuation of ideal goods was convoluted and followed different sets of laws. In different areas of social life, the social determination of value differed substantially but always resulted from collective spiritual work (Schäffle, 1875, pp. 467, 534). In order to communicate the values of ideal goods within and between circles, individuals required symbolic goods that allowed them to give material expressions of ideas and values. Unlike consumption goods, the values of ideal goods found their expressions not in money but in symbolic goods such as ceremonies, bonuses (*Prämien*), certificates (*Zeugnisse*), awards, court verdicts, titles, decorations (*Orden*), citations (*Verweise*), praise, blame, medals, and ornaments (Schäffle, 1875, pp. 512–517).

Schäffle (1875, pp. 514–524) also considered symbolic goods as a means to stimulate activity in the autonomous areas of the social body. Symbolic goods like ornaments and certificates could be used as "social declarations of value" (*soziale Geltenmachung des Wertes*) and could be employed to stimulate the members of society to take up novel habits. In Schäffle's eyes, authoritative circles therefore not only determined social values, but were also justified to stimulate, "train" (*einüben*), or "modify" (*modificieren*) parts of the social body. Most activities in society were based on custom (*Sitte*) or tradition (*Tradition*) and thus without any stimulation of the central consciousness. Yet, as Maudsley's second explanation of stimulus diffusion suggested, the transition between conscious and "local" *(partikulär*) acts was gradual (Schäffle, 1875, p. 717). Certain reflective movements, for example recognizing letters in a text, had once been consciously trained but then played out autonomously. For Schäffle, the same held true in the social nervous system.

To understand the gradual transition between conscious and autonomous action, Schäffle investigated Wilhelm Wundt's psychology. Wundt (1874, pp. 173–175) addressed the relationship between central consciousness and subordinated nervous centers through the concept of "inhibitions" (*Hemmungen*). Accordingly, a conscious stimulus, like the movement of a muscle, can be inhibited (*gehemmt*) if stimuli from other areas act on the nerve cells. To overcome such inhibitions, a conscious stimulus had to act upon the nerve cells unidirectionally with a high intensity and it had to originate from a higher instance. With respect to the social body, Schäffle (1875, p. 718) therefore argued that if a social reformer wanted to modify "social inertia" like tradition and habits, the conscious stimulus needed to be amplified by a higher "social reflective instance" (*sociale Reflexinstanz*) and it had to originate from one direction.[27] Only then, the traditional reflexes could not inhibit the central stimulus.

In "twenty-three theses" based on Wundt's work, Schäffle (1875, pp. 703–730) suggested that the organization of society was a "higher repetition" of the individual spiritual life (*Geistesleben*).[28] As the complexity of the social body surpassed the organic body, society showed a greater need for the "modifications" of its parts than natural organisms (1875, pp. 717–722).[29] These modifications could take effect not only by creating new impulses, but also by the efforts of central consciousness to eliminate or reduce existing inhibitions by augmented one-sided impulses. Hence, referring to Wundt (1874, pp. 820–821), Schäffle (1875, p. 716) argued that many areas of society were in need of "social training" (*sociale Einübung*) by the central authorities.

For Schäffle (1878c, p. 76), the most straightforward example of such modification, or training was mandatory schooling (*Bildungszwang*) that forced the population into taking up new habits for a certain time. Other centrally induced modifications like professional training (*Erlernung des Berufs*), the teaching of tradition (*Exercitium von Tradition*), and the establishment of "institutions of protection" (*Schuzanstalten*) like prisons and the military could similarly do away with social inertia (Schäffle, 1875, p. 719). Society needed to train the "basic psychophysical institutions" (*Einschulung der psychophysischen Grundanstalten*) through new laws and social reform (Schäffle, 1875, pp. 379–380). However, when it came to Schäffle's main contribution to social reform, the mandatory insurance for the labor class, the concept of "training" broke down.

Schäffle's primary objective in social reform was the introduction of a mandatory insurance system that covered laborers against disability, accidents, diseases, and the inability to work in old age (*Invaliditäts- und Altersversicherung*). Schäffle (1870a, pp. 700–702, 731) had long championed such insurance systems and expected them to eventually create the fundament for "planned self-care" (*planmässige Selbstfürsorge*). In Schäffle's eyes, forcing the population to join an insurance scheme would similarly improve social welfare like mandatory schooling, and controls (*Schulzwang,*

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[27] Wundt (1916, p. 228) did not object to Schäffle's borrowings and remarked that the economist used "biological analogies" mostly as a "heuristic maxim" (*heuristische Maxime*) and not as an "adherence to genetic biology" (*Anlehnung an die genetische Biologie*).

[28] Schäffle presented these theses in a much more structured way in the third edition of *Structure and Life* as "twenty theses" (Schäffle, 1896a, pp. 248–265).

[29] This idea was also inspired by Comte's claim that "social phenomena, as the most complex of all, are most modifiable in their composite factors" (Schäffle, 1875, pp. 721–722).

Gesundheits- und Wohnungspolizei). By forcing individuals to enroll in insurance schemes, they became "free of dangers" by accidents, diseases, and old age (Schäffle, 1878b, p. 42).

Yet, in contrast to mandatory schooling and other forms of social training, mandatory insurance membership could not be temporary. Hence, the idea that individuals could be consciously stimulated to take up the habit of joining an insurance scheme until they did so autonomously did not fit this social reform. In the draft of his insurance system (*Der korporative Hülfskassenzwang*), Schäffle (1882, p. 16) argued that for the most efficient organization of insurance, membership had to be "permanent" (*dauerhaft*). In the existing "atomistic insurance business" of private companies, members could freely decide whether they wanted to continue to pay contributions or cancel the contract (Schäffle, 1878b, p. 42, 1882, pp. 15–17). This voluntary membership had consequences for the organization and operation of insurance. Private insurance companies had to make sure that their members stayed committed over long periods, had to fear the solvency (*Zahlungsfähigkeit*) of their members, had to rely on accurate probability calculations, and were dependent on the interest rate on their reserves.

In contrast, Schäffle (1882, pp. 8, 17–21) argued that mandatory insurance systems did not have to worry about the commitment of their members. As a result, they benefitted from constant memberships and lower risks. A further benefit resulted from Schäffle's idea to set up mandatory "corporative insurance cooperatives" (*korporative Versicherungsgenossenschaften*), which meant that businesses in different regions and branches could be forced to set up their local insurance organizations in self-governance. Using such a system, the responsible organizers "could take into account the […] concrete individual and collective risks" and adjust the contributions (*Prämien*) accordingly.[30] Neither private insurance companies, which enrolled members from all professions and geographical regions, nor the central state authority could ever attain this specific local knowledge. Schäffle's system of corporative insurance cooperatives was therefore not "limitless centralization", but "free self-governance" under the auspices and guidance of the state (Schäffle, 1882, pp. 21–23).

Due to the fundamental differences in the organization of private and mandatory insurance, Schäffle did not believe in a slow transition from private to mandatory organization by social training. For Schäffle (1882, p. 16), there existed a "threshold" between the two types of organizations that was impossible to surpass. The compulsory insurance system had to be implemented by legal reforms that could be enforced by the authorities instead of stimulating the population to take up new habits. It is

[30] Another benefit was that by tying laborers to local associations, fraud could be mitigated (Schäffle, 1882, p. 31).

therefore not surprising that Schäffle's studies on the insurance system were not framed by the neurological analogies that he borrowed from Maudsley and Wundt.

Schäffle's work on corporative insurance cooperatives did not remain a theoretical exercise. In various contributions to his journal *ZgS* and newspaper articles, Schäffle widely disseminated his reform plans. In the early 1880s, Schäffle was one of the few economists who got appointed by Bismarck to assist him with the legislation on mandatory insurance. Schäffle (1905b, pp. 143–184) proudly noted in his autobiography that he had sent his draft on compulsory accident insurance to Bismarck in October 1881 and was invited to Berlin to discuss the matter personally with the Chancellor.[31]

Together with Adolph Wagner and Bismarck's main advisor on social policy Theodor Lohmann (1831-1905), the group of social reformers planned the implementation of the insurance system over several days in early 1882. One point of contention between Schäffle, Wagner, and Bismarck on the one side, and Lohmann on the other, was whether insurance membership should be voluntary or mandatory.[32] To the great disappointment of Lohmann, Schäffle and Wagner succeeded in convincing Bismarck to introduce a system of mandatory health insurance in 1883 and accident insurance in 1885.[33] Despite his success, Schäffle did not become a permanent member of the highest authoritative circle of the German Empire and returned to Stuttgart after two weeks.

In 1887, Schäffle seized the opportunity to take effect once again on social reforms by the means he had described in his social psychophysics—the dissemination of ideas through the press network. As German historian Wilfried Rudloff (2021, pp. 193–194) explained, Schäffle exerted an outstanding influence on the invalidity and old age insurance "from his Stuttgart desk". Through several articles, Schäffle promoted the idea of a wage-based pension scheme in opposition to the "bleak

[31] Schäffle was little known to Bismarck beforehand. Before Schäffle was invited to Berlin, the Prussian ambassador to Stuttgart, Otto von Bülow (1827-1901), had to report on the life of Schäffle at the request of Bismarck and assured him that Schäffle was no longer a socialist. See Bülow an Bismarck, 20. Dezember 1881, in: BArch, R 43/527, Bl. 215-216.

[32] Wagner (1881, pp. 5–6) agreed with Schäffle on the necessity for mandatory insurance. On Wagner's contribution to Bismarck's social policy, see Heilmann (1980).

[33] See Theodor Lohmann an Ernst Wyneken, 1. Februar 1882 (*Abteilung II, 2. Band, 1. Teil, Nr. 40*, in: Quellensammlung zur Geschichte der deutschen Sozialpolitik 1867 bis 1914, 2. Band, 1. Teil. Von der zweiten Unfallversicherungsvorlage bis zum Unfallversicherungsgesetz vom 6. Juli 1884. Digitale Version unter Mitarbeit von Hans-Werner Bartz, Anna Neovesky und Torsten Schrade, URL: https://quellen-sozialpolitik-kaiserreich.de/id/q.02.02.01.0040 (3.1.2023)). On the formation of the German welfare state (*Sozialstaat*), see the two volumes by Wolfgang Ayass, Wilfried Rudloff, and Florian Tennstedt (Ayass, Rudloff, & Tennstedt, 2021; Tennstedt, Ayass, & Rudloff, 2021).

egalitarianism" (*kahle Gleichmacherei*) of the uniform pension (*Einheitsrente*).[34] With his ideas, Schäffle brought about a "shift in thinking" in the Ministry of the Interior.

It is likely that Schäffle considered himself to be a member of both the highest central consciousness and the lower autonomous circles. With his ideas about mandatory insurance Schäffle decided about social values, tried to modify lower instances of the social body and he managed to surpass the threshold of the central consciousness of the state. These modifications of the social body by the introduction of mandatory insurance were internationally unprecedented and were a landmark in the emergence of the German welfare state.[35]

Schäffle further showed that he could accurately predict the future "order of society". In the latest edition of *Impossibility of Social Democracy*, which has been translated into English, Schäffle (1892a, pp. 408–419) gave an outlook into the year 2000.[36] Schäffle (1892a, p. 418) admitted that:

> "I have no faith in the millennial realm of Democratic Communism, in the fabled kingdom which is to give everything equally to all, to dispense with government and aristocracy, to be rid of all established professional differentiation and all private gains."

Instead, Schäffle (1892a, pp. 416–417) suggested that by the year 2000, "there will have been a slow and gradual development of public management of many departments of business" that still relied on the "agency of Capital itself". At the same time, the "State by the year 2000 would, there is no doubt, have a constitutionally tempered universal suffrage", "female labour will by that time probably have attained a well-regulated organization", and "protection of labour will have been carried to a far higher development". Schäffle (1892a, pp. 408–409) also expected that universal suffrage would be tempered by the "supplementary representation through the communal-corporative structure of the latest social reform". For Schäffle, the proletariat was capable of "positive construction" that gave "impetus to the improvement of all social conditions".

3.5 Conclusion: neurological analogies as powerful heuristics

Before *Structure and Life,* Schäffle experienced great difficulties in dealing with the function and the value of symbolic goods like letters, newspapers, advertisements, literature, scientific findings, and

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[34] On Schäffle's influence on the invalidity and old age insurance, see also Ayass, Rudloff & Tennstedt (2021, p. 146).

[35] On the history of the German welfare state, see Tennstedt (1981) and Hentschel (1981).

[36] Schäffle's outlook was a response to Edward Bellamy's (1850-1898) popular novel *Looking Backward, 2000-1887* of 1888. In the book, Bellamy predicted an egalitarian and classless society in the year 2000. On Schäffle's response to Bellamy, see also Hodgson (2010, p. 307).

art. They had an important function in society, but due to their inexhaustibility and reproducibility, they had little subjective values—symbolic goods were of "odd" character. We have seen in this chapter that the symbolic goods lost their "oddity" when Schäffle framed them by the tissue analogy. Schäffle could visualize symbolic goods as part of a "social nervous system" and could assign them the functions of communication and storage of knowledge. Schäffle argued that "social ganglia" like businesses, cooperatives, and municipalities used symbolic goods to communicate values through the social nerve fibers. Businesses and institutions of consumer protection tried to surpass individuals' "thresholds" to alter their perceptions. With advertisements, brochures, and news articles, they aimed to increase the subjective use values of certain consumer goods.

Through neurological analogies, Schäffle not only disposed of a more detailed account of how knowledge was dispersed throughout the social body but also gained more insight into how knowledge was created. According to Schäffle, most knowledge, or as he called it, ideal goods, was generated in the social ganglia. Businesses, collectives, interest groups, academic circles, and other "authoritative circles" divided society's spiritual labor and produced specific knowledge in various areas of the social body. Due to the thresholds that existed throughout the social nervous system, these new ideas, trends, and insights did not disperse widely across the entire social realm and did not automatically enter the central consciousness of the state, let alone every single member of society. Unlike consumer goods, which freely circulated once their subjective values exceeded their production costs, ideal goods traveled within the "nerve fibers" (*Nervenbahnen*) of the press system and were hindered on their path by thresholds.

In contrast to consumer goods whose values were determined on a market by the juxtaposition of subjective values and the cost of production, the values of ideal goods obeyed a different set of laws. Their values were determined by specialized authoritative circles in education, fashion, science, and the arts. I have therefore argued that neurological analogies served Schäffle as heuristic tools to inquire into the functions and values of ideal goods or their materialistic representation as symbolic goods. We have also seen that Schäffle took part in an authoritative circle of social reformers himself. Schäffle not only believed that his innovative ideas about compulsory insurance systems had a social value, but he also thought that he was qualified as a member of an authoritarian group to stimulate the parts of society and modify them according to his ideas.

Compared to Schäffle's tissue analogy that we have encountered in Chapter 2, Schäffle's social psychophysics received much more attention and appraisal. Like Schäffle, German sociologist Georg Simmel (1858-1918) believed that society consisted of a variety of differentiated groups and collectives (Simmel, 1890), which he delineated with the concept of "threshold" (Simmel, 1908).[37] In an anthology of outstanding contributions to sociology, Werner Sombart, whom we will encounter in the next two chapters, included Schäffle's thoughts on the "basic spiritual connections" (*die geistanstaltlichen Grundverknüpfungen*) without suppressing the analogies of nerve cells, ganglia, and fibers (Sombart, 1924a, pp. 60–75). Yet, as we will see in the next chapter, Sombart did not take up Schäffle's social psychophysics in his economics but built his theories on an entirely different set of biological analogies.

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[37] On Schäffle's influence on Simmel, see Dahme (1988b, p. 4, 1988a).

Part II WERNER SOMBART'S "TOOLS" FROM BIOLOGY

"If I can cut the tree in less time with a hand saw: why bother to get a steam saw with a lot of effort?!" (Sombart, 1930, p. 304).[1]

INTRODUCTION

In the introduction to his ground-breaking *Modern Capitalism* (1902a), German economist Werner Sombart explained that the fundamental epistemological problem of economists was that "[w]e want unity and life infinitely creates new variety".[2] What he voiced in 1902, occupied Sombart his whole life. In his dissertation, Sombart (1888, p. 3) wanted to retrace the "concrete variety" of rural Italy. Over the next decades, Sombart collected and processed a stupendous amount of contemporary and historical sources to get an all-encompassing picture of the "variety of firms" and to study its development (Sombart, 1902a, p. 25). Sombart complemented the insights gained through his impressive library of more than 30,000 volumes by visits to manufactures and by window-shopping.[3] In the third volume of *Modern Capitalism*, Sombart (1927a, p. 882) claimed that the "motives that operate in economic life are very manifold, and the colorfulness of life finds its expression in the colorfulness of economic organizations". In one of his last contributions to economics, Sombart (1934) promoted a planned economy that should conserve the variety of different industries in Germany at all cost.

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[1] "*Wenn ich aber den Baum in kürzerer Zeit mit der Handsäge fällen kann: warum mit vielem Aufwand eine Dampfsäge herbeiholen?!*".

[2] In the German original, Sombart (1902a, p. XXX) stated: "*Wir wollen Einheit, und das Leben schafft ewig neue Mannigfaltigkeit*".

[3] On Sombart's library, see vom Brocke (1992, p. 135). Sombart (1901, p. 17) claimed, for example, that "shop displays" (*Schaufenster*) were useful to validate his ideas. As Backhaus (1989, p. 601) fittingly put it, Sombart wanted to "mine every available document of any type".

Sombart also wanted to conserve variety in his economic methodology. His work is thus hallmarked by his attempt to illustrate the entire capitalist life with its manifold firms, branches, orders, technologies, commodities, mentalities, and motives. For Sombart (1902a, p. XI), economics was an "empirical science" that based every finding (*Erkenntnis*) "on the direct experience of living processes" and that could "never suffer from an excess of empirical knowledge". Sombart's aim to conserve variety led to a voluminous output that I will not be able to evaluate comprehensively. Rather, I will concentrate in the following two chapters on those instances in which Sombart made use of biological analogies to explain the variety he encountered in the economy.

More specifically, I will investigate how Sombart used the biological principle of differentiation and integration that he learned from Ernst Haeckel to understand how a great variety of firms unfolded in capitalism. Despite his adherence to empirical investigations, Sombart admitted that he needed "tools" (*Werkzeuge*) to "screen" (1896), "process" (1902, p. XI, 1930, p. 260), and "order" (1902, p. XIII) the empirical material in order to go beyond his teacher Schmoller's aim to collect detailed economic observations. For Sombart (1930, p. 340), empirical research only gained significance by "its usefulness as building material, the 'theory', however, only by its usefulness as tool, or scaffolding". The principle of differentiation and integration can thus be seen as one of the main tools from biology that Sombart applied in his economics.

Sombart occasionally used the term "organism" to describe the economy and in some instances invoked Eugenics and Social Darwinism. Yet, I believe that Haeckel's biological principle was the most elaborated and consequential biological analogy in Sombart's theory-building. In the existing literature on Sombart's economics, his borrowing from Haeckel has not been investigated yet. Only Hutter (1994) has attempted to highlight Sombart's biological analogies, but similar to his analysis of Schäffle, he focused all his attention on the term "organism", which in my view, had only little epistemological and no heuristic value for Sombart.

To my advantage, Sombart has attracted much more interest from economic historians than Schäffle and Wagemann. Three biographers (Appel, 1992; vom Brocke, 1992; Lenger, 1994), in particular, have retraced Sombart's life and work in great detail, such that I can spare a longer introduction to Sombart here. Nevertheless, a brief description of Sombart's life helps to open up the subject.

Sombart was born in 1863 into the rich family of Anton Ludwig Sombart (1816-1898), a sugar trader, politician, and co-founder of the *Verein für Socialpolitik*. After abandoning the idea of becoming a naval officer due to medical issues, Sombart studied law and took courses in economics in Pisa, Rome, and Berlin, where he graduated under Adolph Wagner and Gustav Schmoller in 1888. After a stint at the Bremen Chamber of Commerce, Sombart was appointed associate professor at the

Handelshochschule Breslau in 1890. There, Sombart attracted negative attention from his colleagues for often visiting the Silesian factories with his students, motivated by his wish to study Marx's theories in the field. Soon, Sombart became the leading expert on Marx and the Socialist Movement and he took seriously the advice that Friedrich Engels gave him to not interpret Marx's ideas as "clear-cut dogmas, but beacons for further research" (vom Brocke, 1992, p. 120).

At the turn of the century, Sombart began to deviate from his Marxist path, and, in 1902, he published the first two volumes of *Modern Capitalism*—a book that can be considered one of the most influential writings in German economic thought. In 1906, Sombart accepted the call to become a professor at the newly founded *Handelshochschule* Berlin, and in 1917, despite heavy doubts by faculty members due to Sombart's concession to Marx, he was appointed professor at the University of Berlin (*Friedrich-Wilhelms-Universität zu Berlin*). Next to the professorship, Sombart consolidated his position as a leading intellectual, influential editor, and core member of the *Verein für Socialpolitik*. In 1927, Sombart published his third volume of *Modern Capitalism* in which he argued that capitalism had come to an end and was likely to be gradually replaced by a more rational and stable socialist economy. In the 1930s, Sombart showed open sympathies for fascism, called for a rejuvenation of agriculture, and promoted autarky. The cultural-pessimist streak that Sombart cultivated since at least the early 20th century, came to a full bloom during this time. However, the Nazi Regime was not fond of Sombart's plans as they were too conservative and opposed technological innovations. Disillusioned not only about the course of the German Nation but also about his own work, Sombart died in 1941 in Berlin (Lenger, 1994, pp. 377–385).

Inspired by the stages theories of Schmoller and Marx, Sombart distinguished in his analysis of the economy between early, high, and late capitalism—a distinction that is considered to be his main contribution to economics. Early capitalism spanned from the late medieval period to the mid-19th century when it transitioned into high capitalism. With the First World War, high capitalism was replaced by late capitalism. Each of these epochs, Sombart argued, was dominated by an altering capitalist spirit that was inherent in the population, politicians, laborers, and entrepreneurs. Whereas the capitalist spirit was wild, and speculative in the 19th century, Sombart thought that this spirit had become more rational and security-seeking after the First World War.[4]

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[4] As is well known, the capitalist spirit became the dominant characteristic that Sombart used to distinguish capitalism from other stages like pre-capitalism and socialism (1902a, pp. 55, 72). Sombart's first two volumes of *Modern Capitalism* (Sombart, 1902a, 1902b) center around early capitalism. Sombart devoted his third volume (Sombart, 1927a) to the study of high capitalism and included a short outlook on late capitalism. His *German Socialism* (Sombart, 1934) can be considered his investigation of late capitalism.

In the 1930s, Sombart came to believe that the capitalist spirit transformed into a socialist spirit that prompted laborers and entrepreneurs to aim for rationality and planned stability. Hence, Sombart (1927a, pp. 1016–1018) famously claimed that it was "irrelevant" (*gleichgültig*) whether the economy was capitalist or socialist. In both systems, the mode of production (*Arbeitsweise*) was "intellectualized" (*vergeistigt*), by which Sombart meant that work was rational, based on planning, accounting, and technology. With such claims, Sombart wielded a far-reaching impact, especially in Germany and Russia.[5] Moreover, Sombart is considered to have coined the term "capitalism" and his research on the history of accounting caught on with economists and historians alike.[6]

We will see in Chapter 4, how Sombart was fascinated by the great variety of economic life since his first writings. I will discuss how Sombart's assertion that the economy consisted of a great variety of firms was incompatible with Marx's theory of industrial development. As a result, Sombart developed a new theory of industrial development based on Haeckel's principle of differentiation and integration. I will claim that Haeckel's principles led to several new insights and research paths, the most important of which was Sombart's distinction between a "firm" (*Betrieb*) and a "business" (*Unternehmen*). As the distinction is important to go through my arguments in the subsequent sections, it worthwhile to clarify this difference already here. According to Sombart, a firm is merely the organization of labor and capital towards a certain end (*Zweck*). The end, or purpose, of a firm can differ depending on whether a firm is capitalist (profit-seeking), or non-capitalist (self-sufficient).[7] In the first case, a firm is a "business" (*Unternehmen*), in the second case, it is a handicraft firm, a cooperative or a socialist firm. I will further argue that Sombart's new theory of industrial development led to two new research paths. On the one hand, Sombart intensified his research on the "capitalist spirit" that dominated the modern economic life. On the other hand, he tried to understand in what manner "organization" became a key determinant of higher productivity.

Just as often as his impact on economics, historians have emphasized Sombart's sympathy for fascism in the 1930s, a time during which he proposed a new order of the German economy that included a conservative plan to go back to agriculture and promote traditional handicraft production methods. I

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[5] See Zweynert and Riniker (2004) on Sombart's popularity in Russia.

[6] Sombart remains a major point of reference in the historiography of accounting. On accounting and the rise of capitalist rationalism, see Yamey (1964) and Carruthers and Espeland (1991). For research directions in accounting history, see Napier (1989).

[7] We will see that Sombart (1902a) described the non-capitalist economy as a system ruled by the "principle of self-sufficiency" (*Bedarfsdeckungsprinzip*). A more accurate translation of *Bedarfsdeckungsprinzip* would be "principle of coverage of needs". For the sake of brevity and readability, I will use the term "self-sufficiency", which also reflects Sombart's notion that in non-capitalist systems, meeting basic needs was sufficient.

will show in Chapter 5 that such ideas not only resulted from Sombart's cultural pessimism but were also based on a "schema" (*Schema*) that Sombart used to pin down an "economic system". I will argue that Sombart developed this schema from the insights he gained through the biological principle of differentiation and integration. Yet, Sombart did not go further in his borrowings from biology and did not take over a new set of biological analogies used by his contemporaries to promote a corporatist (*ständische*) economy. The late Sombart thus makes the case for the failure of biological analogies in economics.

Chapter 4 Differentiation and Integration in Industrial Development

Sombart's recourse to biology has often been cast in a negative light. Historians have highlighted Sombart's use of the "element of race" (Schumpeter, 1954, p. 792), his concessions to the "racial delusion of the brown leaders" (Krause, 1962, p. 90), and his development of a "racial anthropology" (Lenger, 1994, pp. 187–218). Others understood the term "organism," to which Sombart occasionally alluded, as a catchword for legitimizing state control and hierarchy. Hutter (1994, p. 295) argued that in Sombart's work, the "economic organism is transferred into a system of hierarchically composed meaning". Appel (1992, pp. 227–228) portrayed Sombart as part of a reactionary, anti-Western, and anti-capitalist movement in the interwar period that drew on the "organism analogy" (*Organismusanalogie*) to make the case for a strong political leadership.

The fact that historians focused their attention on Sombart's racial theory and his allegedly politically motivated uses of the organism metaphor in the interwar period is probably owed to the historiography of the so-called German "Conservative Revolution".[1] Since Sombart sympathized with representatives of the Conservative Revolution and has occasionally been described as a conservative revolutionary himself, his biological analogies seemed for many to be concessions to a folkish (*völkisch*), romantic, and anti-Capitalist worldview.[2]

Even though Sombart has often been labeled too quickly as a reactionary and anti-capitalist thinker, I do not dispute that he can be called a conservative revolutionary in the interwar period. In this chapter, is not my main concern to locate Sombart in a larger current of conservative thinkers or to discuss his organism metaphor. Rather, I want to bring to the fore that Sombart resorted to an explicit biological analogy at the end of the 19th century: Haeckel's principle of differentiation and integration. In my view, this principle had much more far-reaching consequences on Sombart's economics than his racial slurs and his passing invocations of the term "organism". Sombart also used Haeckel's

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[1] The paradoxical term "Conservative Revolution" (*Konservative Revolution*) was coined by Swiss historian Armin Mohler (1920-2003), who used it to describe the German national-conservative movement during the Weimar Republic. According to Mohler (1972), the diverse group of conservative revolutionaries opposed the parliamentary system, were anti-modernist, and anti-capitalist. As its core members, Mohler defined cultural historian Arthur Moeller van den Bruck (1876-1925), philosopher Oswald Spengler (1880-1936), philosopher Ernst Jünger (1895-1998), and politician Edgar Julius Jung (1894-1934). Many conservative revolutionaries referred to the state or the economy as an "organism". For a more recent view on the Conservative Revolution, a term that caught on with many historians, see Woods (1996).

[2] German historian Rolf Sieferle (1995) portrayed Sombart as a "conservative revolutionary" alongside Mohler's main representatives of the movement.

principle in a way that was anything but anti-capitalist or anti-modernist. With Haeckel's principle, Sombart explained how capitalism unfolded into a variety of firms that drove out the old and unproductive handicraft system.

4.1 The Lure of Variety

For his doctoral dissertation, Sombart traveled to Italy for a two-year stay during which he studied the organization of the *Agro Romano*, the vast agricultural land surrounding Rome. His study included interviews with local farmers and politicians, exposés about the soil quality and the climate, as well as a historical study on the development of the social classes and the production techniques. Sombart did not compare his study to Goethe's travels in Italy, but he seemed to have been similarly interested in investigating the manifold details he encountered on his way. Sombart (1888, p. 3) advertised his work by explaining that he wrote it for "those, who take joy in exploring the concrete variety [*Mannigfaltigkeit*] of economic and social phenomena". And quite to the taste of his teacher Gustav Schmoller, who saw in economics a policy-oriented science, Sombart expressed that his study pursued a "practical-social political interest".[3]

Sombart (1888, p. 4) claimed that he conducted an "autopsy" of the region, which represented a certain "type of stage" of the Western European economy. His analysis, therefore, had the "status of an experiment in the exact sciences", which later on should help to assess the conditions in Germany and to "become more cautious in choosing the healing methods for possible diseases". The study bore the mark of a social reformer and not of Marx's theories of surplus, exploitation, and industrial development. Nevertheless, Sombart (1888, p. 7) argued that the origin of the "disease" of the Roman Campagna was to be found in the "unhindered, free unfolding of economic forces" that led to "a socially unhealthy arrangement in production, distribution, property, and wages." The high profits of landowners were not advantageous for a prosperous development but created a "plague bump" (*Pestbeule*) that endangered the whole "economic organism", because it hindered the more efficient use of the soil by modern technology. Hence, the state had to intervene in the interest of the whole (Sombart, 1888, pp. 105–118).

Sombart's investigation of the Roman Campagna was a historical detail study, but he did not shy away from making use of the rent theory that he found in the works of Wagner and Schäffle. To understand the agricultural activity in the surroundings of Rome, Sombart (1888, p. 127) also

[3] Consider, for example, Schmoller's inauguration of the *Verein für Socialpolitik* in late 1872 when he claimed that the goal of economic research was practical and should "raise the lower classes [..] and integrate them into the organism of society and the state" (Schmoller, 1890, p. 11).

attempted to draw "a picture in a deductive way using Thünen as a guide". Yet, theories that could not be applied to the concrete variety had no room in Sombart's economics. As his scathing review of Friedrich von Wieser's *Natural Value* shows, Sombart (1889a, pp. 1488–1490) did not think fondly of the newer theories of value. For Sombart, Wieser stood at the end of a "wrong scientific development of the 'subjective' teaching of value founded by Gossen, Jevons, and continued by Menger, Sax and others". Attempts to define a "natural value" were "out of touch with the world" (w*eltfremd*) as "values" could not be calculated.

In the early 1890s, Sombart shifted his attention from agriculture to the study of urban businesses. From the long debates in the *Verein für Socialpolitik* about the chances of survival of small "distributive businesses" against their larger competitors like wholesalers, department stores, and consumer cooperatives (*Grossmagazine*, *Warenhäuser*, *Konsumgenossenschaften*), Sombart (1892) knew that there existed the "most diverse gradations" of retailers.[4] Detailed empirical studies on the different types of retailers and new statistical data, brought Sombart to realize that next to "purely speculative wholesalers", there was space for small retailers, consumer cooperatives, and even non-profit stores for civil servants (*Beamte*).

The shift of interest toward industry and its development is also noticeable in Sombart's (1893) studies on the Italian proletariat. Before Sombart investigated the working conditions in Italian industry, he outlined the development of handicrafts, manufactures, and factories in different branches of the Italian economy. Sombart (1893, p. 190) concluded that Italy was still in a lower stage of industrial development because handicrafts and small firms still dominated production. The study of Italian industry (*Gewerbe*) was not about gaining insight into social policy. Rather, Sombart (1893, p. 178) wished to further his knowledge about the earliest forms of "capitalism", like the "biologist who diligently examines the lowest organized living creatures".

At this point in time, Sombart thought that one of the "organized living creatures" was the Italian economy as a whole, and not, as we will later see, the different types of firms in the industry. This whole did not have to be studied by investigating the different forms of industry in much more detail. What Sombart wanted to tease out of his studies on the Italian economy, was "the typical, the general in the particular". Instead of "identifying the particulars", as he had done in his dissertation on the Roman Campagna, Sombart (1893, p. 181) now wanted to study the Italian economy in its "relation

[4] In 1888, the *Verein für Socialpolitik* organized a meeting to inquire into the new types of wholesalers, department stores, and cooperatives that started to emerge in Europe in the last quarter of the 19th century and threatened small retailers. See the study by Wilhelm Lexis (1888) on consumer cooperatives, or Victor Mataja's (1892) investigation of French and English department stores.

to the theory". By "theory", Sombart (1893, p. 238) referred to Marx's theory of industrial development and his claim that the capitalist process of production created "an industrial reserve army" through the introduction of mechanized factories. Sombart concluded that although Italy only had begun to industrialize in the late 19th century, the effects predicted by Marx already manifested themselves in the form of strikes.

As Lenger (1994, pp. 47–75) noted, Sombart became deeply interested in Marx's theories over the course of the early 1890s. Through the abovementioned study on the Italian proletariat and his investigations of the Silesian industry, Sombart cemented his reputation as a Marxist. One reason for Sombart's greater interest in economic theory might have been his increased weariness when it came to empirical studies. Sombart (1889b, pp. 1459–1463) thought that many empirical-statistical economists of his time either reduced too extensively or lost themselves in too much detail. The "average" wage, for example, which had dominated statistical investigations since at least Quetelet, "eliminated" variety, as it replaced the differences between "mountain and valley, town and country, man and woman, young and old, skilled and unskilled" by a "uniform number" (*einheitliche Zahl*). One can see why Sombart considered Schäffle an important influence on his thought.[5] According to Sombart, creating classes of wages was a more suitable way to gather and process statistics.[6]

Another reason for Sombart's turn to Marx was the renewed interest in Marx's theories through the publication of the third volume of *Capital* in 1894. Sombart's (1894) review of the third volume received much attention and was even praised by Engels shortly before his death in 1895.[7] Two years later, Sombart (1896a, p. 112) embraced Marx's theories in his widely disseminated *Socialism and Social Movement in the 19th Century*.[8] Whereas Sombart had previously only hinted towards the accuracy of Marx's theories, he now made clear that he believed in Marx's law of "industrial development" (*Industrieentwickelung*).

[5] In a letter to German economist Hermann Losch (1863-1935), Sombart named Schäffle as one of several authors from whom he learned a lot. See Sombart an Hermann Julius Losch, 22. Februar 1934, in Kroll, Lenger & Schellenberger (2019, p. 522).

[6] Sombart (1889b, pp. 1462–1463) also thought that Kuno Frankenstein's suggestion to categorize the wage statistics by age and branches was unfeasible. Such detailed statistics would lead to a large number of files that could not be processed by the Statistical Offices and were of little scientific interest. Not much is known about Frankenstein, who taught at the Berlin *Humboldt-Akademie* founded in 1878.

[7] On Engels' praise of Sombart's Marxist analysis, see vom Brocke (1992, p. 120).

[8] See Lenger (1994, pp. 71, 78) on the popularity of Sombart's *Socialism and Social Movement in the 19th Century*.

Marx did not use the term "industrial development", but explained in the first volume of *Capital* that in the "historical development of the large-scale industry", "manufactures are constantly passing into the factory system, and handicrafts into manufactures".[9] Marx (1887/1996, p. 9) also suggested that this development followed the "natural laws of capitalist production" and that it ran parallel to the concentration, or centralization of capital. In the fourth section of *Capital*, Marx (1887/1996, pp. 341–342) argued that in the "manufacturing period" (mid-16th to late-18th century) manufactures arose from capitalists' aims to assemble independent handicrafts in one workshop. In the manufacture, individuals cooperated in a novel way through the constant division of labor.[10] Furthermore, the divisions of labor in the workshop implied "concentration of the means of production in the hands of one capitalist" (Marx, 1887/1996, p. 360).

In a later chapter, Marx (1887/1996, pp. 621–622) clarified that this "simple concentration of the means of production and of the command over labour" was "identical with accumulation". Yet, there also existed a "law" of "concentration of capitals already formed, destruction of their individual independence, expropriation of capitalist by capitalist, transformation of many small into few large capitals." It was, what Marx called the "centralisation" of capital "in one place to a huge mass in a single hand, because it has in another place been lost by many". An ever-increasing part of the centralized capital was "turned into means of production, an ever decreasing one into labour power". For Marx (1887/1996, p. 423), this lawful process was necessarily tied to the growth of the "factory system" that represented large concentrations of capital that were turned into the means of production (machinery). In the factory system, the division of labor of the manufacture reappeared where it was "primarily a distribution of the workmen among the specialized machines". This whole transition resulted in the misery of handicrafts and the domestic system, exploitation of laborers, and the rise of the proletariat.

[9] I translated the first part of this quote ("historical development of the large-scale industry") from the German original: "*aus dem geschichtlichen Entwicklungsgang der großen Industrie*" (Marx, 1890/1962, p. 514). The English translation does not highlight "development" and "large-scale industry" (Marx, 1887/1996, p. 493). Throughout this thesis, I will take over Engels' translations of the three types of firms in Marx (1887/1996): handicraft (*Handwerk*), manufacture (*Manufaktur*), and factory (*Fabrik*).

[10] According to Marx (1887/1996, pp. 339–340), cooperation already existed "at the dawn of human development, among races who live by the chase". Capitalist cooperation, however, was different from this simple form of cooperation, because it was characterized by the division of labor in the manufacture. For independent handicrafts, or peasant agriculture, cooperation in manufacture was a "historical form peculiar to, and specifically distinguishing, the capitalist process of production".

For Sombart (1896a, pp. 109–112) the transition of small handicrafts into the large-scale factory (*Grossbetriebe*) was "evident" (*ist klar*) in industrial development. The replacement of handicraft by large-scale industry was part of the class struggle that Marx had described: "Where one takes its place, the other must step aside" (Sombart, 1896a, pp. 74–76). Hence, the establishment of large-scale factories was the "economic pre-condition of socialism" as it created the proletariat and the productive forces that could eventually be taken over by the very proletariat through the "socialization of the means of production" (*Vergesellschaftung der Produktionsmittel*). Sombart's reading of Marx was in line with the convictions of the Social Democratic Party (SPD) at the Congress in Erfurt in 1891. In what has become known as the *Erfurt Program*, leading socialists like Karl Kautsky (1892, pp. 1–2) foresaw the complete demise of small-scale industry by "natural necessity" (*Naturnotwendigkeit*). The elimination of traditional types of small-scale industry by "colossal large-scale industry" went "hand in hand" with the monopolization of the means of production and the transition from tools to machines.

It is fair to say that Marx's theory of industrial development could be neatly tied to the rapid development of German industry in the late 19th century and the widespread concerns about the disintegration of the old handicraft order that was associated with it. One of the most well-known Marxists, Russian economist Mikhail Tugan-Baranovsky (1865-1919) received much attention in Germany when he explained that Britain had ushered in "the epoch of the final victory of large-scale industry" in the late 19th century. The prior stability of small-scale firms had made room for "large-scale capitalist industry" with its "wild fluctuations" (Tugan-Baranowsky, 1899, p. 5).[11]

Germany industrialized later, but all the faster than other European countries, such that by the turn of the century its iron and machine industry even outstripped that of Britain (Landes, 1969, p. 263). When the German *Länder* were unified in 1871, the steelmaker Thyssen, for example, was a small hoop-iron mill "on the green fields outside of Mülheim". By 1900, the Thyssen headquarter was a tall three-story building in the midst of the blast furnaces of a massive industrial complex (Fear, 2005, pp. 74, 106–109). As historian Fritz K. Ringer (1969, p. 1) explained, the rapid German urbanization and eroding agricultural traditions were an "unpleasant introduction to the problem of technological civilization". Like in many other Western Nations, the "Great Transformation" (Polanyi, 1944/2001) in Germany led to a sense of instability among intellectuals, who fed skepticism against the machine age.

[11] According to Tugan-Baranovsky (1899, pp. 39–40), these fluctuations could not tamed. One could only mitigate their negative impacts on the workforce by establishing trade unions. On the influence of Tugan-Baranovsky's work on German business cycle economists, see Beckmann (2005).

At the turn of the century, countless German economists and sociologists portrayed industry as a threatening presence. Mechanized production went "beyond the scope of the family home and turned into the monstrous [*ins Ungeheure*]" (Tönnies, 1887, p. 78). "Enormous supply of capital" (*ungeheures Kapitalangebot*) flowed towards industry and "had an interest" in impoverishing the rural workers to turn them into cheap labor (Oldenberg, 1897, pp. 7–9, 30).[12] Sombart's teacher Adolph Wagner (1901) highlighted the "flip side" (*Kehrseite*) of industrialization like international dependency on food imports, and capital, or the impoverishment of the population by large-scale industry. To avoid such dependency, economists like Ludwig Pohle (1902, pp. 41, 170–171, 239–242) wanted to increase tariffs to halt a further decline in agriculture and restore the balance between rural production and urban consumption. German sociologist Georg Simmel (1903, pp. 202–204) described how rising urbanization and the growth of industry created a "frightful disproportion" of the city and an "immense organization of things and powers". [13] The threat of industry also found its visual expression in an illustration by German caricaturist Josef Benedikt Engl (Figure 13).[14]

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[12] While around 1800, there existed only three cities (Hamburg, Berlin, and Vienna) in the German language area with more than 100,000 inhabitants, there were 48 of them in 1910 (Reulecke, 1985, p. 203). See also Lenger (2013) on the rapid urbanization in the 19th century in Europe and the U.S.

[13] German historian Nicolas Berg (2006, pp. 49–51) argued that German academics critical of industrialization used "counter-metaphors" (*Gegenmetaphern*) to nature. Wolfgang Hock (1960, p. 56) explained how the debates on industry versus nature and agriculture were reinvigorated in the 1930s.

[14] Depictions of industry or technology as monsters were not a German peculiarity. They appeared much earlier in Britain, for example in the satirical magazine *Punch*, and were also widespread in 'muckraker articles' in the U.S. at the turn of the century. Breyer et al. (2017, pp. 11–13) interpreted the term "monster" as an expression of the feeling of being overwhelmed by capitalism and rapid industrialization. Another interpretation of the illustration is that the monster emerging from the smokestacks represents the perceived danger from organized labor. Such an interpretation would fit the satirical journal *Simplicissimus* (1896-1944) which was critical of militarism and the bourgeois lifestyle during the Wilhelmine epoch. The poem "*Hab Acht!*" (Watch Out!) by Jakob Wassermann (1873-1934) at the bottom of the page tells the story of a guard who warns citizens of an imminent threat. The last row reads: "*Hab Acht! Die Wolke flammt, es läutet Sturm!* (Watch out! The clouds are burning, the storm is coming!)".

Figure 13: A monster emerging from the industrial district. Illustration by Josef Benedikt Engl (1867-1907) in the satirical journal *Simplicissimus*. Source: *Simplicissimus*, 13 (27. Juni 1896).

Sombart (1903, p. 509) also ranked among those who warned of the flip side of industrial capitalism, but at the same time, he was in awe of the wonders that capitalism brought about:

> "Capitalism has given us the masses, it has robbed our lives of inner peace, it has alienated us from nature […], it dissolved the world into an arithmetic […] and has driven the population into a slave-like dependency on a few entrepreneurs. But in return, [capitalism] has achieved one thing in an admirable way: it was able to provide an enormous amount of people with the means of subsistence in the finest way".[15]

[15] In the German original, Sombart claimed: "*Der Kapitalismus hat uns die Masse beschert, er hat unser Leben der inneren Ruhe beraubt, er hat uns der Natur entfremdet, er hat uns den Glauben unserer Väter genommen, indem er die Welt in ein Rechenexempel auflöste und eine Überbewertung der Dinge dieser Welt in uns wach rief, er hat die große Masse der Bevölkerung in ein sklavenartiges Verhältnis der Abhängigkeit von einer geringen Anzahl von Unternehmern gebracht. Aber dafür hat er eines gerade in bewunderswürdiger Weise geleistet: er hat eine riesig angewachsene Menschenmenge auf das beste mit Unterhaltsmitteln zu versehen vermocht, er hat gerade das Futterproblem meisterhaft gelöst, besser als irgend eine Wirtschaftsverfassung vor ihm*".

According to Sombart (1903, pp. 28–29, 325), capitalism could achieve these admirable results through increased productivity by new types of economic organizations that drove back handicrafts. Yet, unlike many of his time, Sombart did not think that higher productivity was afforded by the replacement of handicrafts by large-scale mechanized factories alone.[16] Sombart (1903, p. 345) believed that "the development of modern industry in its transition from handicraft organization to a capitalist one is characterized by an almost limitless number of varieties." What these varieties in modern industry had in common was that they possessed a "capitalist essence", or "capitalist spirit": they calculated, speculated, rationalized, and, most importantly, organized in their process of production (Sombart, 1903, pp. 76–80). Hence, just as crucial for increased productivity was how firms were "organized", that is, how well the individual parts of a firm cooperated with each other, and how well they were guided by a "capitalist entrepreneur".

We will see in the next section that Sombart came to such conclusions by changing his views on the industrial development quite drastically between 1896 and 1902. What I think played a fundamental role in Sombart's change of perspective was that he succumbed again to the lure of variety and wanted to study this variety by means of Ernst Haeckel's biology. With Haeckel's principle of differentiation and integration, Sombart could dismember Marx's theory of industrial development and use the separated parts to build a new theory of what he called "industrial development" (*gewerbliche Entwicklung*).

4.2 Dismembering Marx with Haeckel

The first clue that Sombart started to doubt Marx's theory of industrial development can already be discovered in his study *Socialism and Social Movement* (1896a). While Sombart fully embraced Marx's theory when applied to urban industry, he considered the "deductions by Marx" to not quite fit the developments in agriculture. For Sombart (1896a, pp. 110–112), it was not yet clear if large-scale production in agriculture had benefits over small-scale farms. Whether Marx's theory of industrial development is applicable to agriculture must not concern us here. What is more important, is that Sombart's doubts about Marx's theory solidified through new empirical studies on German businesses that were published in the very same year.

Under the lead of Schäffle's student Karl Bücher, the *Verein für Socialpolitik,* of which Sombart was a core member, orchestrated a large-scale empirical survey on German handicrafts between 1895 and

[16] Sombart (1903, p. 28) defined productivity as the ratio between the number of individuals directly involved in the production process and the quantity of the produced commodities.

1897. The complete survey amounted to ten volumes on the condition of handicrafts in Germany and Austria, covering more than 70 regions, and more than 50 branches. For Sombart, the great advantage of the survey was that it was not purely statistical, but consisted instead of more than 100 detailed monographs written by a young generation of economists who studied under Bücher, Wagner, Schmoller, and Brentano.[17] It included, for example, a study by Arthur Spiethoff (1873-1957) on the bookbinderies in Berlin, a report on the Breslau tanneries (*Lohgerbereien)* by Walther Borgius (1870-1932), or an investigation of the dying shops (*Färbereien*) in Leipzig by Otto von Zwiedineck-Südenhorst (1871-1957). In its scale and coverage, it was unprecedented.

As the *Verein für Socialpolitik* was policy orientated, these empirical studies were not primarily targeted toward testing Marx's theory. Rather, the economists were occupied with figuring out whether small-scale handicrafts (*Handwerker*) needed protection against large-scale factories that threatened to crowd out small firms. For Sombart (1902a, p. 662), however, the survey became his "most important source of knowledge about industrial development", and a source without which he could not have written his *Modern Capitalism*.

The fundamental role that the survey played for Sombart is already evident in his first rough summary of the majority of the monographs that were published in 1896. After outlining the new insights of the survey, Sombart (1896b) claimed that the "existing theories of modern industrial development were thrown overboard in their essential parts in light of the new material". With "existing theories", Sombart not only referred to Marx's theory of industrial development, but also to several economists' ideas that handicrafts could secure themselves niches in individualistic-artistic production, or in reparation.[18]

The survey revealed to Sombart that despite the years of massive industrialization and its accompanying growth of large-scale mechanized factories, there still existed various types of small handicrafts and middle-sized to large manufactures that produced commodities without heavy

[17] The ten-volume study published between 1895 and 1897 was titled "Investigation of the handicrafts in Germany with special attention to its competitiveness against large-scale industry" (*Untersuchungen über die Lage des Handwerks in Deutschland mit besonderer Rücksicht auf seine Konkurrenzfähigkeit gegenüber der Großindustrie*). The study consisted of 97 detailed monographs on enterprises of various branches all over Germany. The nine volumes on Germany were edited by Karl Bücher, while Eugen von Philippovich edited a single volume on Austria. Sombart's (1902a, pp. 662–666) and Grandke's (1897) overviews of the monographs show that Hamburg and the Ruhr district were underrepresented. On the widespread interest in industrial development among German economists of the late 19th century, see Pierenkemper (2007).

[18] Sombart (1896b, pp. 630–631) also made clear that protecting handicrafts against large-scale factories was of no avail.

machinery. These firms were not operating in niches but were highly productive clothing, porcelain, and furniture manufactures. Instead of arguing that Marx's theory did not yet fully manifest itself in Germany, Sombart (1896b, p. 639) claimed that Marx's theory was "outdated". The survey suggested to Sombart that there was a "great variety of developmental paths" (*Mannigfaltigkeit der Entwicklungsreihen*) when it came to the development of firms. The path of industrial development was not the linear, one-dimensional trajectory from handicraft, to manufacture, and to factory as Marx (1887/1996, p. 9) had suggested as part of the "natural laws of capitalist production".

The confrontation of Marx's theoretical framework that Sombart had appropriated in the 1890s with the empirical evidence of a great variety of firms marked the beginning of Sombart's skepticism toward Marx's research method. While at the turn of the century Sombart merely took issue with Marx's linear theory of industrial development, in the 1920s he widened his criticism to a more fundamental objection to Marx's method of abstraction. In the 10th edition of Sombart's *Socialism and Social Movement*, for example, Sombart (1924a, p. 196-224) objected to Marx's tendency to seek fundamental laws of the economy, which Marx (1986, p. 38) had described as finding the "unity of the diverse" (*Einheit des Mannigfaltigen*).[19]

Sombart could have taken the survey's results as proof of the invalidity of economic theory to support Schmoller's claim that economists still needed to collect more detailed insights before proceeding to establish theories. One of Schmoller's great contributions to economics was his *History of German*

[19] Sombart (1924b, p. 196) mainly criticized Marx's "casual" (*salopp*) treatment of the term "law" (*Gesetz, Gesetzmäßigkeit*) in the first volume of *Capital*, and in the introduction to the *Grundrisse der Kritik der Politischen Ökonomie* (a manuscript only published in 1903). According to Sombart (1924b, pp. 201-204), Marx sought at times to find ideal-typical (*idealtypische*), or inherent (*immanente*) laws of the economy. In other instances, Marx described the deterministic process of history as "natural laws". Marx's (1986, pp. 37-45) outline on "The Method of Political Economy" in *Grundrisse*, also suggests that he targeted unity in variety and not variety in unity. Marx subscribed to the method of abstraction of the economists of the 19th century who had created "tenuous abstractions" like "division of labour, money, value, etc."—a process of abstraction that Marx (1890/1962, p. 27) later termed *Forschungsweise*. When these abstractions were successfully established, the economist could form the bigger picture and advance "to the State, international exchange and world market" (Marx, 1986, pp. 37-38)—the *Darstellungsweise* (Marx, 1890/1962, p. 27). According to Marx (1986, pp. 37-38), "the correct scientific method" was to re-create the concrete from the abstract, or arrive at the "synthesis of many determinants, thus a unity of the diverse" (In the German original, Marx (1961, pp. 631-632) explained: "*Das Konkrete ist konkret, weil es die Zusammenfassung vieler Bestimmungen ist, also Einheit des Mannigfaltigen*"). Such and similar statements by Marx might explain why Sombart (1930, pp. 99-137) later assigned Marx to the group of "ordering" (*ordnende*) or "scientific" (*naturwissenschaftliche*) economists next to Menger, Mill, Pareto, and others who wanted to reduce economic life to "elementary facts" (*elementare Tatsachen*). For an interpretation of Marx's *Grundrisse* similar to mine, see Schramke (1975).

Commerce in the 19th Century (1870). In the 700-page book, Schmoller lives up to his reputation as an empirical-descriptive economist. Schmoller (1870, pp. vii–x) explained that the purpose of his study was "to collect only the material" by compiling, comparing, and arranging dispersed statistics.[20] Instead of relying on the deductive methods of Smith, Frédéric Bastiat, and Adam Müller, who "deduced the economic conditions […] from individual motives", Schmoller believed that he could "observe" with his "own eyes and an open heart".

In contrast, Sombart (1896b, p. 639) thought that despite the complexity of the matter, it was possible to form a "unifying theoretical construction" that explained the development of businesses into a variety. With the new theory of industrial development that he presented three years later, Sombart (1899) believed to have achieved this goal. The theory marked the beginning of Sombart's own theoretical contributions, for which he has been considered by German sociologist Volker Kruse (*1954) as a part of the "paradigm change in German social science". Kruse (1990, p. 158) argued that at the turn of the century, social scientists like Sombart, Max Weber (1864-1920), Alfred Weber (1868-1958), and Franz Oppenheimer (1864-1943) had switched from asking "what was?", to "how did it become?" and aspired a "synthesis of historicist and nomothetic currents".[21] As I will show in the following sections, Sombart's synthesis of the nomothetic and historical approach that resulted in a new theory of industrial development was built on the basis of Haeckel's biological principle of differentiation and integration. I claim that by this principle, Sombart was able to refine Marx's "blurred" theory of industrial development and conserve the variety of firms in his theory.

4.2.1 Marx's "blurred" theory of industrial development

Sombart presented his new theory of industrial development in an article about *Industry and its Organization* (1899). The article is extremely dense and has the disadvantage of having been published in two parts, which might explain why it has often been disregarded by historians.

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[20] For his study, Schmoller (1870) did not rely merely on quantitative statistics, but investigated the reports by the Chambers of Commerce, exhibitions, economic journals, visits to factories, workshops, and the homes of craftsmen.

[21] The term "nomothetic method" (*nomothetische Methode*) was coined by German philosopher Wilhelm Windelband (1848-1915) to describe the method by natural scientists in contrast to the "idiographic method" (*idiographsiche Methode*) by historians. Nomothetic scientists used generalizations and abstractions to find regularities and laws, while idiographic scientists emphasized the uniqueness of phenomena (Windelband, 1894). German philosopher Heinrich Rickert (1863-1936) made a similar distinction by emphasizing that in the cultural sciences (*Kulturwissenschaften*) the uniqueness of phenomena took center stage (Rickert, 1902). Both neo-Kantian philosophers built their distinction on Wilhelm Dilthey's (1883) anti-positivist definition of the social sciences that claimed an ontological divide between the natural and the social. As Kruse (1990, p. 151) argued, however, Windelband and Rickert accepted a "dualism" in the methods of the social sciences such that generalizing depictions of social life by the nomothetic method had a certain legitimacy.

Nevertheless, I think that it is worthwhile to investigate Sombart's thought processes in the article in great detail as it contains the core elements that permeated all his subsequent work.

Sombart introduced his investigation of industrial organizations by describing the "colorful range of phenomena presented to us by industrial life": smoking chimneys, spinning women, steam engines, boilers and barrels with fermenting substances, factory inspectors, strikes, and cartels. Sombart tasked himself with finding out how these different phenomena were organized, that is, what types of organizations (*Organisationsformen*), or synonymously, types of firms (*Betriebsformen*) brought these economic phenomena to life.

In order to identify the different types of organizations, Sombart did not rely on a purely inductive method, but built on what seemed to him the most promising and still unmatched theory of industrial development: Marx's investigation of handicraft, manufacture, and factory in the fourth part of the first volume of *Capital*. Sombart thought that Marx deserved credit for having learned from the English economists Charles Babbage and Andrew Ure to focus on the "formative force" (*betriebsbildende Kraft*) and the order (*Ordnung*) in the production process of a capitalist firm. Moreover, Marx's theory stood out among the more recent treatments of industrial development by Bücher and Schmoller, because Marx had emphasized that specific types of firms were "historically transient" (*historisch vergänglich*) and part of specific economic stages (*Wirtschaftsstufen*).[22] The merit of Marx's approach was therefore that he not only emphasized "order", or "organization", but also that he showed how the organization of different types of firms changed in different stages of economic development.[23]

Despite his admiration for Marx, Sombart (1899, p. 316) thought that Marx "blurred" (*verwischen*) many important details in his treatment of industrial development. Marx was correct in depicting the manufacture and the factory as a new form of capitalist cooperation. However, Marx also repeatedly equated these two "large-scale firms" (*Großbetriebe*) with the "capitalist business" (*kapitalistische Unternehmung*). In Sombart's (1899, pp. 314–317) reading, Marx thus implicitly assumed that small firms were pre-capitalist, which resulted in a lack of "sharpness" in his analysis of the domestic system, which was capitalist, but relied on small workshops.

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[22] Sombart (1899) thought that Marx's theory was unrivaled by the more recent studies on economic development. Sombart lamented that economists like Karl Bücher, and Gustav Schmoller did not follow Marx in his aim to determine the mode of production, but put more effort into investigating the "interconnections" within the whole economy instead of looking inside the firm.

[23] In Marx's (1887/1996) description of industry, the term "organization" plays a fundamental role next to the division of labor and the introduction of machinery.

Furthermore, Sombart took issue with Marx's suggestion that all types of firms eventually turned into large-scale factories or were crowded out by them. Neither could this idea be any longer supported in light of the new survey on German industry, nor did it fit Sombart's view on technology. We have already seen how Sombart learned from the survey by the *Verein* that there existed a great variety of developmental paths in industry. We will also see in more detail below, how Sombart had a different understanding of technology than Marx. In a nutshell, Sombart (1899, pp. 367–368) thought that Marx's theory was "tailored" (*zugeschnitten*) to fit the cotton industry. As a result, Marx formed an image of technology based on the "cotton mill" that took over the manual steps divided up in the manufacture. For Marx (1887/1996, p. 423), emancipation from the "human labour power" occurred through the introduction of the automated machinery of the cotton mill. Instead, Sombart believed that there existed other technologies that emancipated the process of production from the laborer: chemistry and electricity. These technologies could to some extent also be used by smaller firms (Sombart, 1899, p. 332).

What Sombart did not specifically address in 1899, but what I think he also implied with his criticism of Marx's tendency to equate the large-scale firms with capitalist firms, was that the ownership of the means of production was not a distinct enough criterion to classify firms. As we have seen above, for Marx, the transition from handicraft to manufacture was accompanied with the concentration of capital in the hand of the capitalist. As Sombart (1902a, pp. 200–201) pointed out later, in the case of a joint-stock company, the management (*Leitung*) of the firm could be independent of ownership. Through credits, even the capitalist owner of the firm became dependent.

Overall, Sombart (1899, pp. 379–381) believed that Marx confounded "heterogeneous methods of distinction" in his analysis of the mode of production in different epochs.[24] Marx claimed that the manufacture transformed human beings into specialized laborers, but he also claimed that during this process the workers' tools became increasingly specialized.[25] For Marx (1887/1996, p. 346), therefore, manufacture was not only a new form of cooperation based on the division of labor but was also "characterised by the differentiation of the instruments of labour." Even more pronounced, Marx (1887/1996, p. 190) emphasized technology when he stated that it is "not the articles made, but how they are made, and by what instruments, that enables us to distinguish different economic epochs".

[24] Likewise, Sombart (1899, p. 387) argued that Engels' and Schmoller's stage theories lacked a distinct classification of different organizations, despite building more systematically on the division of labor.

[25] Evoking Darwin, Marx (1887/1996, pp. 344–346) saw the "implements of labour" adapted to the "special functions of each detail labourer" in analogy to the variation of "natural organs of plants and animals". This process of specialization continued until each function could be taken over by automated machines in the factory.

Hence, Sombart (1899, pp. 316, 379–383) concluded that Marx evoked both the division of labor and technology to explain industrial development but neither was followed up in detail. As there was no clear "principium divisionis" between firms in different epochs, Marx's theory remained "sketchy" (*skizzenhaft*). What Sombart needed was a means to distinguish between the variety of firms and their different levels of productivity, without having to rely on technology, or on the possession of the means of production.[26] Sombart (1899, p. 355) thought that Marx's shortcomings could be overcome by Haeckel's principle of "differentiation" and "integration". By this principle, Sombart believed to be able to explain the variety of organizational forms and their different levels of productivity independent of technology.

4.2.2 Haeckel and the principle of differentiation and integration

Before I discuss Sombart's engagement with Haeckel's principle, it is helpful to first outline what Haeckel meant by differentiation and integration and how the biologist applied it in his studies. By first delving into Haeckel's biology, I can also elicit possible reasons for why the principle was appealing for Sombart's economics.

In a popular essay on the division of labor in nature and human life, Haeckel (1869) suggested that both within animal and human organizations, "individuals" specialized in certain tasks. They carried out "differentiation", or "division of labor". As a result of this specialization, the interdependence of the different individuals grew, which necessitated increased cooperation, or "integration". The degree of differentiation, therefore, determined the degree of integration. One can best understand this process through Haeckel's favorite marine organism, the siphonophora. Haeckel printed his own drawing of a siphonophora, reproduced in Figure 14, on the title page of his essay and explained how it formed through differentiation and integration.

Haeckel (1869, pp. 18–24) illustrated how the siphonophora, a jellyfish-like marine invertebrate, consists of a long "elastic axis" to which hundreds or thousands of individual polyps latch. These "individuals" have their own will and can also live on their own for a while, but are usually found connected to the "community" of the siphonophora as a result of "adaptation" in the "struggle for existence" (Haeckel, 1869, p. 33). Once an individual connects to the community, however, it specializes (differentiation) and loses all other skills that it previously possessed. Individual polyps specialize by becoming swim polyps, protective polyps, hunting polyps, and intellectual polyps.

[26] Marx (1887/1996, p. 617) highlighted that the division of labor led to more labor productivity, defined as "the relative extent of the means of production that one laborer, during a given time, with the same tension of labour power, turns into products". Yet, Marx did not explicitly separate productivity from technology.

Losing their previous skills, the polyps become highly dependent on each other and have to establish an "inner connection" by communicating and cooperating (integration). The intellectual polyps "feel, want, and think" for the other "citizens", while the hunting polyps share their food with the community. Despite the high degree of differentiation, the siphonophora is therefore animated by a "common will"—possibly under centralized guidance.

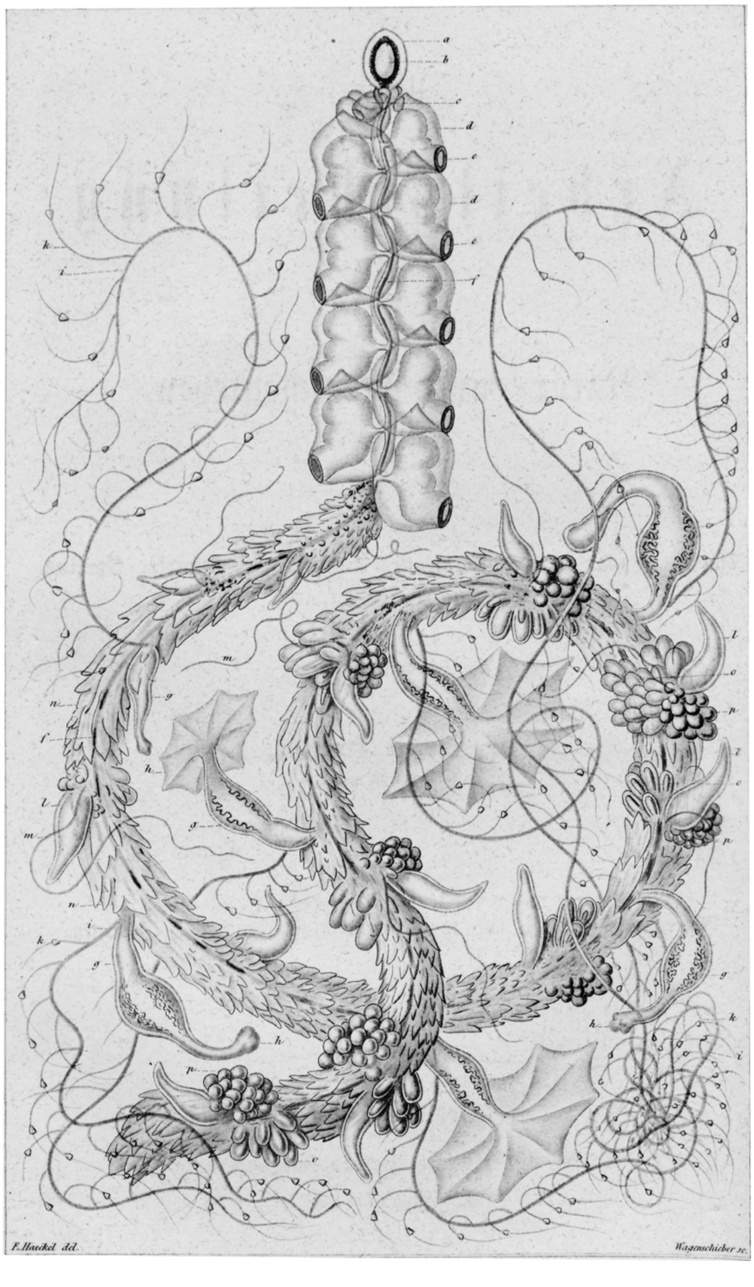

Figure 14: The Siphonophora, an assembly of specialized intellectual, swimming, hunting, and feeding polyps. Source: Haeckel (1869).

Haeckel's explanation of how the community of the siphonophora formed resonates strongly with how Marx's portrayed the emergence of the first manufactures. According to Marx (1887/1996, pp. 341–342), one way in which manufactures arise is when independent craftsmen create a product

(*Gesamtprodukt*) like a "carriage". If these craftsmen begin to permanently work only on the product by being employed, they lose their previous ability to produce other types of commodities. It is possible that Sombart connected the dots between Marx's explanation of the origin of the manufacture and Haeckel's principle already here. However, Haeckel's (1869) assertion that individual polyps assembled into the community "under pressure" or by the "struggle for existence" is not to be found in Marx, nor in Sombart.

I believe that another of Haeckel's notions facilitated the transfer of the biological principle to Sombart's economics much more. Haeckel (1869, p. 29) claimed that differentiation led to an "infinite variety in organization". Such assertion was derived from Haeckel's magnum opus, the *General Morphology of Organisms* (Haeckel, 1866a, 1866b). In the two-volume book, Haeckel used the principle of differentiation and integration as one of his main reasoning devices in ontogenesis and phylogenesis. The principle was therefore applicable not only to the individual development of an organism (ontogenesis) but could also explain how species developed into a "variety" of forms (phylogenesis). From a single-celled organism up to the highly differentiated and integrated human body, there existed manifold forms of organization in nature.

By means of his famous phylogenetic trees, one of which I reproduced in Figure 15, Haeckel emphasized that there existed a great variety of organisms with different grades of differentiation and integration. In what Haeckel (1866b, p. 397) termed the "system of organisms", one can find highly differentiated, but also single-celled, or only slightly differentiated organisms. Crucially, the existence of highly differentiated organisms did not mean that the early forms of single-celled species went extinct.[27] As can be seen in Haeckel's graphic device of the phylogenetic tree, single-celled *Moneres* (Nr. 1) not only existed at the beginning of time (f b d h), but also in the present stage (p m n q) next to the siphonophore (in the *Coelenterata* phylum, Nr. 15) and other highly differentiated organisms like *Vertebrata* (Nr. 19, fishes, or mammals) and *Articulata* (Nr. 17, insects, or crabs). The same held true for the less differentiated *Spongiae* (Nr. 8) and *Florideae* (Nr. 10). A variety of species coexisted in 19 "phyla".

[27] Haeckel (1866b, p. 233) explained that the "absolute number of organic individuals" stay the same, while only the "ratios of individual species to one another are constantly changing".

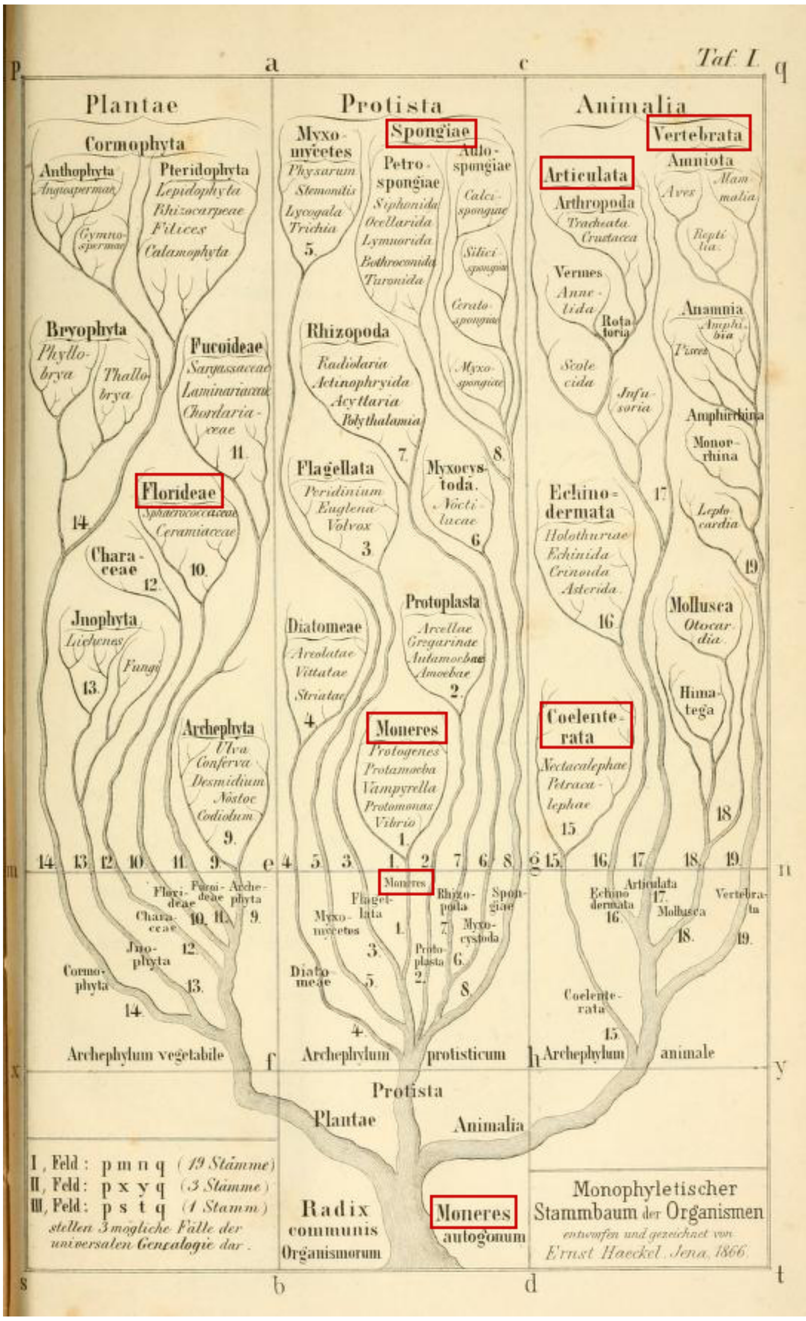

Figure 15: Phylogenetic Tree (*Stammbaum*) of organisms. Source: Haeckel (1866b).

The fact that different species coexisted next to each other did not mean that they were all equally "performative" (*leistungsfähig*). In Haeckel's (1866a, pp. 289–290) system, the more differentiated and integrated an organism was, the higher its rank (*Ordnung*) and its performance (*Leistungsfähigkeit*). Haeckel explained that when two cells gave up their independence and started to cooperate, they first profited from a "quantitative increase in strength". Once they began to differentiate, these organisms also improved their "qualitative perfection" (*qualitative Vervollkommnung*). As we will see presently, Haeckel's claims about differentiation, integration, variety, and performance can be found in very much the same way in Sombart's new theory of industrial development.

4.2.3 Sombart's theory of industrial development

At the time of Sombart's borrowing of the biological principle, Haeckel was at the height of his popularity. Only shortly after Sombart had referred to Haeckel in his 1899 essay, a Prize Competition (*Preisausschreiben*) sponsored by German industrial Friedrich Alfred Krupp (1854-1902) made Haeckel's Social Darwinism and Eugenics immensely popular.[28] Yet, Sombart did neither declare his allegiance to Haeckel's Social Darwinism, nor did he openly promote a research agenda along biological analogies.[29] Sombart was much more secretive about his borrowings from biology than Schäffle, possibly due to the criticism that the latter received for trying to map society to the human body.

The fact that biological analogies fell out of favor after Schäffle, might also explain why Sombart did not directly refer to Haeckel when introducing the terms differentiation and integration. However, there is plenty of evidence that Sombart borrowed the principle from the biologist. In the article on *Industry and its Organization*, Sombart (1899, p. 14) was fascinated by what Haeckel (1869) was able to explain only from the division of labor, which "dazzles in a thousand colors!". Sombart (1899, p. 391) further explained that he borrowed the principle from the "natural sciences" and later referred to Haeckel in his *Modern Capitalism* when explaining how competition (in quality and price) can be interpreted as the "struggle for existence" (*Kampf ums Dasein*) between firms (1902b, pp. 424–425).[30]

Two further reasons might explain why Sombart hesitated to promote the principle as a new discovery. First, every economist since Smith knew about the division of labor and the resulting increase in productivity. Economists like Friedrich List (1841, pp. 222–224), Roscher (1864, pp. 88–105), Marx (1887/1996), and Bücher (1893, pp. 112, 145) already emphasized that effective division of labor requires sound cooperation, or control. Second, as we have seen in Chapter 2, economists knew that Haeckel had borrowed the idea of the division of labor from economics in the first place and also Sombart (1899, p. 14) remarked that the principle was rooted in economics. To what benefit

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[28] As Puschner (2001, pp. 95–96) emphasized, the prize competition titled "What do we learn from the principles of the theory of descent in relation to the interpolitical development and legislation of the states" (*Was lernen wir aus den Prinzipien der Deszendenztheorie in Beziehung auf die interpolitische Entwicklung und Gesetzgebung der Staaten*) kickstarted the careers of "fanatic racial theorist" Ludwig Woltmann (1871-1907), or eugenicist (*Rassenhygieniker*) Wilhelm Schallmayer (1857-1919). On the Krupp Prize Competition, see also Weikart (2004, pp. 15–16).

[29] As Lenger (1994) noted, Sombart developed his racial theories only after the First World War and abandoned them again in the 1920s.

[30] After 1902, Sombart no longer referred to Haeckel with regard to the principle of differentiation and integration.

was it then to bring these ideas back to economics?[31] One might suggest that Sombart would not have needed Haeckel to use division of labor and cooperation in his economics. However, Sombart's argumentation followed Haeckel's at great length and led to results that he could not have produced by simply entertaining the idea that the division of labor requires cooperation.

In his article on *Industry and its Organization*, Sombart argued that since "the beginning of the organization of human work," man has thought of nothing else but specialization and cooperation—"the principles of organization".[32] Confronted with the "great variety" that he observed in the new survey about German businesses, Sombart first classified different types of firms according to their level of differentiation and integration. Similar to how Haeckel was able to explain the variety of biological organisms, Sombart (1899, p. 337) claimed that he could use the principle to explain the "great variety of types of firms". Instead of Haeckel's 19 phyla, however, Sombart (1899, pp. 342–343) proposed to distinguish between 8 different "species", or "types" of firms *(Betriebsarten*, or *Betriebsformen*).[33] And just as Haeckel ascribed a better performance to highly differentiated and integrated organisms, Sombart argued that firms with a higher degree of differentiation and integration were more productive.

Among the eight types, the first and lowest, that is, least productive type was the "single firm" (*Alleinbetrieb*) like the craftsman (*Handwerker, Kunsthandwerker*) who carried out all relevant tasks himself. Another form of the single firm was the female home worker (*Hausarbeiterin*) who, for example, polished cutlery and was highly specialized "as a whole" (Sombart, 1899, pp. 343–344). This single type often extended to the second type, which Sombart called the "family firm" (*Familienbetrieb*). It was most often to be found in agriculture where man and woman cooperated in production. In some cases, the family firm turned into a "domestic system" (*Hausindustrie*) like the

[31] The Austrian economist Ludwig von Mises (1881-1973), for example, objected to the usefulness of the principle. Mises (1931, p. 291) accepted that "as far as the division of labour is concerned, the social body may be compared with the biological". However, the division of labor was the "*tertium comparationis* of the old simile" and was the "fundamental principle of all forms of life". Nothing new could be learned from the comparison.

[32] In the German original, Sombart (1899, p. 335) stated: "*Alle Organisation menschlicher Arbeit beruht, seitdem die allerersten Anfänge planmäßigen Produzierens überwunden sind, auf nur zwei verschiedenen Principien: auf der Spezialisation und der Kooperation. Nichts anderes vermag der Mensch zu ersinnen, als diese beiden Organisationsprinzipien, die auch der vollendesten Betriebsanordnung, freilich in mannigfaltiger Kombination, allein zu Grunde liegen*".

[33] As I indicated in the introduction to this chapter, it is important that Sombart used the term "firm" (*Betrieb*) and not "business" (*Unternehmen*).

weavers in Saxony and Silesia, the embroidery firms in Switzerland, the toy industries in Thuringia, or the instruments industry in Saxony.

The third type of firm was the “stooge firm” (*Gehülfenbetrieb*) like blacksmiths, locksmiths, tailors, shoemakers, carpenters, plumbers, and bookbinderies. Similar to the family firm, the stooge firm had one main worker who was surrounded by several stooges who supported the principal creator of the product. Sombart called these three lower forms of firms “individual firms” (*Individualbetriebe*), because the main work was still dominated by one individual that assigned other members supporting tasks. In the individual firm, only one person “planned”, that is, deciding about the number of employees, purchasing raw materials, and organizing sales. Yet, individual firms were “independent organizations of production”. They were not be found in the “primitive economic stages” of the “in-house economy” (*Eigenwirtschaft*), where consumption and production were united in the same family, or community (Sombart, 1899, pp. 402–403).

Things started to change with the fourth type, the “extended stooge firm” (*erweiterter Gehülfenbetrieb*), because this type went beyond the boundaries of “individual-personal effectiveness” (*individuell-persönlicher Wirksamkeit*). The extended stooge firm was a multiplied stooge firm (the third type), like a blacksmith with two forge fires, or a bakery with several ovens. As a result, the firm lost its unity and center. The “main worker” (*Hauptarbeiter*) had to integrate the individual parts of the firm by overseeing the workforce and had less time at hand to carry out his original work of creating. In many cases, this act of overseeing turned into planning as rules were fixed and written down (Sombart, 1899, p. 348).

The fifth type, the “large individual firm” (*Individualbetrieb im Grossen*) like a painting, or construction firm, was somewhat different. What sounds like an oxymoron, Sombart (1899, pp. 349–350) explained by the fact that such firms were large but did not show high degrees of differentiation (similar to individual firms). None of the several painters employed by a modern painting firm had tasks that differed much from those of other employees. At the same time, they all received clear instructions from one central planner. Exercising the tasks remained individualistic and there was no “social use of the means of production” (*gesellschaftliche Nutzung von Produktionsmitteln*). This fifth type was only an aggregate because its parts were not dependent on each other. A painting business could lay off 30 workers on one day and employ 20 the next day—it could be cut apart “like a sausage” (Sombart, 1899, p. 351).

In contrast, the sixth type, the “small societal firm” (*gesellschaftlicher Betrieb im Kleinen*), was an “organic whole”. It dominated the textile and clothing industry (*Konfektionsindustrie*) and also found its representation in Smith’s “pin factory”. What distinguished the sixth type from all prior types was that the "overall production process" (*Gesammtproduktionsprozess*) was now dissolved in its single components (*Bestandteile*). In a clothing firm, the tasks were divided between the cutter, the presser, the stitcher, the sewer, and the buttonholer who worked in different production lines on trousers, waistcoats, and skirts—work was divided up "horizontally and vertically". Sombart (1899, pp. 351–353) emphasized that the sixth type should not be confounded with the fourth type (the extended stooge firm) even though statistical surveys would place both under the category of middle-sized firms (*Mittelbetriebe*) with 6-20 employees. For the first time, the unity of the production process was not the individual master anymore but was established by the "organism of the overall worker [*Gesamtarbeiter*]". The differentiation and integration led to a "new entity" that made coordination, or guidance even more pressing.

Sombart called these three types "transitional firms" (*Uebergangsbetriebe*) as only a small step was needed to turn them into the "societal firms" (*Gesellschaftsbetriebe*) of types seven and eight. The seventh type, the manufacture (*Manufaktur*), was characterized by its size and an even greater role of the guiding entrepreneur, who now had the exclusive task of planning and overseeing. In manufactures found in the clothing, furniture, and porcelain industry production was "societal" (*gesellschaftlich*), by which Sombart meant that certain steps in the production process were carried out by placing unfinished products in one machine (mixing clay, heating ceramics, cutting wood). Other essential parts (*Teilverrichtungen*) of the highly differentiated production process, were still done by hand and distributed among the "single (person-)organs of an overall worker" (Sombart, 1899, p. 360).[34]

In many cases, the manufacture transitioned into the eighth and last type of firm, the "factory" (*Fabrik*). In the factory, the highly differentiated manual tasks were taken over by mechanized industry. Sombart warned to not consider this transition as a developmental necessity. In contrast to Marx, Sombart could observe in the survey by the *Verein* that not all manufactures went to the next step by introducing automated machinery. Considering the highly differentiated and productive porcelain and furniture manufactures, Marx's idea that all manufactures eventually end up as factories did not hold true. I have indicated that Sombart also struggled with Marx's understanding of technology, which was tied to the highly differentiated production process and the increase in productivity in the factory. With differentiation and integration, Sombart had a principle at hand that could explain higher productivity without reference to technology, but only to "organization". I

[34] Sombart (1899, p. 360) claimed that the manual work in the furniture and porcelain industry proved that individualistic work was not completely crowded out in modern firms. Hence, the manufacture was the "synthesis" of individualistic and societal work.

conjecture that this separation of organization and technology gave Sombart space to think about types of technologies that were not associated with a high degree of division of labor.

Detached from the context of division of labor, technology comprised much more than the specialization of tools, or the automated machinery of the cotton mill. Sombart (1899, pp. 9–10) began incorporating recent works on the essence of technology by Franz Reuleaux (1829–1905), Ernst Kapp (1808–1896), and Emanuel Herrmann (1839–1902) in his theory of industrial development. For Sombart (1899, pp. 24–26) Herrmann's work was particularly suggestive because the latter had diverted the attention from the "never-ending view on the 'division of labor'" towards other "work procedures" (*Arbeitsverfahren*). Following Herrmann, Sombart turned his attention to technological innovations for ordering and sorting material that were applied by factories relying on chemical processes (breweries, distilleries, matches, candles, and paper industries).

In contrast to Marx, Sombart (1899, pp. 367–368) also classified firms as factories when they used chemical processes in their production. Thus, the decisive feature of a factory was not the use of mechanical technology, but the application of an "automated production process" that went beyond "the barriers of the organic". Sombart (1901, pp. 8–9) revealed a little later that he gained this insight from Herrmann's (1891, pp. 468–470) definition of technology. Accordingly, technology was the "emancipation from organic nature" as each invention made "to control the elements and shape the materials of nature" emancipated man from the organic barriers. Technology meant that human needs could be satisfied without having to rely on "nature's organizing process": with steel and steam, waiting for the tree or the animal to grow belonged to the past.[35]

Applied to his theory of industrial development, Sombart's perspective on technology meant that he did not only consider large, highly differentiated, and mechanized firms as factories. Sombart (1899, pp. 358–360) could observe that smaller transitional firms (types 4-6) and manufactures began using chemical methods in their production processes, emancipated themselves from the organic, and turned into factories. Haeckel's biology also showed its impact on how Sombart explained the transition from small firms to manufactures and factories. Instead of arguing, like Marx, that small individual firms developed into manufactures and then into factories when they took on machinery, Sombart argued that firms 'branched out' in much the same way organisms did in Haeckel's phylogenetic tree. To clarify this process, Sombart made use of what he called a "phylogenetic tree" (*Stammbaum*) as a tool of reasoning. His phylogenetic tree which I reproduced in Figure 16, is much

[35] I have argued elsewhere that Sombart used the insight that technology was the "emancipation from the organic" to form his business cycle theory (Kuster, 2023).

simpler than Haeckel's (Figure 15) and consisted of an individual firm (*Individualbetrieb*), manufactures (*Manufaktur*), and factories (*Fabrik*).

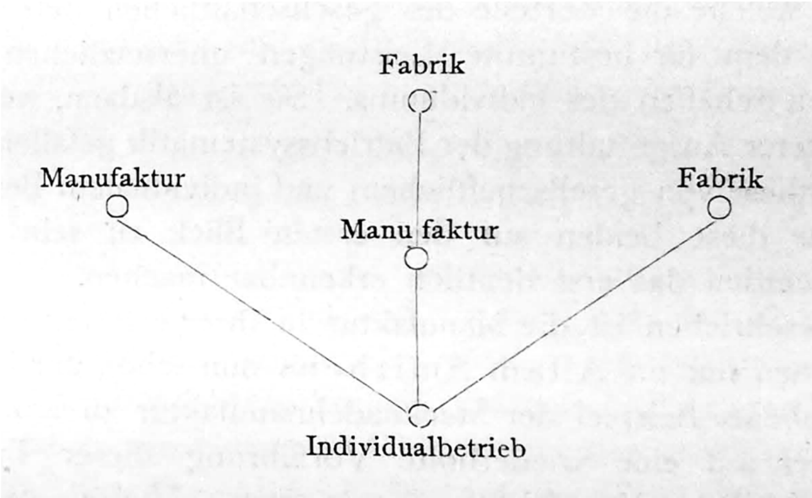

Figure 16: Sombart's "phylogenetic tree" (*Stammbaum*), showing the transition from small firms to manufactures and factories. Source: Sombart (1899, p. 359).

With the help of his phylogenetic tree, Sombart suggested that an individual firm could develop into a manufacture and stay a manufacture (the left path in Figure 16), could develop into a manufacture and then transform into a factory (the middle path), or develop directly into a factory (the right path). The 'middle path' in Figure 16 is Marx's story in which the manufacture was only a "transitional firm" (*Übergangsbetrieb*). In Sombart's eyes, however, the manufacture, for example in the porcelain and furniture industry, could also be highly developed and productive while remaining on the level of manual work (the left path). The right path in Figure 16 had not been discussed by Marx either. Individual firms could directly transform themselves into factories without having to go through the stage of the highly differentiated and integrated manufacture.

In his theory of industrial development, Sombart could explain why large-scale mechanized factories did not take over the whole realm of production. Instead of technology, Sombart considered "organization" as the decisive factor for increased productivity, which explained why manufactures flourished despite the competition from factories. Yet, Sombart had only partially accounted for the existence of the variety of firms in the economy. What is not visible in Figure 16 is that Sombart also had to recognize that the small "individual firms" (types 1-3) and the middle-sized "transitional firms" (types 4-6) survived in a modern economy—despite their lower productivity when compared to the highest types (7 and 8). Some of the individual firms were part of the domestic system (*Hausindustrie*) and thus dependent on the merchant (*Verleger*) who organized the raw materials and sales.[36] Others were traditional rural and urban handicrafts (*Handwerker alten Stils*), stooge firms, and small societal firms (Sombart, 1899, pp. 343–347). The detailed survey by the *Verein*, but also the latest industrial census suggested that these small and middle-sized handicraft businesses were not completely crowded out.

The industrial census of 1895, which Sombart did not discuss until three years later in his *Modern Capitalism*, provided further evidence that small societal firms (type 6) were by no means in decline. Instead of shrinking in number, they experienced a sharp increase not only in the number of firms, but also in the number of the workforce employed in them. Both increased far beyond 60%, between 1882 and 1895 (Sombart, 1902a, p. 568). Statistics also revealed that between 1858 and 1895 the number of craftsmen in cities relative to the whole population had only declined by one-third. Handicraft had not completely disappeared, and in rural areas their number even increased in relation to the population (Sombart, 1902a, p. 620).

Most troublesome for Sombart was the fact that many of the least productive handicraft firms were still found in urban areas. Hence, Sombart (1902b, p. 541) wondered "[h]ow on earth can it be explained that in large cities there is even one handicraft hairdresser, baker, butcher, carpenter, locksmith left?" Sombart (1902b, pp. 540–560) suggested possible explanations for the resilience of these small firms and located them in convenience and habits of consumers, lack of purchasing power for high-quality products, and the establishment of credit cooperatives. These factors might delay the decline of small firms, but not bring it to a halt, because customers adapted quickly to newer types of organizations, and cooperatives were no remedy for the lower productivity of small firms. As Sombart already pointed out in 1896, niches like art and reparations were no explanations for the resilience of small businesses as they were operating in much broader areas. How did Sombart explain the prevalence of smaller firms that were neither manufactures nor factories?

Since Sombart had already successfully wielded Haeckel's ideas up to this point, one might imagine that he tried to further investigate biology for inspiration. If Sombart had delved deeper into Haeckel's line of biological thinking, he might have created something like an ecology of industry or moved towards exploring industrial symbiosis. After all, Haeckel had coined the term "ecology" (*Oecologie*),

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[36] Sombart (1899, pp. 317–319) classified the domestic system as individual firms (type 1-3) but separated it from the old handicrafts, a distinction he already made earlier (Sombart, 1891). Sombart did not believe, as Bücher (1893, p. 117) accused him, that the domestic system would disappear in the future due to its lower productivity when compared to manufactures. For Sombart, the domestic system was mainly inferior to manufactures, because it tended to exploit laborers more severely.

and had shown a profound interest in symbiotic relationships between different species.[37] In his inaugural address at the University of Jena in 1869, Haeckel (1870, p. 365) defined "ecology" as the "households of animal organisms" and their relationships to the "inorganic and organic environment", which involved the "friendly or hostile conditions […] in the struggle for existence". Gustav Schmoller (1870, pp. 157–167), in his *History of German Commerce in the 19th Century*, forwarded similar ideas (without reference to Haeckel) when he reflected on the notion that smaller handicrafts might profit from the new branches and new requirements (tools, services) that emerging large-scale factories helped to create.[38]

However, Sombart did not go on to investigate how the households of different types of firms interlinked with each other and how they established symbiotic relationships. We will see in Chapter 8 that only Wagemann went along such lines. Sombart, by contrast, claimed in his *Modern Capitalism* that the main reason why handicraft businesses could survive in a modern economy was that they either adopted a "capitalist spirit", or became dependent on other firms that had already adopted such spirit. The small handicraft firms that the survey by the *Verein* and the census of 1895 revealed were in fact not actual handicraft firms anymore, but small capitalist firms (*kleinkapitalistische Firmen*). These firms were no longer dominated by the old, medieval, guild-like "handicraft spirit", but were under the spell of the rising "capitalist spirit".

For Austrian economist Rudolf Hilferding (1877-1941), the capitalist and the handicraft spirits were "motives" that Sombart ushered in as "dii ex machina" to go beyond Marx's historical materialism to explain the development of capitalism (Hilferding, 1903, p. 451). Similarly critical, German historian Friedrich Keutgen (1861-1936) reproached Sombart for "boiling down everything to psychology", and artificially creating a divide between pre-capitalist medieval times and the modern capitalist

[37] Haeckel (1866b, p. 236) coined the term "ecology" (*Oecologie*) in his *General Morphology*, where he defined it as "the science of the relations of organisms to each other" (*die Wissenschaft von den Wechselbeziehungen der Organismen unter einander*) or as the "physiology of the relations of organisms to the outside world and to each other" (*die Physiologie der Wechselbeziehungen der Organismen zur Aussenwelt und zu einander*). See also Stauffer (1957) on Haeckel's definition of ecology. Haeckel (1866a, 1866b) did not use the term "symbiosis", but analyzed "parasitic" relationships between organisms, without mentioning the possibility of mutualistic, or commensalistic relationships.

[38] Like many of his contemporaries, Schmoller (1870, pp. 157–170) observed that production and trade underwent fundamental changes in the 19th century. Small communities and household production were replaced by large factories that profited from technological progress and economies of scale. However, contrary to Marx, Schmoller did not consider the increasing number and growing size of factories to be alarming. According to Schmoller (1870, pp. 166–167), handicrafts could profit from factories' demands and the new branches they opened up.

epoch (Keutgen, 1906, p. 309). Both critiques are valid. Yet, what I want to draw attention to in the following is not how Sombart derived the origin of the capitalist spirit, and how right or wrong it is to speak of a handicraft as opposed to a capitalist spirit. Instead, I want to highlight that the idea of a "capitalist spirit" can also be seen as a result of Sombart's commitment to the biological principle of differentiation and integration. We have seen that Sombart managed to separate the "organization" of the firm from "technology" with the help of the biological analogy. I believe that Sombart also used Haeckel's principle to split the idea of the firm into its "means" (*Mittel*) and its "purpose" (*Zweck*). According to Sombart, the purpose of a firm was either capitalist (profit-seeking), or handicraft-like (self-sufficiency). Both purposes could be achieved by the same means (*Mittel*) of organization and technology.

Remember that Marx considered these three elements (spirit, organization, technology) only as a combined set, merged into a type of firm. The handicrafts were pre-capitalist, small and undifferentiated, and did not use machinery. In contrast, the factory was capitalist, differentiated, and machine-based. By dismembering this set into its components, Sombart claimed, for example, that a factory could be capitalist, or non-capitalist, could be undifferentiated, or differentiated, and could make use of different types of technologies. Similarly, a small firm did not necessarily have to be pre-capitalist but could also be imbued with the capitalist spirit.

We will see in Chapter 5, how Sombart used these three elements (spirit, organization, technology) in his later studies on the "economic system" as "basic components" (*Grundbestandteile*) for what he called a "schema" (*Schema*). By separating the spirit (the purpose) from the organization (the means) in his analysis of the firm, Sombart also created two immediate paths for further economic research. On the one hand, Sombart investigated the characteristics of the capitalist spirit and found that it was constituted by rationality, calculation, and accounting. On the other hand, he could reflect on the essence of organization, planning, and its "subject", the entrepreneur. I will discuss these paths in the remaining two sections.

4.3 The Unfolding of the Capitalist Spirit

Already in the article on *Industry and its Organization*, Sombart (1899, pp. 313–314) called for a "novelty" (*Neuerung*) in the assessment of what a business (*Unternehmen*) is. To this end, Sombart distinguished between the "type of firm" (*Betriebsform*) and the "type of economy" (*Wirtschaftsform*). The type of firm was merely a question of organization, that is, it was "a certain way of combining labor into a uniformly ordered work process, with the purpose of producing certain consumer goods according to a certain method." As I have shown in the last section, these types of firms developed into a variety of eight different types based on different degrees of differentiation and integration.

The type of economy, however, was characterized by the "final purpose of production" and came only in two different types. It was either aimed at self-sufficiency (*Bedarfsdeckungswirtschaft*) or aimed towards profit (*Erwerbswirtschaft*). In his *Modern Capitalism*, Sombart (1902a) clarified that the former, self-sufficiency, was the defining motive of the handicraft spirit, while the latter, profit-seeking, was what defined the capitalist spirit. A firm was only a "business" (*Unternehmung*) if it was dominated by the capitalist spirit.

Whereas Marx had argued that a small handicraft firm was pre-capitalist and the factory was the essence of a capitalist business, Sombart claimed that any firm was a "business" when it was dominated by the capitalist spirit, that is, by the aim to make a profit (Sombart, 1902a, pp. 69–78). The personification of the business, and in consequence, of the capitalist spirit was the entrepreneur (*Unternehmer*). The entrepreneur could make use of any of the eight types of firms to reach his end (making a profit). In the shape of the domestic system (*hausindustrielle Organisation*) it encompassed several individual firms (type 1-3). In the shape of a concern (*Konzern*), the business could even make use of several different types of firms at once (for example as plants and divisions).[39]

In the same way, the handicraft spirit (dominated by self-sufficiency), could make use of one or several types of firms. When the handicraft spirit dominated the individual firm (type 1-3), it created what Sombart's contemporaries commonly defined as the handicraft (*Handwerk*). In Sombart's (1902a, pp. 6–8) view, however, this handicraft "mindset" could be transferred to other types as well. As a consumer cooperative (*Konsumverein*) it could encompass stores, bakeries, and butchers. In a socialist economy (*Gemeinwirtschaft*) the handicraft mindset could run a factory.

For the distinction between firm and business, Sombart has been praised throughout the economics discipline. Hilferding (1903, p. 447) thought that the distinction "proved to be fruitful" because it abandoned the one-sided perspective on technological superiority in the analysis of industrial development. Veblen (1903, p. 302) remarked that the significance of Sombart's *Modern Capitalism* was the "careful distinction with which he sets out (chap. i), between business (*Wirtschaft*) and industry (*Betrieb*)". In his *The Theory of Business Enterprise*, Veblen (1904/1932, p. 20) took over Sombart's very definition of "business". Likewise, U.S. economist Wesley Clair Mitchell (1874-

[39] Already in his study on the Roman Campagna, Sombart (1888, p. 88) distinguished between an "economic unit" (*Wirtschaftseinheit*) and a "firm unit" (*Betriebseinheit*). The former was the combination of several firms under one capitalist's lead. Yet, in this early work, Sombart did not yet espouse the idea of an emerging capitalist spirit.

1948) followed Sombart's emphasis on "profit" in his definition of the "business enterprise" (Mitchell, 1927, p. 86).

Sombart's distinction between firm and business was also taken up by his friend Walther Rathenau (1867-1922), the German industrialist and politician of the German Democratic Party. In a plea for his plans to transform the German economy into a collective economic community (*Gemeinwirtschaft*), Rathenau (1917/1922) proposed the idea that the spirit of entrepreneurs was malleable. Rathenau explained that a "substitution of the reason" (*Substitution des Grundes*) of businesses had already happened. The essence (*Wesen*) and the effect (*Wirkung*) of businesses had changed substantially over time, while their shape (*Form*) had remained the same, similar to a seashell (*Muschelschale*) in which generations of different creatures set up their dwellings. According to Rathenau (1917/1922, pp. 38–39), a modern large-scale business (*Großunternehmen*), for example, was no longer merely a structure (*Gebilde*) of private interests, but also closely tied to public interests. Large-scale businesses sustained tens of thousands of families, and the First World War had shown that these businesses demonstrated great abilities to convert their production towards armament. Hence, Rathenau (1917/1922, pp. 61–62) predicted that:

> "The essence of the business will not be the strengthening of the principle of the private economy, but the conscious incorporation into the economy of the collective, the permeation with the spirit of communal responsibility [*Gemeinverantwortlichkeit*] and the welfare of the state.".[40]

German economist and biologist Werner Friedrich Bruck (1880-1945) was one of the few who noticed that Rathenau considered "the phenomena of economic life more scientifically, as a kind of anthropo-biology" (Bruck, 1924, p. 629). Bruck also pointed to German economist Johann Plenge (1874-1963), who had drawn phylogenetic trees (*Stammbäume*) on more than a hundred plates to visualize the continuous movements of economic phenomena.[41] Bruck (1924, pp. 629–630) argued that many problems in economics, including the development of different organizations and firms, only became clear through such visual illustrations (*Anschauungsmittel*).

Sombart did not detail his phylogenetic tree any further and devoted his time to the study of the development of the capitalist spirit. In the first part of *Modern Capitalism*, Sombart reprinted his

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[40] In the original, Rathenau (1917/1922, pp. 61–62) stated: "*dem Wesen der Unternehmung wird nicht die Verstärkung des privatwirtschaftlichen Gedankens beschieden sein, sondern die bewusste Einordnung in die Wirtschaft der Gesamtheit, die Durchdringung mit dem Geiste der Gemeinverantwortlichkeit und des Staatswohls*".

[41] As Bruck (1924, p. 629) remarked, Plenge had never published these plates. Also Plenge's biographer Michael Busch (2019), does not mention them.

theory of industrial development from his article on *Industry and its Organization*. In the subsequent chapters, Sombart devoted much space to the exploration of how industry (*Gewerbe*) developed from the late medieval handicraft period to the mid-19th century capitalist economy—the period of "early capitalism" (*Frühkapitalismus*). Based on a stupendous amount of historical material, Sombart traced back how handicraft firms were gradually replaced by other types of firms that adopted the capitalist spirit and turned into businesses.

Sombart (1902a, pp. 378–390) clarified that he could not trace back a distinct origin of the capitalist spirit, which was eternally shrouded in "impenetrable darkness". However, Sombart was certain that the spirit emerged in Europe somewhere in the late medieval period and was likely to have been spread by Italian merchants and Jewish families. Protestantism was only a factor that amplified its dissemination. As Sombart later explained, Weber's emphasis on the protestant ethic and Calvinism was too one-sided and could not explain how businesses emerged and operated.[42] Instead, Sombart (1902a, pp. 378–390) considered several phenomena that fostered the "genesis of modern capitalism", like the introduction of double bookkeeping, population growth, technology, science, and the legal system. Their origins could not be clearly pinpointed but stood in continuous mutual interaction and reinforcement. Like Veblen, Sombart seemed to have subscribed to "cumulative causation" in his explanation of economic phenomena. Causal relationships had neither a starting point nor a stopping point but ran in an endless sequence.[43]

A comprehensive example of how Sombart understood cumulative causation was his short paragraph of how the thriving clothing industry (*Konfektionsindustrie*) can be explained. Today's "theoreticians", argued Sombart (1902a, p. XXV–XXVI) would explain the clothing industry by the "nearest cause" (*nächstliegende Ursache*) and find it, for example in the surplus of women in the urban population. Instead, Sombart promoted "long sequences of thought" (*lange Gedankenreihen*)

[42] Sombart (1927a, pp. 6–7) claimed that "Even if it is admitted that the meaning of capitalist economy has an inner kinship with Puritan piety, this does not prove that even a single mine has been dug, a single blast furnace started, out of motive forces which have their strongest or any root in that piety" (*Selbst zugegeben, daß der Sinn der kapitalistischen Wirtschaft eine innere Verwandtschaft mit der puritanischen Frömmigkeit aufweist, so ist damit noch nicht bewiesen, daß auch nur ein einziges Bergwerk abgeteuft, ein einziger Hochofen angeblasen ist aus Triebkräften heraus, die in jener Frömmigkeit ihre stärkste oder überhaupt eine Wurzel haben*). Whether Max Weber took inspiration from Sombart directly for his *Protestant Ethic and the Spirit of Capitalism*, or whether the two befriended economists developed the concept of capitalist spirit in mutual interaction must not concern us here. Several historians have emphasized Weber's indebtedness to Sombart (Appel, 1992; Kaesler, 2010; Swedberg, 2000). Lenger (1994, p. 133), by contrast, argued that "no convincing evidence of a direct influence [of Sombart] on Weber's Protestantism studies has been presented so far".

[43] On Veblen's cumulative causation, see Anderson (1933, p. 602), and Hodgson (2003).

and “causal chains” (*Kausalreihen*) that traced back the underlying causes of the nearest cause (surplus of women). Sombart espoused the idea that the surplus of women in urban areas could be explained by the dissolution of the family, which resulted from urbanization. Urbanization was caused by intensified agriculture, which was the outcome of the unfolding of capitalism. The unfolding of capitalism was caused by capital’s pursuit of profit (*Verwertungsstreben des Kapitals*), which was a result of the unfolding of the capitalist spirit.

Sombart argued that with the idea of “causal chains”, he could derive the “objective condition” (surplus of women) from the “subjective condition” of the capitalist driving forces (*Triebkräfte*) like the capitalist spirit. We will see in Chapter 5, how Sombart continued to use interactions of objective and subjective “conditions” in his schema of the 1920s. By illuminating the interaction between increasing rationalization in technology, and the development of the capitalist spirit, Sombart concluded that the capitalist spirit became utterly rational and security-seeking in the 1920s. Yet, in the late 19th and the early 20th century, Sombart considered the capitalist spirit not only to be rational, but also to be wild, speculative, and most importantly, still unfolding. The capitalist spirit spread into areas that were previously dominated by the handicraft spirit, which explained the resilience of the small firms that still showed up in the surveys and statistics.

4.3.1 The resilience of small firms

Sombart emphasized that the transition from the handicraft system of the medieval period to the capitalist system of the modern economy was a gradual process. Thus, even in a modern economy, there existed rudiments of the old handicraft spirit in certain areas. Sombart (1902a, p. 475) defined the handicraft spirit by several characteristics of which self-sufficiency was only the most central. Signs of the prevalence of the handicraft spirit were personal ties in certain branches, long-term contracts between employers and employees, entrepreneurs who did not fully specialize in becoming exclusive organizers, and a “guild-like” (*zünftlerisch*) or static attitude.

Sombart (1902a, pp. 76–77, 101) maintained that the handicraft spirit not only dominated craftsmen who produced commodities but was inherent in any subject that used its own skills to produce a service or commodity in order to “make a living” (*seinen Lebensunterhalt verdienen*). Especially in the countryside, the handicraft spirit still prevailed among smiths, bakers, and weavers (Sombart, 1902a, pp. 573–580). In cities, Sombart (1902b, pp. 540–560) discovered handicraft (*handwerksmässige*) hairdressers, bakers, butchers, carpenters and locksmiths. Sombart explained the presence of these handicraft firms pointing to “inhibitions” (*Hemmungen*), and the inertia (*Trägheit*) of the population.

In other areas of the economy, the firms had already transformed into "businesses" with an inherent capitalist spirit. For Sombart (1902a, pp. 485–552) capitalism reigned in those branches where large-scale firms like manufactures and factories were prevalent. The capitalist spirit dominated the coal and steel (*Montanindustrie*), the machine, the chemical, the textile, and the clothing industry. In the late 19th century, it had also begun wandering into retail trade and small producers in urban areas. Sombart (1902a, p. 198) could uncover the capitalist spirit through its "symbol"—the "ledger" (*Hauptbuch*) with its profit and loss account.

The subject of the business was the "capitalist entrepreneur", whom Sombart (1902a, pp. 197–199) defined by three characteristics. First, the entrepreneur had a "dispositional-organizing" role as he connected people in the production process. Second, the entrepreneur pursued a "speculative-calculating" activity as many of the elements with which he was dealing were unknown variables. Third, the entrepreneur was "rationalistic" as his activities were the result of "conscious acts from causes".[44]

If small businesses did not want to be swept away by capitalist firms, they had to adapt their spirit, that is, adopt the characteristics of the capitalist entrepreneur: they had to calculate, follow the rules of bookkeeping, and rationally organize production. Sombart (1902a, p. 483) reckoned to recognize that craftsmen started to adapt, assistant plumbers (*Klempnergesellen*) established metal factories, and master drapers (*Tuchmachermeister*) set up loom after loom and became the owners of clothing factories. Craftsmen gradually transformed into "small capitalist entrepreneurs". Sombart (1902a, pp. 517–523) claimed that by the late 19th century, masons, carpenters, and other "installation firms" had become capitalist firms as their entrepreneurs planned and organized themselves the purchasing of raw materials and the installations.

Sombart also drew attention to certain developments in industry that were not visible in the statistics. Through the survey by the *Verein*, Sombart (1902a, p. 658) claimed to have gained insight into the interconnections of firms. The detailed studies on different branches revealed that many small firms became dependent on credits from other firms, or banks. These "dependency relationships" were ignored when firms were merely categorized by their size in statistical surveys. At first glance, for example, it seemed as if the surge of new bakeries, butchers, and locksmiths in urban areas was a sign that even handicraft firms were able to thrive in the late 19th century. Yet, Sombart knew from the

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[44] Hence, at the time of his *Modern Capitalism*, Sombart did not yet depict the entrepreneur as a "conqueror" (*Eroberer*) like in later years, which subsequently "paved the way" for Schumpeter's definition of the entrepreneur (Campagnolo & Vivel, 2012, pp. 924–925, 936).

survey that the apparent capitalists who guided these firms were not independent anymore, but turned into "laborers at the service of capital" (Sombart, 1902a, pp. 487–488).

The baker was swayed by the credits that grain traders or millers offered them. Many bakers only rented their bakeries, which belonged to large speculators. Similar dependencies came to the fore when investigating the relationships of butchers to the cattle traders, or the credits provided to the locksmiths by the ironmongers. Sombart discovered other forms of dependencies among construction businesses, carpenters, and upholsterers (Sombart, 1902a, pp. 490–508). As soon as these dependencies took over, the masters of the small firms had to take over rational calculation and even when they joined credit cooperatives, they turned into entrepreneurs as they had to tend to their book-keeping.

Sombart (1902b, pp. 430–431) claimed that industrial development was not characterized by the competition (*Wettbewerb*) between the types of firms, for example, the small individual firms versus the large-scale factories. It is for this reason that Sombart did not ascertain capital and firm concentration (*Kapitalkonzentration, Betriebskonzentration*) in the overall economy. Rather, capitalist development meant competition between the two types of economy (*Wirtschaftsformen*)—a competition between handicraft firms versus capitalist businesses. With the relentless expansion of the capitalist spirit, individual firms became dependent on credit, capital, and the symbols of capitalism like bookkeeping and accounting. Sombart (1902a, p. 397) thus concluded that despite being a great variety, the different types of firms and their subjects, the entrepreneurs, had turned into "cogs in the giant machinery of modern commerce". Entrepreneurs lost their free will and became part of the mechanism of capitalism "over whose engine only one maxim was written in golden letters: debit and credit [*Soll und Haben*]!".

Sombart's conclusion about the outcome of the unfolding of the capitalist spirit stands in stark contrast to the colorful variety that he observed in the economy. After all the efforts to classify different types of firms and their prevalence in different branches, Sombart simply claimed that they were all rational calculating clogs of a machine. As a consequence, Sombart (1902a, p. 198) believed that the "variety of connections" (*Mannigfaltigkeit der Beziehungen*) that the different types of firms built through the work of their entrepreneurs could be reduced to a "calculating activity": the congruence between payment (*Leistung*) and compensation (*Gegenleistung*). Behind the colorful variety of the economic organism stood a rational calculating machine.

4.3.2 A machine behind the organism

It is certainly true, as Lenger (1994, p. 134) remarked, that Sombart's conclusions about the unfolding of the capitalist spirit bear the pessimist mark of Simmel and Marx. What had once been the means (money, rationalization, calculation) to an end, now turned into an end in itself. But why did Sombart mainly emphasize that all firms shared the common characteristics of a capitalist business and did not investigate how different types of firms interacted? Why did he not deepen his adherence to biological analogies, and take over the ideas of Haeckel's ecology? Why did he not make use of Schäffle's "social nervous system" that we have encountered in Chapter 3, or something like Wagemann's "business metabolism" that we will explore in Chapter 8? I believe that Sombart started to investigate interconnections between businesses along Haeckel's biology, but quickly called off the exercise due to the insights he gained from reading one of his fellow German social scientists, Ferdinand Tönnies (1855-1936).

In the previous section, I have emphasized that Sombart used the principle of differentiation and integration to explain how a variety of firms unfolded. What I left out, was that Sombart also attempted to apply the principle to the economy as a whole. Because specialization and integration took place not only within, but also between firms, the biological principle could be used to describe the development of the national economy (*Volkswirtschaft*). Making use of the idea that a higher grade of differentiation and integration meant higher productivity, Sombart (1899, pp. 391–393) distinguished between three increasingly differentiated and integrated and thus increasingly productive economic stages. In the undifferentiated individual economy (*Individualwirtschaft*) production and consumption took place in the same location. Consequently, there was no need for "entanglement" (*Verschlingung*) between the parts of the economy. In the partly differentiated transitional economy (*Uebergangswirtschaft*) some consumption needs were already satisfied by other parts of the economy. In the fully differentiated societal economy (*Gesellschaftswirtschaft*) the entanglement attained levels that turned the economy into an "inseparable whole".

Sombart (1901, pp. 7–10) clarified a little later that economic development was "dominated by an increasingly differentiated and integrated function of the individual". As a result, individuals became more interconnected over time, because they needed others to "produce the desired economic success". The farmer, dominant in the individual economy, was self-sufficient, as he extracted and created everything by himself and was "economically free". The modern "cultural man" (*Kulturmensch*) of the societal economy (*Gesellschaftswirtschaft*) was dependent on others, as he did not produce most of what he consumed. He was "economically unfree and tied [*gebunden*] to others". Combining these insights with his newly formed ideas about the essence of technology, Sombart distinguished between two "principles of development" (*Entwickelungsprinzipien*). The economy was dominated by the principle of differentiation and integration, while technology was ruled by emancipation from nature, which implied that:

> "The principle of development of technology is freedom, and the principle of development of the economy is the lack of freedom [*Unfreiheit*], is restraint [*Bindung*]."[45]

It is important to emphasize that Sombart (1899, p. 393) used the term *Gesellschaftswirtschaft* and not *Gemeinwirtschaft* to describe the highly differentiated societal economy. Referring to Tönnies' (1887) *Community and Civil Society,* Sombart argued that with the emergence of the societal economy, a "mechanism takes the place of the former organisms in economic life". In his well-known study about society's transformation in the 19th century, Tönnies (1887) argued that rural, family, and village-based communities (*Gemeinschaften*) were gradually replaced by urban, individualistic civil societies (*Gesellschaften*). In the community, the interconnections (*Verbindungen*) between its members were "real" and "organic". In civil society, however, they were "ideal" (*ideell*) and "mechanically" created. What Tönnies meant was that in older communities, connections were personal, tied to the family and the local environment. By contrast, in civil society, connections had to be established "artificially" by contracts, money, credit, and law. Most importantly, Tönnies (1887, p. 47) claimed that the interrelationships in civil society were based on "payment" (*Leistung*) and "compensation" (*Gegenleistung*)—the very terms that defined the actions of Sombart's capitalist entrepreneur.

Tönnies' concept of civil society is the key to understanding why Sombart depicted the economy as a machine that constrained its individual parts and robbed them of their free will. Sombart contended himself with claiming that the economy was interconnected through the ledger, through payment and compensation, and did not investigate interconnections between firms along biological analogies. In other words, Sombart did not further inquire into the specifics of the "integration" of the economy as a whole, although Haeckel (1869) gave several hints that one could understand integration as cooperation, communication, or centralization. However, with respect to integration within firms, Sombart took up Haeckel's suggestions and investigated how cooperation and centralization improved the performance of businesses. I suggest that through applying Haeckel's principle and his specifications of the term "integration", Sombart came to believe that "organization" was one of the most important factors of production in the economy.

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[45] In the original, Sombart (1901, pp. 9–10) stated that: "*Das Entwickelungsprinzip der Technik ist die Freiheit, und das Entwickelungsprinzip der Wirtschaft ist die Unfreiheit, ist die Bindung*". If we believe Swedish economist Gustav Cassel (1866-1945), who argued that "nowhere was there a distinction between economy and technology" (Cassel, 1900, p. 7), then Sombart's separation of economic development into a technological and economic principle was unprecedented.

4.4 The Organization of the Firm

We have seen in the previous section, that Sombart considered the principle of differentiation and integration as a force that dominated the organizations of firms. The higher the degree of differentiation and integration in the organization of a firm, the higher its productivity. Differentiation, or specialization resulted in higher productivity as workers specialized and became more efficient in their tasks. The effect of differentiation also showed itself in the ability of the production director (*Produktionsleiter*) to detach himself from the "technical function". Sombart (1902b, p. 436) explained that if the director was apart from the daily production process, he could be in touch with the market and quickly react to the ever-changing trends.[46] Hence, Sombart (1902b, p. 442) argued that the "real secret of the increased productivity of the capitalist enterprise" did not lie in technology, but in the "process of differentiation".[47]

Sombart (1902b, p. 442) also emphasized the importance of "integration" when he argued that productivity resulted from the "inner essence of capitalist organization". Organization differed not only between handicraft and capitalist firms, but also between the individual firm, the stooge firm, the manufacture, and the factory. However, the term "integration" was much harder to make sense of in economics than "differentiation". Sombart knew from Haeckel that organisms with a higher degree of differentiation needed a higher degree of integration. Sombart also learned from Haeckel (1869), that integration either meant that the individual parts of a siphonophora, or a bee hive, cooperated or communicated more intensively, or were more strictly guided by a central authority.

However, Sombart argued that there was a fundamental difference, or in Hesse's (1966) terms, a "negative feature", between the organization of firms and the organization of natural organisms. Sombart (1899, pp. 321–322) explained that up to his time, a firm (*Betrieb*) had been defined as an "organization for the purpose of continued execution of work". Yet, according to this definition the beehive that collected food, or the beaver that constructed a dam, had to be seen as a "firm". Sombart claimed that what distinguished a firm from an organization in the natural world was the "planned and the orderly [*Planmässige*, *Ordnungshafte*]". Combining these insights with his knowledge of Haeckel's notion about integration, Sombart claimed that what made the difference in the organization of a firm was to what degree a single person, or authority, had to control, oversee, and plan the whole production process.

[46] Sombart (1902b, p. 442) thus opposed Grandke's (1897, p. 1076) assessment that such advantages over handicraft were "imponderables" (*Imponderabilien*).

[47] See Sieferle (1995, p. 80) on Sombart's examples for increased productivity without technological advantage.

According to Sombart (1899, pp. 322–329), every firm had a "plan". Even in the undifferentiated individual firm (type 1), the person in charge had to decide when to work and when to rest, and how much raw material to buy. As soon as more people were involved in the production process, a plan was "objectified" into an "order" (*Ordnung*) that contained the guidelines about the introduction, design, and execution of the working process. Depending on the level of differentiation, the order was "thought, spoken out, written, printed, […] implicitly agreed, or explicitly enacted" (Sombart, 1899, pp. 323–324). In a painting business (type 5), for example, the order was still quite simple as painters received the details about the working process directly from the master, who also came by from time to time to oversee his workers. In a steel plant, however, the firm needed a "technically trained man" who was fully occupied with overseeing the productions process. A large business like the Krupp AG possessed several firms under one capitalist directory and assigned hundreds of sub-directors to each individual firm. For Sombart (1899, p. 328), a firm was therefore defined by what "what a man's oversight is capable of guiding".

Sombart's use of Haeckel's principle and the resulting emphasis on planning and overseeing as the essential features of organization were unparalleled in the economics discipline at the turn of the 20th century. Karl Bücher, for example, claimed that the progress of society was dominated by differentiation and integration, but he did not apply this principle to individual firms in detail.[48] According to Bücher (1893, pp. 109–111), a handicraft business differed from a factory, because of its "locality" (*Örtlichkeit*).[49] Schäffle (1869, p. 261), despite being fascinated by the "morphological variety" of the different forms of businesses, only distinguished between them on a judicial basis. Even in the third edition of *Structure and Life*, Schäffle (1896b, pp. 256–262) he held on to the idea that the variety of businesses could be captured by distinguishing between family, public, and private business.

Alfred Marshall famously applied Haeckel's principle of differentiation and integration to the development of businesses, which, according to Camille Limoges and Claude Ménard (1994, p. 342), provided him "the key for interpreting the history of social organization". Yet, Marshall backed off "from the consequences of the analogy", abandoned the concept of organization and preferred to deepen his understanding of the "representative firm". Marshall's "coupling of the economic and

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[48] Bücher (1893, pp. 131–132) argued that "the division of labor [..] was always "organization of work according to the principle of economy". Yet, in Bücher's view, the "type of firm" (*Betriebsform*) was not defined by a different degree of differentiation and integration.

[49] Handicrafts produced for the local market in immediate relation to the customers (*Kundenproduktion*) and split up when it grew too large. Factories produced for the large market of the decentralized national economy (*Warenproduktion*).

biological processes" led him to an unbearable consequence in that they suggested "monopoly as the only possible outcome". Marshall (1890, p. 301) seemed to have read Haeckel differently than Sombart as he suggested that "those organisms which are the most highly developed", that is, the most differentiated and integrated ones, "are those which are most likely to survive in the struggle for existence". Hence, Haeckel's principle suggested to Marshall that economic competition would result in the most differentiated and integrated firms controlling the different branches as monopolists.

Limoges and Ménard attributed Marshall's "regression" from Haeckel's principle to the already standardized view of economic competition and the image of the market as a mechanistic system to which Marshall succumbed. I might add to these conclusions that Marshall also did not strive to conserve variety. Marshall (1890, p. 353) observed that "business management or undertaking has always had different forms, and their number and variety was never so great as in England now". But at the same time, Marshall (1890, p. 383) believed that "in spite of a great variety in detail nearly all the chief problems of economics agree in this that they have a kernel of the same kind". This "kernel" was not something like Sombart's capitalist spirit that dominated the economy despite the variety of the different types of firms, but what Marshall (1895, p. 397) later introduced as the "representative firm" that "had a fairly long life, and fair success, which is managed with normal ability".[50]

U.S. economists of the early 20th century who applied evolutionary metaphors to explain industrial competition reached a similar dead end. Mary Morgan (1995) pointed to the fact that U.S. economists like William Graham Sumner and John Bates Clark introduced evolutionary metaphors like "struggle for existence" and "selection" in their economics to make sense of competition between firms. However, Morgan (1995, p. 328) showed that the transfer of notions about varieties of species and sub-species "did not take place" in Sumner's and Clark's economics. For the two economists, the outcome of competition (or struggle for existence) was "uniformity", or "inequality", but not variety.

[50] For Tiziano Raffaelli (2003, pp. 107–114, 153) the representative firm was not a break with variety as Marshall did consciously use the term representative and not normal, or average. I tend to disagree with Raffaelli, because Marshall, despite emphasizing variety, still sought to extract the typical of any firm in different branches. To borrow again the pictorial representation afforded by the two depictions of the ideal plants in my introduction, Marshall did what Schleiden did by selecting one representative plant from the great variety. Neither Marshall, nor Schleiden denied variety, but both wanted to find the typical despite variety. This does not mean that Sombart's theory of the firm was superior, but only that different aspects of a firm were emphasized. While Marshall could inquire into the different costs that a firm faced over its lifespan, Sombart could investigate different types of organizations and how they are distributed among different branches.

At the turn of the century, Sombart stood alone in his claim that differentiation and integration gave rise to a variety of firms. Likewise, Sombart's belief in "organization" as the main contributor to productivity has not been taken up by his German contemporaries. German economist Bernhard Harms (1876-1939), for example, believed that Sombart's theory of organization (*Organisationslehre*) was too "theoretical" (Harms, 1905). At the 1909 meeting of the *Verein für Socialpolitik*, Sombart (1910) stood up against the Austrian economist Eugen Philippovich (1858-1917), and the German engineer Otto Kammerer (1865-1951) who argued that increased productivity in industry can mostly be attributed to technological advancements. For Sombart (1910, p. 571), productivity remained a "problem of organization" (*Organisationsproblem*). Not only was the organization of production as important as the tools used by laborers in the manufacture, but it was also the key advantage for increasing productivity in trades that did not rely on technology.

It seems as if Sombart's emphasis on differentiation, integration, and organization found much more acclaim among U.S. and English economists who are usually assigned to the Institutional School. In his first chapter on the "Forms of Industrial Organization", U.S. economic historian Abbott Payson Usher (1883-1965) followed Sombart at great length.[51] Usher (1920, pp. 13–18) emphasized that with the "specialization of skill" within the firm came the tendency toward disintegration, which had to be offset "speedily by integration of control". The "general industrial system by which this control was exercised", however, passed "under a great variety of names": "domestic system", "commission system", "putting-out system", "manufacture", and "factory". These firms were the evidence "of a transition to a new system of organization in which the workmen were to be more than mere aggregations of units". Like Sombart, Usher (1920, p. 5) highlighted that "it is necessary to recognize that no one form of organization really dominates social life at any particular period".

From his reading of Usher, English economist Maurice Dobb (1900-1976) took over the principle of differentiation and integration in his *Capitalist Enterprise and Social Progress* (1925/2012, pp. 10–11). Most consequential, the principle took effect in the hands of English economist Ronald Coase in his *The Nature of the Firm*. Referring to Usher and Dobb, Coase (1937, p. 398) remarked that "economic differentiation creates the need for some integrating force without which differentiation would collapse into chaos; and it is as the integrating force in a differentiated economy that industrial forms are chiefly significant". What Coase distinguished from Sombart, however, was that he linked

[51] Usher (1920) did not directly refer to a source, but mentioned Sombart's *Modern Capitalism* in the appendix to the chapter alongside the works of Bücher, Rodbertus, and Marx. Usher argued that among these authors, Sombart presented the "most considerable socialistic interpretation of industrial history" and "in its entirety the generalization is much more elaborate and complex [than Bücher's scheme]".

up the integration within the firm with the integration between firms. As we have seen, Sombart simply claimed that firms interlinked through accounting and then concentrated on how entrepreneurs planned the internal organization of a firm. Instead, Coase wanted to know when the integration between firms, for example the price mechanism of the market, was replaced by the integration of the firm's organization. Through such questions, Coase arrived at the "transactions" approach to the firm, which became one of the fundamental pillars of New Institutional Economics.

What Coase's use of the principle of differentiation and integration also shows is that by the 1930s, the biological principle lost its direct reference to Haeckel's biology. The same holds true for the principle of differentiation and integration in Sombart's work. As we will see in the next chapter, Sombart only used the principle as one of 12 basic components in his schema and did not further investigate how he could make use of Haeckel's insights.

4.5 Conclusion: a principle to explain variety in development

While adhering to Marx's theory of industrial development, Sombart encountered in empirical studies that the economy did not develop as Marx had predicted. Firms did not develop in a linear fashion from handicrafts to manufactures and factories but unfolded into a great variety of types. Sombart aimed to conserve this variety while creating a new theory of industrial development. To explain how these different types of firms unfolded, Sombart reached for a tool that he found in the writings of biologist Ernst Haeckel. With Haeckel's principle of differentiation and integration, Sombart could clarify how a variety of different types of firms developed and how it came about that the economy was populated by large factories and manufactures, but also different small and medium-sized firms.

I conjectured that Sombart introduced the idea of the capitalist spirit to understand how smaller and less productive firms could coexist with larger and more productive types. According to Sombart, small firms had to adopt the capitalist spirit in order to survive in the capitalist epoch. They had to be run by a capitalist entrepreneur who calculated, kept to bookkeeping, and rationalized the production process. Firms that did not transition from the old handicraft spirit to the capitalist spirit would inevitably die out.

I have also shown that Sombart came to believe that the productivity of a business was afforded by the degree of differentiation and integration. As differentiation and integration played a substantial role in determining a business's productivity, Sombart wanted to know more about the integration of firms, that is, how well firms were "organized". Sombart concluded that planning and overseeing were crucial elements in the organization of a business, and with such ideas, he stood at the forefront of German economic thought.

Compared to Schäffle, Sombart committed to a much lesser degree to biological analogies and did not go much further than using Haeckel's principle in his economics. Sombart did not establish an ecology of firms and did not investigate the interrelationships between firms by the biological concept of symbiosis. Another reason for Sombart's hesitation to go further along using biological insights in his economics might be that Haeckel's principle had a substantial heuristic value for Sombart. The principle not only allowed Sombart to conserve variety in his theory of industrial development but also offered new research paths that Sombart explored with much effort in his later work. I believe that one of the most consequential effects of Haeckel's principle was that Sombart could distinguish between spirit, organization, and technology. As we will see in the next chapter, Sombart used these three "basic components" (*Grundbestandteile*) to build a schema that he used to characterize an economic system.

Chapter 5 The Economic System and the End of Unfolding

At the turn of the 19th century, Sombart welcomed the unfolding of capitalism in the name of progress and productivity. The great variety of capitalist firms that gradually replaced the old types of handicrafts provided subsistence for millions of people. No intervention was needed to hamper this development. By the 1930s, Sombart's views had changed dramatically. In his *German Socialism* (1934), Sombart advanced reactionary ideas to limit technological progress, go back to handicraft production, and put measures in place for a rejuvenation of agriculture. In addition, he argued for the establishment of autarky, and the introduction of a "leader-principle" (*Führerprinzip*) in the economy. Sombart's biographers (vom Brocke, Lenger, and Appel) emphasized this change in Sombart's attitude and thereby sustained the long-held idea by historian Werner Krause (1962) that Sombart turned "from a socialist of the chair [*Kathedersozialist*] to a fascist".

I do not challenge the historians' verdicts that Sombart underwent a change of attitude between 1900 and 1934 toward the benefits and harms of modern capitalism. Instead, I want to emphasize the continuity in Sombart's work. Although Sombart altered his view on the capitalist system, his economic theory remained remarkably consistent over the years. Throughout the years, Sombart argued that capitalist industrial development did not lead to a concentration of firms. What is more, by splitting up Marx's theory of industrial development into three parts—the spirit, the organization (or order), and technology—Sombart investigated in the 1920s how developments in one of the components (*Grundbestandteile*) changed the characteristics of the other two. Innovations in technology and engineering, for example, were likely to capture human interest to such an extent that the spirit (*Geist*) became only fascinated by the processes, the efficiency, and the rationality of society.

I will show in this chapter that by investigating these interrelationships, Sombart came to believe that the epoch of capitalism neared its end in the 1930s and that a new order of "German Socialism" had to be established. Sombart shared with Schumpeter (1928, p. 385) the conviction that capitalism was in a "process of transformation into something else". Many of Sombart's conclusions that the capitalist economy had neared its end, resulted from working with what he called a "schema" (Schema), or "ideal type" that he built from his insights that I discussed in the previous chapter. In the schema, the unfolding of a variety of firms was separated from technological progress and the spirit. For my study of biological analogies, the case of the late Sombart is relevant in three regards. First, I can show how Sombart continued to work with the consequences he drew from committing to Haeckel's principle of differentiation and integration. Second, it allows me to evaluate why Sombart did not detail biological analogies any further. Third, I can reveal that Sombart did not fall victim to biological analogies that corporatist and National Socialist economists used to argue for a coerced restructuring of German society.

5.1 Bleakness of Rationalism

Virtually during the same period when Sombart was in awe of the progressive aspects of capitalism, his resentment towards rationalism and technology rose. Already at the beginning of the 20th century, possibly due to his interactions with Simmel, Sombart (1902a, pp. 385, 397) complained about die "bleakness" (*Öde*) of economic rationalism, and asserted that "calculation, speculation, and business" turned into an end in itself. In his retrospective of the 19th century, Sombart (1903, pp. 509, 162) underlined that capitalism has "alienated us from nature" and that technological progress had replaced the "living individual (the craftsman)" with an "automatic movement of dead bodies".

In later years, Sombart (1913, pp. 423–426) claimed that the rise of technology and engineering had the effect that people no longer paid attention to anything but functionality, processes, and efficiency. In Sombart's eyes, there emerged a "parallelism" between the scientific and the capitalist spirit. The result of this rational spirit was that:

> "The natural, living world is smashed into ruins, so that an artistic world of human ingenuity and dead materials may rise on these ruins: this applies to the economy and technology alike."[1]

By the 1920s, Sombart claimed that the entire business became like an "undead machine" that only aimed at "the lowest prices, the fastest flow of goods, the highest technology, the greatest wealth" (Sombart, 1925a, pp. 5–8). An advertisement by the furniture factory Willi Laabs that Sombart ripped out the *Berliner Illustrirte Zeitung* (Figure 17) adequately summarizes Sombart's image of rationalization, technological progress, and the destruction of living nature.[2]

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[1] In the original, Sombart (1913, p. 427) claimed that: "*Die natürliche, lebendige Welt ist in Trümmer geschlagen, damit auf diesen Trümmern eine kunstvolle Welt aus menschlicher Erfindungsgabe und toten Stoffen zusammengefügt sich erhebe: das gilt für Wirtschaft wie Technik gleichermaßen*".

[2] The advertisement can be found in the Sombart papers in GStA PK VI. HA. Nl Sombart, *Unverzeichneter Karton Nr. 6*. The page is part of an envelope labeled as "Culture of Cap." (*Kultur des Kap.*) that contains a collection of newspaper articles on culture, modern technology (physician of the future, city of the future), and education. It was published in *Berliner Illustrirte Zeitung* 41, 1925, (11. Oktober), p. 1323.

Figure 17: Advertisement "My goal of production" (*Meine Produktionsrichtung*) by Willi Laabs in Gollnow. Source: GStA PK VI. HA. Nl Sombart, *Unverzeichneter Karton Nr. 6*.

The advertisement states that through "sharp calculation" and "rational processes", consumers profited from the "cheapest products" and "lowest costs". In much the same way as Sombart described it, one can see in Figure 17, how the factory, controlled by a single master, has turned into one large, automated machine that absorbs the surrounding nature. In the 1920s, it no longer mattered for Sombart if a business was making use of large-scale machinery or not. Any type of firm that was dominated by the capitalist spirit had become machine-like through "spiritualization" (*Vergeistung*).

Sombart's biographers Lenger (1994, pp. 304–305) and Appel (1992, pp. 159–177) have pointed out that Sombart's critique of rationalism and his "cultural pessimism" were common features among

German intellectuals of the 1910s and 1920s.[3] Many economists and sociologists developed these features in close exchange with Sombart. Faced with rationalization in science, economics, and popular culture, Max Weber coined the term of "disenchantment" of the world in 1917 (Swedberg, 2000). Max Scheler (1912/2004) criticized the "dominating ethos of industrialism" that was biased towards "utility and tools". Walther Rathenau (1917/1922, p. 112) thought that plutocratic capitalism had forced "mechanistic, rationalistic, and entrepreneurial thinking" upon the people.[4]

Especially in the case of Sombart and Scheler their weariness of rationality also spilled over into their methodology in the social sciences and led to new approaches that a contemporary observer, theologian Ernst Troeltsch (1865-1923), described as "scientific revolutions". According to Troeltsch (1921, pp. 1017–1018), Sombart, for example, "emphasized the opposition against the rational-democratic world of ideas, without going back to the older German-conservative and nationalistic world of ideas". It is surprising, however, that neither Lenger, nor Appel wanted to know more about Sombart's scientific revolutions. Lenger (1994, p. 305) merely remarked that Sombart's theories were "methodologically questionable", while Appel (1992, p. 187) asserted that Sombart's theorizing was "without a doubt rather superficial". Their verdicts are probably based on an extensive literature that emphasizes the "anti-rational", "esoteric", "escapist" and "disconnected" (*weltfremd*) character of Sombart's work.[5] To a large degree, these attributions are based on pointing to Sombart's esoteric correspondents who pledged to a cult of Fichte and *Lebensphilosophie*.[6]

Instead, I think it is worthwhile to investigate a little closer Sombart's anti-rational approaches to economics that Troeltsch described as scientific revolutions. I believe that the most outstanding and consequential of these approaches was the development of what Sombart called a "schema" (*Schema*) that he used to assess an "economic system" (*Wirtschaftssystem*). This schema, which Sombart brought to full fruition in 1927, was not superficial, but simply had a different goal than reductionist economic theories—it aimed at conserving variety, investigating interrelationships, and finding the "unity" of an economic system.

[3] See also Lebovicz (1969) and Ringer (1969) on the cultural pessimism of German intellectuals during the interwar period. Specifically on Sombart, see Lindenlaub (1967b, pp. 328–332).

[4] On the friendship between Sombart and Scheler, see Lenger (1994) and Mitzman (1973). For a discussion of the exchanges between Sombart and Weber, see Swedberg (2000). For Sombart's influence on Rathenau, see Hellige (2014).

[5] Consider the works of Mosse (1964), Mitzman (1973), vom Brocke (1987), and Krüger (1983).

[6] Appel (1992, pp. 164–166) and Krüger (1983, pp. 190–192) emphasized the renaissance of Fichte and his version of *Gemeinwirtschaft* that inspired economists and sociologists of the interwar period.

5.2 A Schema to pin down the Economic System

On presenting his "schema", Sombart (1927b) claimed that any conceivable past and future economic system could be described by a set of 24 characteristics (*Merkmale*). These characteristics could be grouped into 12 "pairs of opposites" (*Gegensatzpaare*) and brought under the three basic components (*Grundbestandteile*) of the economy:

- economic mindset (*Wirtschaftsgesinnung*), or spirit (*Geist*);
- shape (*Form*), or rules and organization (*Regelung und Organisation*);
- technology (*Technik*), or procedure (*Verfahren*).

Three pairs of opposites fell under the spirit category, six under shape, and the three remaining under the category of technology:

A. Spirit (economic mindset):
   I. **Principle of self-sufficiency — Profit principle**;
   II. Traditionalism — Rationalism;
   III. Solidarism — Individualism;
B. Shape (rules and organization):
   I. Boundedness — Freedom;
   II. Private economy— Communal economy;
   III. Democracy — Aristocracy;
   IV. Closed— Dissolved;
   V. Economy of self-sufficiency — Market economy;
   VI. **Individual firm — Societal firm**;
C. Technology (procedure):
   I. Empirical — Scientific;
   II. Stationary — Revolutionary;
   III. **Organic — Non-organic (mechanical — inorganic)**.[7]

[7] In the German original, the pairs of opposites are the following: A. Geist (Wirtschaftsgesinnung): I. Bedarfsdeckungsprinzip — Erwerbsprinzip, II. Traditionalismus — Rationalismus, III. Solidarismus — Individualismus; B. Form (Regelung und Organisation): I. Gebundenheit — Freiheit, II. Privatwirtschaft — Gemeinwirtschaft, III. Demokratie — Aristokratie, IV. Geschlossenheit — Aufgelöstheit, V. Bedarfsdeckungswirtschaft — Verkehrswirtschaft, VI. Individualbetriebe — gesellschaftliche Betriebe; C. Technik (Verfahren): I. Empirisch — wissenschaftlich, II. Stationär — revolutionär, III. Organisch — nichtorganisch (mechanisch — anorganisch).

Three pairs of opposites (A. I., B. VI., C. III.) that I highlighted in Sombart's schema above contain the ideas of 1902, namely, that there existed a pre-capitalist spirit and a capitalist one, that certain firms were dominated by one individual (*Persönlichkeit*) while others showed high degrees of differentiation and integration, and, finally, that organic and inorganic methods could be used in production. Hence, the consequences of Sombart's use of Haeckel's principles were still the essence of the schema and were expanded by nine additional "pairs of opposites" that I will not discuss in detail here. In the above form, the schema found its way in three publications (Sombart, 1925b, 1927b, 1930) and in all his works after 1925, Sombart used the pairs of opposites in his analysis of economic systems.

Similar to his work on industrial development, Sombart's schema resulted from his discomfort with existing "systems". According to Sombart (1927b, pp. 6–7), previous Austrian and German economists like Wagner, Schäffle, Menger, Schmoller, Philippovich, Bücher, and Schönberg had described the economy as a "system", "connected whole" (*verbundene Gesamtheit*), or "organism", but rarely took the "idea of the 'economic organism' seriously". Economists investigated markets, money, credit, and firms, and also argued that the economy consisted of "social connections between single economies [*Einzelwirtschaften*] within a whole". Yet, Sombart (1927b, p. 7) argued that one is left in complete darkness about what "kind of connection" the economists had in mind and on what basis these connections were established. Hence, Sombart raised similar concerns about the term "organism" as Schäffle before him. Yet, instead of becoming more explicit and trying to borrow more concepts, principles, and images from biologists, Sombart (1927a, p. 504) used his schema to find the "architectural peculiarity" of high capitalism.

With the help of the schema, Sombart (1927b, pp. 17, 26) argued, for example, that the connection between economic subjects (who decide) and economic objects (who obey) could be organized by coercion, or by contracts (B. I. Boundedness, or Freedom). A craftsman could produce for the local needs of the village, or for "customers" on larger markets (B. V. Economy of self-sufficiency, or Market economy). Sombart also hoped to be able to investigate the "interconnection" (*Zusammenhang*) between the 24 characteristics.

Take again the three highlighted pairs of opposites. B. VI stated that firms were either individual firms (*Alleinbetrieb, or Gehilfenbetrieb*) like smiths, tailors, and shoemakers, or differentiated "societal firms" that have become like "organisms". Both could be large, or small, and both could rely on production methods that were either organic, for example manual labor, or inorganic, for example automated machinery, or chemistry (C.II.). Finally, either type of firm could be run according to the principle of self-sufficiency (in a pre-capitalist, or socialist system), or the principle of profit (in a capitalist system) (A. I.).

Most often, however, societal firms were large and could only use machinery when they were highly differentiated. Individual firms, or small societal firms were less likely to produce with machinery, but often used chemical methods (1927b, pp. 34–38). Next to them, coexisted large societal (differentiated) and large individual firms that still relied on organic (manual) production methods. Connecting the different types of firms to the spirit (A. I.), Sombart argued that the unfolding of highly differentiated and automated factories could never have been achieved if the economy was ruled by a pre-capitalist spirit that did not aim toward profit. Sombart (1927b, p. 36) asked, for example, if only the (subsistence) needs, or the needs of the closest community had to be fulfilled, why would someone operate a large manufacture that produced a thousand boots per day? If Sombart had not preserved the variety of different types of firms in his schema and had reduced them to something like the "representative firm", he could not have investigated these interrelationships between types, technology, and spirit.

In a further step, Sombart (1927b, p. 52) hoped that by studying the "manifold parts" (*mannigfache Einzelbestimmungen*) in detail, he could "mentally find the unity" (*gedanklich die Einheit finden*) of an economic system. A good way to understand what Sombart meant by "manifold parts" and "unity" is to imagine each of the 12 pairs of opposites as some sort of 'toggle switch' that can rest on the left, on the right, or somewhere in between. Finding the "unity" of an economic system meant for Sombart defining whether it was pre-capitalist, capitalist, or socialist, that is, pinning down on which side the switches lay.[8]

In a pre-capitalist economy, like the medieval German handicraft economy, 10 of the 12 switches were on the left.[9] Most importantly, the economy was dominated by self-sufficiency

[8] Sombart's demarcations of pre-capitalist, capitalist, and socialist were met with great resistance, especially from his contemporary historians like Georg von Below. Later historians such as Ferdinand Braudel have also pointed out that markets (a decisive characteristic of Sombart's capitalist economy) already existed in the medieval period (Plumpe, 2019, pp. 17–19).

[9] Craftsmen produced only in the case of need (A.I.) and passed on their knowledge personally to their apprentices—the spirit was traditional (A.II). The guild system ensured solidarity between the craftsmen and hampered competition (A. III). Similarly, 4 of the 6 'order' switches and the three 'technology switches' were on the left. B II. was on the left, because the initiative to work was with the individuals and not with the collective. As Sombart had already emphasized before, the handicraft economy was dominated by undifferentiated individual firms, meaning that B. VI lay on the left. Only B. V. was on the right because craftsmen already traded their goods for money and did not consume them by themselves like farmers in their home economy (*Hauswirtschaft*). B. IV. was somewhere in between "closed" and "dissolved". On the last point, Sombart (1927b, pp. 24–25) explained that many craftsmen fulfilled functions that were divided up in a capitalist economy. Yet, at the same time, there existed already a high degree of the division of labor between handicrafts.

(*Bedarfsdeckung*), by individual firms, by organic technology and it was "tied", or "bounded" (*gebunden*), because individuals could not freely choose their occupation (Sombart, 1927b, pp. 23–26). In a capitalist economy, however, 10 of 12 switches were on the right.[10] Capitalism was defined by the profit principle, a combination of individual and highly differentiated firms, inorganic technology, and freedom. In a socialist economy, many of the pairs of opposites were switched back so that 6 of the 12 switches were on the left.[11] Socialism was ruled again by self-sufficiency (*Bedarfsprinzip*), and was tied, or planned, but was based on large differentiated societal firms, and inorganic technology.

I will detail how Sombart explained the transition from a capitalist system to a socialist economy in the next section. Here, I want to first investigate how Sombart reflected on his schema and how it was received by his contemporaries. Sombart (1927b, p. 27) highlighted that he sketched "ideal types" of economic systems with his schema. These systems themselves, however, never reached this "purity" in actual history. In his eyes, the benefit of these ideal types lay in their ability to go beyond the "uniform sequences of development" (*einheitliche Entwicklungsreihe*) offered by economists like Marx, or Bücher. Their theories only showed how the economy lawfully developed from its medieval structure to the modern economy based on one criterion.[12] In contrast, Sombart argued that the schema allowed him to maintain the notion that there was no "lawful sequence" (*gesetzlicher Ablauf*) from traditionalism to rationalism, or from self-sufficiency (*Bedarfsprinzip*) to the profit principle (*Erwerbsprinzip*). These developments could also "run in the opposite sense" (Sombart, 1927b, pp. 31–32).

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[10] Only B. II was on the left (capitalism was organized by entrepreneurs with private initiatives), and B. VI. lay in between (there existed small, undifferentiated, and larger differentiated societal firms).

[11] Socialism relied on self-sufficiency and solidarity (A.I. and A. III. on the left) but was still dominated by rationalism (A. II on the right) it took over from the capitalist system. Similarly, technology was scientific, and inorganic (C. I. and C. III. On the right) and had the "utopian" hope to be revolutionary. Sombart (1927b, pp. 26–27) argued that revolutionary technology was not compatible with the order (*Ordnung*) of the socialist system, indicating that technology had to become stationary under socialism (C. II. on the left). The order was a planned, or "tied", aimed at self-sufficiency and communal economy (B. I. on the left, B. II on the right, B. V. on the left). Socialism was also dissolved (B. IV. on the right), because it relied on a high degree of the division of labor, and, as the emergence of unions and cooperatives showed, it tended towards a democratic order (B. III on the left) that gradually replaced the aristocratic order of capitalism (Sombart, 1927b, p. 32).

[12] Sombart (1927a, p. 7) contended that Marx explained economic development by one causal factor, the "necessity of capital to reproduce itself" (*Verwertungsstreben des Kapitals*). Bücher only relied on "the length of the distribution channel" (*Länge des Absatzweges*) to explain the processes of economic life (Sombart, 1927b, p. 12).

One of the first reviewers of Sombart's third volume of *Modern Capitalism*, German economist Edgar Salin (1892-1974), remarked that Sombart's ideal type was of "special character". It was not only a "condensation" (*Verdichtung*) of known facts (and thus similar to Weber's ideal type), but Sombart also applied the ideal type to "verify" and "specify" facts and problems (Salin, 1927, p. 324).[13] Salin believed that Sombart used the term "capitalism" neither in a purely historical, nor in a purely logical way, but he used it to arrive at a "comprehensive knowledge" (*Gesammterkenntnis*) by "pictorial representation" (*Anschaulichkeit*).

Salin considered these two characteristics of Sombart's approach to be responsible for the resistance by several contemporary economists against Sombart's *Modern Capitalism*. Accordingly, Brentano's trenchant review of Sombart's work had to be explained by the fact that Brentano possessed a diametrically opposed style of visualization (*Anschauungsform*) that did not seek comprehensive knowledge (Salin, 1927, p. 320). Similarly, Salin claimed that economists like Schumpeter, Wieser, Liefmann and others strove for a more "cosmopolitan" theory that was concerned with partial knowledge (*Teilerkenntnis*) like "classical and after-classical economists".[14] Instead, Sombart was one of the main proponents of what Salin (1927, p. 326) called "German theory", or "*anschauliche* theory" next to Friedrich von Gottl-Ottlilienfeld (1868-1958), Alfred Weber (1868-1958), Johann Plenge (1874-1963), and Arthur Spiethoff (1873-1957). Variations of Sombart's "economic system" can be found, for example, in Spiethoff's (1933, 1955) "economic style" (*Wirtschaftsstil*) and Walter Eucken's (1951) concept of "economic order" (*Wirtschaftsordnung*).

Salin (1927, pp. 326–327) noted that *anschauliche* theory did not necessarily have to be German, because it distinguished itself from partial knowledge by its "seeing and selecting". According to Salin, Sombart saw "the economy in its general, rational and irrational contingency [*Bedingtheit*] and connection [*Verbindung*]" instead of "abstracting and reducing the economy to a few logically

[13] Weber explained that "[a]n ideal type if formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct" (Shils & Finch, 1949, p. 90). Another aspect that Salin did not highlight in his comparison between Sombart's and Weber's ideal types, is Weber's methodological individualism. Weber created the ideal types to classify individual behavior (Heath, 2020). In contrast, Sombart created his ideal types to classify whole social systems.

[14] Schumpeter (1927), for example, did not acknowledge Sombart's schema and argued that Sombart's "analytical tools; if he even possesses any, stem from Marx". Salin (1927, p. 329) also highlighted that the "rational theoreticians" were far from possessing a "unified concept" of theory. Indeed, as the works of Oppenheimer, Diehl, Böhm-Bawerk, Wieser, Schumpeter, Amonn, Spann, Liefmann, and Lederer show, they disagreed fundamentally about the definition of "value" and the usefulness of marginalism (Köster, 2011).

solvable problems that were dominated by rationality". Most importantly, Salin (1927, p. 327) highlighted that also Sombart "abstracted", but only left out the "random phenomena" while conserving the "overall interconnection" (*All-Zusammenhang*) of the "economy as life".

In light of Salin's remarks, I think it is misleading to translate "*anschauliche* theory" as "intuitive theory" as Bertram Schefold (2004) did. Intuition, a term that neither Salin nor Sombart use, suggests that Sombart tried to grasp the unity of the economic system by a feeling, or instinct, without the need for conscious reasoning. As Salin emphasized, however, comprehensive knowledge contained within itself the "sharpest (logical) partial knowledge" and he pointed to Sombart's application of the laws of prices and wages in *Modern Capitalism* (Sombart, 1927a, pp. 666–679). Salin (1927, p. 331) added that Sombart might lack the "final sharpness of logical thinking", but it was more likely that he thought that "rational theory was insignificant partial knowledge.

Hence, Salin's review supports my claim that Sombart could deal with reductionist theory, but that he preferred an alternative style of thought that conserved the variety of the living economy. However, I think that the term *anschaulich* does not sufficiently explain what Sombart tried to do with his schema. One reason for this insufficiency is the difficulty to characterize what the term *anschaulich* means, let alone trying to translate it into English. Meinel's (2004, p. 245) translation of *Anschaulichkeit* into "pictorial representation" that I use throughout this thesis, does not do justice to Sombart's schema either. If pictorial representation was the only defining feature of *anschauliche* theory, then one would need to also consider Irving Fisher's visualization of the mechanical balance under Salin's category as it allowed reasoning based on the levers and baskets as Mary Morgan (1999, 2007, 2012) has elaborated.[15] Yet, Fisher's reductionist approach based on the mechanical balance was definitely not what Salin had in mind when speaking of *anschauliche* theory. Much more fitting is Salin's description of Sombart's method as "comprehensive knowledge" (*Gesammterkenntnis*), which, in Sombart's terminology meant comprehending "the manifold whole".[16]

[15] *Anschaulichkeit* was also a core term among German-speaking physicists of the 1920s (Forman, 1984). Physicists like Erwin Schrödinger (1887-1961), for example, emphasized that *Anschaulichkeit* was necessary for his development of quantum theory. For Schrödinger, *anschauliche* theory "should provide visualisable pictures in space and time" (de Regt, 1997, p. 470). This is a broader definition of *Anschaulichkeit* than in Salin's essay, where the "overall interconnection" of the economy was a key characteristic of *Anschaulichkeit*.

[16] Another reviewer of Sombart's *Modern Capitalism*, Hungarian economist Theo Surányi-Unger (1898-1973) similarly highlighted that Sombart was able to capture the "manifold different structures [*Gestaltungen*] of real economic life" (Surányi-Unger, 1928, p. 178).

Pinning down this “manifold whole” became the main task of Sombart’s economics in the late 1920s. By applying his schema to the early 20th-century German economy, Sombart concluded that the pre-war economic system was high capitalism. In this high capitalism, freedom ruled (B. I. on the right) as individuals resorted to contracts and they relied on the “price mechanism” (*Mechanisierung der Preisbildung*) of the market (Sombart, 1927a, p. 672). The spirit during high capitalism was dominated by the profit principle (A. I on the right) and technology in production became increasingly inorganic (C. III. on the right). At the same time, Sombart (1927b, p. 35) claimed that the types of firms came in a “colorful variety” (*bunte Mannigfaltigkeit*) and no type took over the whole economy (B. VI. in the middle).

However, in this same period, Sombart saw forces at play within the capitalist system that drove free businesses towards “boundedness” (*Gebundenheit*)—B. I. gradually moved back to the left. Businesses connected into cartels and associations to evade free competition. As cartels and associations required planning and rules (*planmäßige Regelung*), the economy became more “tied” (*gebunden*). The same held true for rational laborers who wanted to increase their bargaining power by forming unions, and independent small retailers that formed cooperatives in order to benefit from economies of scale (Sombart, 1927b, pp. 27–32). These developments resulted directly from the rational calculating capitalist spirit that grew even stronger in the 1920s (A. II on the right). We will see in the next section that Sombart came to believe that capitalism was in the stage of late capitalism and gradually moved toward a socialist economy. Yet, despite the observation that the development of capitalism had come to an end, Sombart still believed that the types of firms remained a colorful variety.

5.3 A Colorful Variety at the End of Capitalism

A main insight of Sombart’s analysis of high capitalism was that his previously made observation about the variety of economic organizations still held true. Sombart (1927a, p. 817) claimed that even in high capitalism, Marx’s idea that the capitalists’ interests led to “ever larger firms and an ever higher consolidation of firms” did not manifest itself in full. In Sombart’s terms, Marx had suggested that capitalist production led to a “concentration of firms” (*Betriebskonzentration*), but this was definitely not the case even when close attention was paid to the fact that certain firms (*Betriebe*) belonged to concerns (*Konzerne*). After an extensive study of the 1925 German statistics on industry (*Gewerbezählung*), Sombart (1927a, pp. 817–883) came to the conclusion that only the coal and steel industry (*Montanindustrie*), the chemical and electro-technical industries, and parts of the textile industry showed significant concentrations of firms. Banking, which experienced increasing concentration in the US, even showed a surge in small and medium-sized firms in Germany.[17]

Overall, firms remained a great variety despite being increasingly tied through cartels, syndicates, and concerns. The pair of opposites B VI remained in between the two extremes of individual and societal firms. Sombart came to believe that in each branch, the conditions that decided upon the size and type of a business differed substantially. In a long chapter, Sombart thus identified the advantages and disadvantages of small and large sizes in every corner of the economy. To take one of Sombart's examples: a large retailer could profit from economies of scale when buying and storing goods, had easier access to capital markets, more opportunities for advertisement, and could offset its risk. A large business also benefited from differentiation as the manager (*Geschäftsleiter*) was relieved of his technical duties and could instead devote his time to studying trends or maintaining contact with suppliers. With growing size, however, the overhead costs (*Unkosten*) rose, and overseeing the business became more challenging. A smaller business also had the advantage of forging closer personal relations with local customers and adapting to local tastes (Sombart, 1927a, pp. 864–867).

Considering the various circumstances that led to different types and sizes of firms in different branches, Sombart argued that:

> "The motives that operate in economic life are just very manifold, and the colorfulness of life finds its expression in the colorfulness of economic organizations, as we get to know them here and elsewhere: rationalization—certainly; but not a complete one […]. It has always led to skewed judgments if one, like Marx and his followers, does not distinguish sharply enough between the rational lines of development and the colorful composition of reality."[18]

This time, Sombart's conviction that the economy remained a "colorful composition" of economic organizations that resulted from manifold motives, had quite a different effect on Sombart's borrowing of biological analogies. The principle of differentiation and integration and his prior

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[17] In particular, the narrow measure of concentration (the number of firms) showed that the number of small and medium-sized banks grew between 1882 und 1907 (Sombart, 1927a, p. 878).

[18] In the original, Sombart (1927a, p. 882) asserted that: "*Die Motive, die im Wirtschaftsleben wirken, sind eben sehr mannigfaltig, und die Buntheit des Lebens findet dann ihren Ausdruck in der Buntheit der wirtschaftlichen Organisationen, wie wir sie hier und anderswo kennenlernen: Rationalisierung—gewiß; aber keine vollständig, wie ich eingangs zu diesem Unterabschnitte schon hervorgehoben habe. Es hat immer zu schiefen Urteilen geführt, wenn man, wie Marx und seine Anhänger, die rationale Linien der Entwicklung und die bunte Gestaltung der Wirklichkeit nicht scharf genug unterscheidet*".

classification of eight types of firms vanished almost completely in the third volume of *Modern Capitalism*. Remember that Sombart used Haeckel's biological principle to explain how eight types of firms could be classified according to their degree of differentiation and integration. Yet, differentiation and integration only suggested that businesses were organized differently and neglected the circumstances (like the specificity of branches, geographical locations, and the behavior of customers) that Sombart now highlighted by paying attention to the "motives that operate in economic life".

It is likely that Sombart felt that Haeckel's principle became too limiting because it reduced the types of organization only to differentiation and integration. Another reason for Sombart's neglect of Haeckel's principle may have been that industry had not developed as Sombart had expected. Haeckel's principle suggested that highly differentiated and integrated firms would gain significant advantages over small firms due to their higher productivity. Instead, Sombart (1927a, p. 963) had to acknowledge the "surprising" fact that in 1907, at the peak of high capitalism, more than a third of the German workforce could be classified under small-scale firms and a fourth under middle-sized firms. Sombart concluded from these statistics that almost 50% of the workforce was still employed in handicraft firms (including trade, transport, services, but not agriculture).

In the eyes of Lenger (1994, p. 341), Sombart's assessment of the handicraft firms was "more than another inconsistency". Lenger argued that compared to the first volume of *Modern Capitalism* Sombart's evaluation of handicrafts had "heavily changed". However, Sombart (1927a, pp. 963–966) was quite clear that what he considered to be handicraft in the 20th century was "not the same" as in the early 19th century. Shopkeepers, restaurant owners, and delivery drivers were likely to be driven by the old handicraft spirit, but other branches underwent an "inner transformation". Just as he had emphasized in 1902, Sombart claimed that many craftsmen became dependent on credit (*Fremdkapital*). Others had to find side jobs in order to survive. They opened their own stores, started to work for larger companies, or concentrated on the "breadcrumbs" of capitalism—reparation.[19] Another (smaller) part underwent modernization and was forced to adopt the capitalist spirit of "economic rationalism, calculation, and accounting".[20] Many craftsmen had to take care of "commercial tasks" like bookkeeping. If anything, Sombart claimed that handicrafts became more dependent on capitalism instead of being "outside of [its] reign" (Lenger, 1994, p. 341).

[19] See also Sombart (1927a, pp. 748–760) on the dependency of handicrafts and other types of businesses on credit.

[20] Sombart (1927a, p. 964) also emphasized that machines and chemical methods were not the panacea of handicraft firms.

I think it is important to emphasize Sombart's unchanged evaluation of the business landscape because it brings to the fore the forces that Sombart thought were at play in the transition from high capitalism to late capitalism: rationalization and boundedness (*Gebundenheit*). These two terms became much more central in Sombart's work than differentiation and integration, but, as we will see, were similarly interdependent. According to Sombart (1927a, pp. 884–894), rationalization began with the introduction of double-entry bookkeeping in the Renaissance. Commerce and business economics (*Handelsbetriebslehre*), which Sombart traced back to the 17th century, also did their part in spreading rationality amongst entrepreneurs. Hence, every capitalist business was "in a certain sense a scientifically led firm (*Betrieb*)". Yet, accounting was only the start. With the introduction of scientific methods in technology (chemistry, machinery) also the management (*Betriebsführung*) started to become scientific. In Germany, the chemical industry promoted "scientificness" (*Wissenschaftlichkeit*) in business practice since the mid-19th century, while in England and the U.S. the "industrial engineers" and "efficiency experts" dominated since the late 19th century. The "Taylor system" was only the pinnacle of this process toward rationalization.

Like the U.S. institutionalist economist John Rogers Commons (1923, p. 192), Sombart (1927a, p. 894) considered rationalization through "efficiency experts" and "industrial engineers" one of the leading factors that led to the "stabilization of business". Yet, much more pronounced than Commons, Sombart believed that rationalization also led to the abolition of free enterprise. We have encountered one reason for the decrease in freedom, or independence, already in the last chapter. The capitalist spirit spread into the former domain of handicrafts, which led to the dependency on credit by small businesses. With credit dependency, businesses were swayed by larger capitalist firms or banks. Another reason was the agreements between market participants who decided to leave their freedom behind and form cartels, concerns, syndicates, and unions. These "ties" (*Bindungen*) were a sign that the capitalist spirit had lost its wild, irrational, and audacious side, and turned into a purely rational and security-seeking spirit (Sombart, 1927a, p. 685).

That Sombart considered cartels as a sign of rationalization was a German specificity.[21] Since around 1900, when cartels became widely discussed among German economists, there was a wide consensus that cartels were a higher form of capitalist-rational organization. Sombart (1903, pp. 371–372) was one of the leading experts in the field who argued that cartels were "approaches of higher and highest forms of capitalist organization". In his eyes, the elimination of competition did not hamper

[21] Cartelization was much less of a phenomenon in the U.S. As Herbert Hoover (1923, pp. vi–vii) explained in a collection of articles on the *Stabilization of Business*, "[t]he law very promptly stepped in to prevent the domination threatened by the combination of ownership with its elimination of competition and its strangling of equality of opportunity".

innovation, but instead boosted it, as the only method to increase profits when prices and quantities were fixed, was the reduction of production costs.[22]

For Sombart (1927a, p. 700), cartels were "despite, or possibly because of their tendency to bind firms together" the children of high capitalism. Hence, that most economic sectors in Germany became cartelized in the 1920s was a sign of the transformation of capitalism into its late stage.[23] In other words, Sombart thought that the very economic rationality that dominated the free high capitalist economy created a new form of "boundedness", which was the first sign of a future socialism. The logic of Sombart's outlook sounds fairly similar to the prophecy by Marx and Engels (1848, p. 11) that the bourgeoisie inevitably creates its own "gravediggers" (*Todtengräber*) by seeking higher profits. However, Sombart's transition from capitalism to socialism had no dialectical character and did not result from a proletarian upheaval.[24] Like Schumpeter, Sombart believed in a slow transition from capitalism to socialism that manifested itself in the spread of rationalization and the security-seeking spirit of late capitalism.[25]

Sombart observed this transition toward security-seeking not only in the cartelization of large industries but also among smaller firms and even the workforce. Smaller businesses joined forces to build resistance against already larger concerns, or warehouses. As syndicates, they profited from lower prices, economies of scale, lower organizational costs, and price setting of their own products (Sombart, 1927a, pp. 693–700). Also in the labor market, the ties between actors had increased dramatically as a result of unionization (Sombart, 1927a, pp. 670–693). Due to the rise of cartels, concerns, unions, and increased state intervention, bureaucracy, and forward-looking businessmen,

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[22] Yet, cartels also worsened the condition of the labor force, because cost reduction also included lowering wages (Sombart, 1903, p. 372).

[23] As cartel expert Robert Liefmann (1932, p. 30) explained, by the md-1920s, "the commodities for which cartels have been formed in Germany, amount to well over 1,000". In mining, iron and steel, and smelting, there existed fewer cartels than in other branches, which explains why Sombart claimed that in these industries concentration did occur. According to Brasch (1927, p. 161), 93% of the shares of mining, 80% of iron and metal, 87% of the electro-technical industry, 98% of potash mining were concentrated in a few hands in 1927.

[24] Sombart (1899, p. 380) did not believe that capitalism was the antithesis of the handicraft period nor did he think that socialism (the synthesis) came about through a sudden turnover (*Umschlag*). Sombart (1896a, p. 72) made it quite clear that the "Hegelian dialectic proof", the "theory of turnovers and negation of negation" was outdated. Only occasionally, Sombart (1902a) used the "Hegelian formula" of "negation of negation" in his arguments about industrial development. I therefore believe that Scholz (1990, p. 16) overstated the value that Sombart attributed to the dialectical method.

[25] As Austrian historian of economics Günther Chaloupek (*1947) highlighted, Schumpeter considered capitalism as a system in decline already in the 1920s and shared many views with Sombart on the transition of capitalism into a socialist system (Chaloupek, 1995).

Sombart (1927a, p. 806) came to believe that the German economy turned into the "rigid system" of late capitalism. Late capitalism developed towards ever greater stability in which enterprises became "ever more cumbersome machines", and market relations moved towards "ever greater boundedness" (Sombart, 1927a, p. 1013).

With the exception of Robert Liefmann and Ludwig von Mises, most German-speaking economists in the 1920s believed in the development toward a rigid, or tied, capitalism.[26] Business economist Eugen Schmalenbach (1873-1955), for example, argued that cartelization was a necessary outcome of increased fixed cost (machinery and administration) in German industry.[27] Also Ernst Wagemann, whom we will encounter in the next chapters, was convinced that Germany developed toward a "tied economy" (*gebundene Ertragswirtschaft*) in which prices and interest rates lost their regulating power as a result of collusions on the part of business associations (*Verbände*), cartels, and unions (Wagemann, 1931, pp. 50, 266).[28]

Sombart (1927a, pp. 583–585) believed that in a "tied" environment, the activities of venturesome entrepreneurs who organized and planned their respective businesses were greatly restricted. His assurance that all economic life became rational, uniform, stable, and dominated by large cumbersome businesses stood in marked contrast to his conviction that firms were a colorful assembly of different types. To level this contrast, Sombart resorted to the difference between the concentration of firms (*Betriebskonzentration*) and the concentration of power (*Machtkonzentration*). Remember that in 1902, Sombart introduced the idea of the capitalist spirit to explain why the high capitalist economy was still pervaded with small firms. In 1927, Sombart had to account for the fact that a large part of the German economy had not only become "tied" into cartels and concerns but also "intertwined" (*verflochten*) due to holdings and subsidiaries.

Sombart (1927a, p. 746) argued that in spite of the fact that there was no overall concentration of firms, the "circle of managing directors" (*Kreis der leitenden Persönlichkeiten*) shrank due to the

[26] Robert Liefmann (1932, p. 49) did not deny that cartels took over large parts of the German economy, but he opposed the idea that cartelization was part of a larger development of rationalization that included public ownership, state regulation, and interference. For Liefmann (1928, p. 588), the concepts of "tied" (*gebundene*) economy, and "end of capitalism" were only "political catchwords".

[27] Schmalenbach (1928) argued that due to the high overhead costs, factories were forced to continue production even if demand fell. In order to avoid falling prices, they formed cartels to set the prices of their products. For an overview of Schmalenbach's arguments and the controversy it entailed, see Köster (2009).

[28] See also Dobretsberger (1932), who wrote a book about the differences between the "free economy" (*freie Wirtschaft*) and the "tied economy" (*gebundene Wirtschaft*).

formation of cartels, cross-holding (*Verflechtung*) between joint-stock companies, and the establishment of concerns. Especially cross-holdings were clear evidence for the concentration of power. On the basis of the published statistics of public joint-stock companies, Sombart (1927a, pp. 740–747) could show that not only the personal but also the "objective entanglement" (*sachliche Verflechtung*) between joint-stock companies was substantial. 25 members of the AEG (*Allgemeine Elektricitäts-Gesellschaft*), for example, held seats in 481 supervisory boards and they had established a subsidiary bank that was invested in 34 joint-stock companies all over the world. Sombart (1927a, p. 747) knew from Walther Rathenau that by the 1920s "four to three hundred men guided the whole European-American economic life". Similarly, concerns led to a concentration of plans, or "unification of the management of independent businesses" (Sombart, 1927a, p. 548). Hence, for Sombart, the rise of large concerns like Stinnes, or I.G. Farben did not result in the decrease of variety of firms, but only in the loss of independent management. It seems as if for Sombart, the growth of concerns was no different from the growing dependency of small firms on credits, rationalization, and accounting. They all succumbed to the capitalist spirit in one way or the other.

The fitting image for the process of concentration of power was not the phylogenetic tree that Sombart used to depict how a variety of firms branched off from the common 'ancestor' of the small individual firm (*Individualbetrieb*). Rather, the process of concentration could be made visible by showing how firms converged on a few concerns, as suggested by German economist Ferdinand Fried (1898-1967).[29] Similar to his teacher Sombart, Fried (1931) proclaimed the "end of capitalism" in his popular book that went by the same name. At the height of the Great Depression, Fried claimed that the German economy had reached its final stage of unfolding in the early 20th century. From there on, no more new types of businesses had emerged. Instead, the existing variety became more and more concentrated in the hands of a few concerns, leading to the convergence of previously independent businesses into giant operations under one management. Using the visualization that I reproduced in Figure 18, Fried explained that the I.G. Farben concern, for example, took control of hundreds of different independent firms over the span of the late 19th and early 20th century. The firms that once had been independent rivers merged into one great "stream" of I.G. Farben

[29] Fried, a pseudonym for Ferdinand Friedrich Zimmermann was an economist, anti-Semite, and journalist for the journal *Die Tat*, a mouthpiece of conservative (non-socialist) anti-capitalism and autarky. Fried later joined the SS and became an important propagandist for the Nazi party. For Fried's work and his impact on Nazi ideology, see Barkai (1988) and Derman (2021).

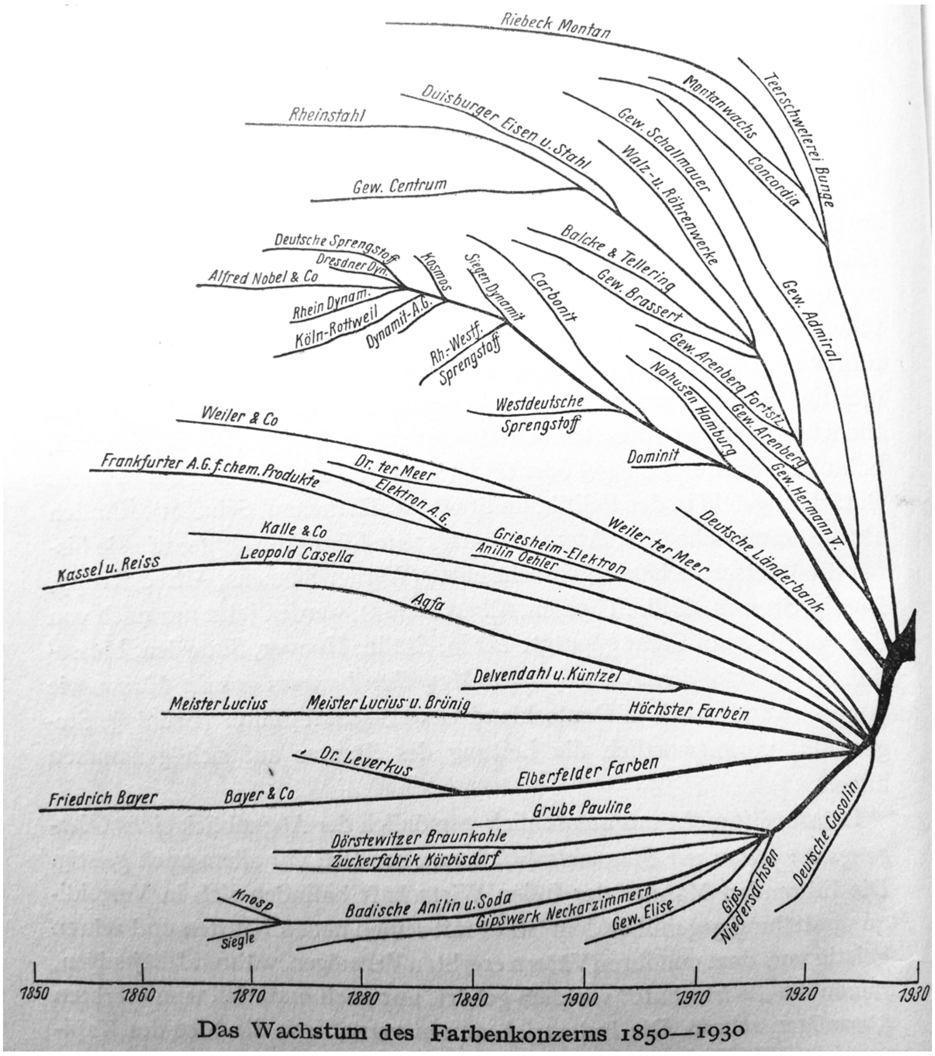

Figure 18: The "growth" of I.G. Farben 1850-1930. Source: Fried (1931, p. 20).

Similar imagery can be discovered in conceptual terms in Sombart's third volume of *Modern Capitalism*. For Sombart (1927a, p. 25), the high capitalist epoch was driven by the "striving for infinity" (*Unendlichkeitsdrang*) and by forces that "strove towards the undetermined". In late capitalism, by contrast, the "driving forces" lost their tensions, and the whole capitalist system became calmer and rigid (Sombart, 1927a, pp. 1012–1013). We will see in the last section of this chapter that Sombart found confirmation for these tendencies towards rigidness in the turmoil of the Great Depression. In consequence, Sombart drafted a "new order" of the economic system that he described as "German Socialism".

5.4 The New Order of German Socialism

The Great Depression marked a fundamental break in Sombart's outlook on the capitalist economy, yet his conviction that the German economy was and should remain a great variety of different organizations persisted. Before the 1930s, Sombart had argued that with rationalization, technological progress, and bureaucratization, the boundedness of late capitalism was steadily taking overhand. By 1932, Sombart abandoned the aim to understand the development of the existing system and declared that the economy was “no natural process” and had no “intrinsic law” (*Eigengesetzlichkeit)*. Instead of accepting that the economy was “destiny” (*Schicksal*), Sombart (1932) authoritatively claimed that the shaping of the economy is a problem of the “will”. To decide what shape this new economic order ought to take, Sombart first sketched the "present state of capitalism" using the "three sides" of his schema (mindset, order, technology).

Sombart (1932, p. 7) argued that the capitalist spirit, which in high capitalism was characterized by a tension between rationalism and irrationalism and between speculation and calculation had almost entirely switched to rationalism during late capitalism: businessmen’s intuitions were replaced by knowledge, the entrepreneurs became administrators, or clerks. Security and stability became the main driving forces as witnessed from the rise of cartels and concerns. The order of the economy, which had been dominated by individualistic competition in the stage of high capitalism, had become “tied” (*gebunden*) by concerns, cartels, unions, and the state. Technology had reached a high grade of development which resulted in a further emancipation from nature, and a new type of rational and disciplined humans (Sombart, 1934, p. 264). Yet, also with respect to technology, Sombart saw the end of progress approaching. In Germany, firms did not fully rationalize (*vergeisten*) their process of production like in the U.S. Taylorism or Fordism, and Sombart (1934, pp. 257–258) believed that there were limits to the increase of productivity and revolutionary inventions.[30] Sombart (1932, p. 10) thus claimed that:

> “The natural course of economic processes has been replaced by a plethora of regulatory interventions; the ‘agile’ has been replaced by the ‘rigid’ system.”[31]

The turmoil created by the Great Depression was also the result of the rigidity of late capitalism (Sombart, 1932, pp. 10–11). The rigid system of cartels, unions, and the state fixed prices and wages “arbitrarily”, which resulted in high wages despite the trough of market conditions. Sombart recognized a similar arbitrariness in Chancellor Brüning’s tendency to step from emergency decree to emergency decree without a unified plan. Like many at the time, Sombart (1932, pp. 12–13) announced that the current order could not be left as is. One solution was to rewind the time and hand

[30] I refer here to Sombart’s (1934) *German Socialism* because in 1932 he surprisingly inserted another definition of technology as “economic technology” (*Technik des Wirtschaftens*) that is not to be found in any other of his work (Sombart, 1932, p. 10).

[31] Sombart (1932, p. 10) stated in the original: “[*A*]*n die Stelle eines natürlichen Ablaufs der wirtschaftlichen Vorgänge ist eine Fülle regelnder Eingriffe, an die Stelle des ‘beweglichen’ ist das ‘starre’ System getreten*.”

back the initiative to the free entrepreneurs of a liberated economy. Yet, Sombart warned that the large concerns, cartels, unions, and banks would resist such ideas and could not be easily dissolved (Sombart, 1932, pp. 15–17). A more promising path was a "planned economy" (*Planwirtschaft*) that Sombart characterized by "comprehensiveness" (*Umfassendheit*), "unity" (*Einheitlichkeit*), and "variety" (*Mannigfaltigkeit*).

The idea behind Sombart's "comprehensiveness" was to resolve the contradictions that he believed were present in the capitalist economy of his time. The economy was planned in the "individual economy" but lacked a plan for the "whole economy" (*Gesamtwirtschaft*). Sombart thus suggested that the planned parts of the individual economy should be ordered, tamed, and brought into a "meaningful connection" (*Sinnzusammenhang*) "as if" the economy was an "organism". In practice, comprehensiveness meant that every part of the economy (production, circulation, distribution, consumption) had to be ordered by a planning board (*Planungsrat*). The planning board fixed prices and quantities and also had the power to establish certain free zones in which the market forces were still at play (Sombart, 1932, pp. 20–21).

Sombart (1932, pp. 21–23) hoped that with a planning board, his new economic order would adhere to the second characteristic, the "unity" of the economy. If every order originated from the central authority of the planning board, the economy could be freed from the messy plans of the current economy. As the current economic order was not free but dependent on the market, and an ever-shrinking circle of entrepreneurs, Sombart simply suggested replacing these unordered dependencies with a more meaningful dependency on the planning board.

According to Sombart (1932, pp. 23–27), what distinguished his version of a planned economy from a socialist planned economy, was the third characteristic, "variety". Harking back at his earlier criticism of Marx, Sombart emphasized that capitalism did not lead to "one type of giant capitalist enterprises". Rather, there existed a "colorful bouquet" of different "economic systems and types". Agriculture, industry, trade, and transportation were organized by different types of firms and were dominated by the private home economy (*Eigenwirtschaft*), market economy, or collective self-sufficiency (*Bedarfdeckungswirtschaft*). Handicrafts, agriculture, cooperatives, public organizations, and capitalist firms all remained constituent parts of late capitalism.

As this description of variety shows, by the 1930s, Sombart had altered his conviction that the capitalist spirit took over the whole realm of the economy. Variety did not only mean a variety of capitalist firms but also a variety of "economic systems". Some firms still operated in self-sufficiency and relied on traditional technology, others were technologically advanced and sought after profit. Some areas were tied, while in other branches freedom still ruled. In other words, Sombart could not find the unity of the current economic system anymore based on his schema of 1927. Most of the 12 pairs of opposites came to rest somewhere in the middle.

Sombart's inability to use his schema to analyze the economic system and its future might explain why he began introducing concepts and theories from his contemporary fascist and corporatist economists. Sombart (1932, pp. 28–31) claimed that to implement his planned economy that preserved a great variety of organizations, the planning board also needed an "infinite variety" of means to implement its plans. The planning board had to organize artificial competition as some sort of race (*Wettrennen*) between firms—foreshadowing the vocational contests (*Reichsberufswettkampf*) by the German Labor Front (*Deutsche Arbeitsfront*) during the Third Reich. The planning board could also resort to other means like centralized education to steer consumption behavior or the creation of fascist leisure organizations like the Italian *Opera Nazionale Dopolavoro*. The board could encourage membership in associations, nationalize certain industries, and implement state control in various branches. These plans could be complemented by economic policies to establish autarky, and a rejuvenation of agriculture (Sombart, 1932, pp. 32–45).

In 1934, Sombart published his last work on economics titled *German Socialism* in which his much-described lack of orientation becomes even more pronounced. Only in one instance, Sombart (1934, p. 313) made use of his schema by claiming that the profit principle could be "switched off" (*ausschalten*) in a planned economy by replacing private capitalist businesses with state ownership that enacted the self-sufficiency principle. Yet, the schema offered no ready answers for Sombart's (1934, p. 283) final target to "permeate economic life with meaningful forms" and replace the profit principle of the small group of entrepreneurs with the "will of the people" (*Volkswille*). In consequence, Sombart took inspiration from Austrian corporatist Othmar Spann (1878-1950), German militarist and anti-democrat Ernst Jünger (1895-1998), and National Socialist state scientist Carl Schmitt (1888-1985) who claimed to have found ways to restructure the economy.

From his reading of Spann's (1921) popular *The True State* (*Der wahre Staat*), Sombart entertained the idea of establishing a "corporatist state" (*Ständestaat*). However, Sombart (1934, pp. 222–225) considered Spann's idea to build a "corporatist structure" (*Berufsstände*) by defining "occupations" too challenging. It was likely that the state would face great difficulties when trying to classify different occupations, because "proper professions" no longer existed in the capitalist economy. Similarly troublesome was Spann's classification of individual professions into economic branches. In Spann's "food corporation" (*Nährstand*), for example, one had to classify both the German farmer and the Jewish grain trader, even though they possessed "different spirits" according to Sombart. In addition, Sombart (1934, p. 223) believed that Spann (1921, p. 247) had shown that the existing economy already possessed a "corporatist structure" (*ständische Gliederung*) due to the division of labor, which rendered a restructuring superfluous.

Nevertheless, Sombart (1934, p. 224) took over Spann's (1921, p. 188) claim that the new social order was an "organic inequality" (*organische Ungleichheit*), that is, it needed strict hierarchies and ranks—a claim that cannot be found in Sombart's previous work. Spann (1921, pp. 189–190) compared the hierarchy within society to a human organism in which the parts can be ordered according to their functional ranks. For the well-functioning of the body, for example, a finger or some "alveoli" (*Lungenbläschen*) are worth less than the heart or the brain. The same would hold true in society, which was a "structure of performances" (*Gebäude von Leistungen*). It is tempting to think that Spann's biological analogy encouraged Sombart to draw inspiration once again from Haeckel's biology to determine which parts of the economic organism were subordinated and controlled by centralized authority and which parts remained autonomous.

However, there is no trace of Haeckel in *German Socialism*. One reason for the lack of Haeckel was Sombart's more recent belief that the natural sciences had no place in the "understanding" (*verstehende*) social sciences.[32] Another reason might be that Haeckel did not offer much insight about hierarchies. Haeckel did not promote strict hierarchies nor did he offer a principle that would have allowed Sombart to form ideas about how the different parts of society could be subordinated to a central authority.[33]

Sombart (1934, p. 228) claimed that society was not a "natural organism", but a "whole of values" (*Wertganzes*), which allowed him to assign ranks to the parts of society in a completely arbitrary fashion. Applied to German society, Sombart argued that the highest rank was occupied by the military and the last rank by the economy. Within the low-ranked economy, agriculture occupied the highest rank. The best way to structure these ranks was to resort to political associations, functional corporations (*Funktionsstände*), and free associations in those branches where capitalism still reigned (Sombart, 1934, pp. 230–232).

On top of restructuring by ranks, Sombart suggested to introduce a hierarchical order that combined his previous insights about entrepreneurial control of the economy with the militaristic "leader

[32] Already in 1927, Sombart (1927a, p. 8) pointed out the advantage of the "understanding" (*verstehende*) social sciences that could "observe [cause and effect, forces and conditions] behind the scenes". In *German Socialism*, Sombart (1934, p. 109) criticized the natural sciences for only being able to build theories based on "the categories of cause and effect".

[33] As Reynolds (2008) elaborated, Haeckel was more nuanced and did not argue for coercive subordination, or a central leader that stood above all other cells and organs. Reynolds also criticized Gasman (1971/2004) for labeling Haeckel as a "proto-Nazi".

principle" of Ernst Jünger and Carl Schmitt. In his *German Socialism*, Sombart (1934, pp. 17–19) repeated his previous claims that in late capitalism, the individual "initiatives" declined. According to Sombart (1934, p. 306), due to regulations, contracts, rules, and organization within the firm, and cartels, unions, and state intervention in the late capitalist economy, there was less room for individual shaping (*Gestaltung*). Fewer and fewer individuals possessed initiative, but those who did had ever more "penetrating power" (*Durchschlagskraft*).

Sombart (1934, p. 307) blamed the few remaining entrepreneurs with the power to initiatives (*schöpferische Persönlichkeiten*) for the misery of the Great Depression. As a response, he suggested introducing the "leader principle" to bring the entrepreneurs under the control of the state authority. With the leader principle, which Sombart (1934, p. 307) borrowed from "the organization of a modern army during the war", the organization of the economy depended on the highest authority of the planning board, which prevented competition between the "lower commanders of the battalions and regiments". Sombart (1934, pp. 308, 60) believed that the leader principle would necessarily lead to a socialist planned economy in which the "behavior of individuals was determined by compulsory norms" and thus conformed to the definition of socialism by the "outstanding members of the NSDAP" (Sombart, 1934, p. 49).

Yet, Sombart stayed clear from making use of the biological analogies that experienced a revival with many members and sympathizers of the NSDAP. We have seen that Sombart already reduced his borrowings from biology in the late 1920s. By the 1930s, he discarded any attempt by social scientists to make use of insights from the natural sciences—including biological analogies. Sombart (1934, pp. 182–199) not only attacked German nationalist publicist Wilhelm Stapel (1882-1954) for his comparison of "folk" with an "organism", but also condemned the attempts by racial theorists to distinguish between sick and healthy individuals.[34] It is likely that Sombart did not think much of Nazi economist Hans Buchner (1896-1971), who claimed that the National Socialist economy should be turned into a "structured organism" that gained its strength through the "blood ties" and "destiny" of the folk (Buchner, 1930, p. 7). Nor did Sombart believe that much could be learned from the "system of organs" that Spann's associate Walter Heinrich (1902-1984) used to form ideas about the structure of the economy (Heinrich, 1928, 1932).

In 1935, Sombart came into direct contact with one of the most intensive applications of biological analogies in the theory of the "corporatist economy". German sociologist and National Socialist Andreas Walther (1879-1960) studied the "true structure of the folk" through the analogies of

[34] See also Lenger (1994, pp. 370–371) on Sombart's criticism of the National Socialists' arbitrary definition of race.

organism, nervous center, cells, and functions. Yet, it does not seem as if Sombart was impressed by Walther's borrowings from biology. Sombart knew of Walther's ideas, because Emmy Wagner, a member of the Reich's *Association of Consumer Cooperatives* (*Reichsbund der deutschen Verbrauchergenossenschaften*) sent him a letter in which she shared her insights from attending Walther's lecture about the "true structure of the folk". The letter is particularly insightful because Wagner made a copy of what Walther probably had drawn on a blackboard in his lecture (Figure 19).

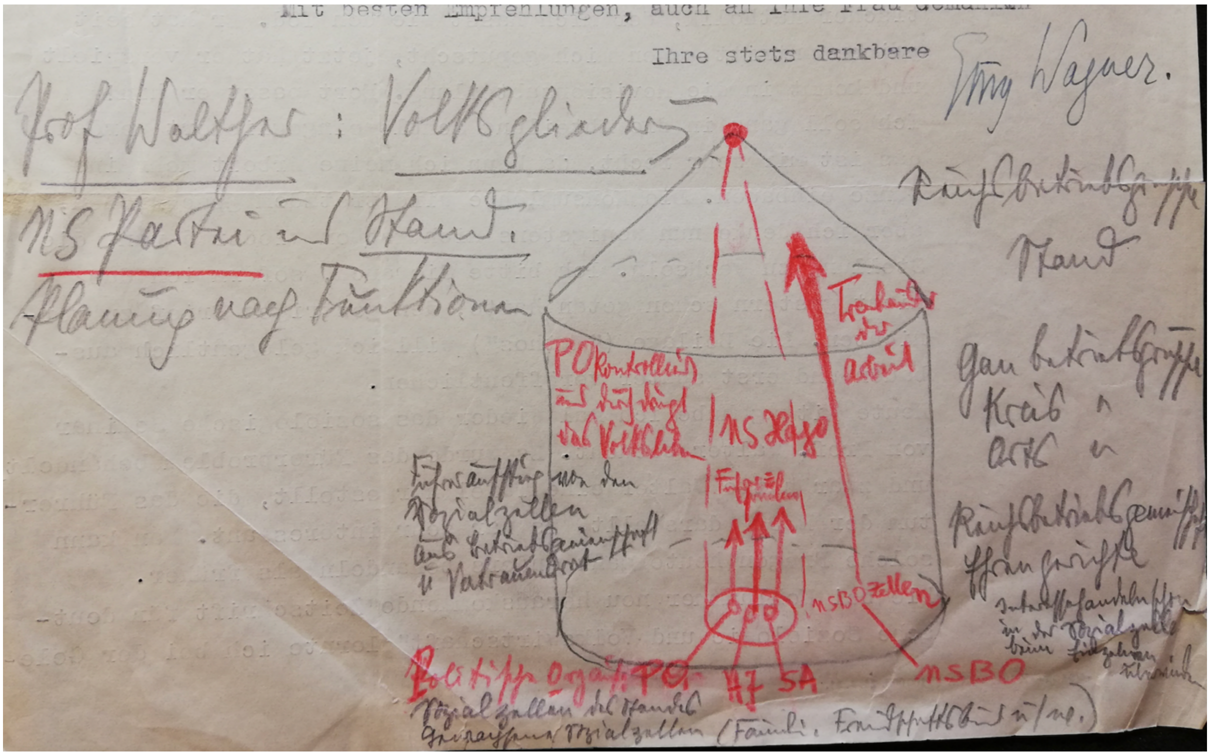

Figure 19: Emmy Wagner's drawing of the "true structure of the folk" in a letter to Werner Sombart in 1935. Source: GStA PK, VI. HA, Nl Sombart, W., 10, Bd.4.

In the article *The True Structure of the Folk* (*Die wahre Volksgliederung*) that Walther used in his lecture, Walther (1935, p. 2) claimed that oriental, medieval European, but also communist societies consisted predominantly of one "plane" (*Grundfläche*) of social cells (*Sozialzellen*) like families, clans, communities, and guilds. The relationship with the state was either very thin or non-existent. In individualistic societies, these social cells were all but destroyed and atomized, which explained the "grave disturbances of today". Walther claimed that while planned economies, state socialism, and to some degree Italian fascism, tried to find ways to solve the conflicts of interest between different interest groups and occupations, the "true structure of the folk" was one that organized the parts of the economy according to their functions.

Walther (1935, pp. 4–5) argued that the state decided "from above" about which individuals had a function in society, depending on whether they served "the whole". Contrary to Spencer's conviction that the whole served the individuals, Walther retrieved Fichte's claim that individuals had to serve the "perennial organism of the folk". The leadership was therefore tasked with selecting what individuals were the most fitting for the different functions and had to structure them according to their skills and performances. For this task, the state needed new "integrative" (*ganzheitsgerichtete*) social cells like PO (*Politische Organisation*), NSBO (*Nationalsozialistische Betriebszellenorganisation*), and HJ (*Hitlerjugend*).

Emmy Wagner drew these cells on the lower plane of her sketch (Figure 19) and located the leader on top (the red dot). What is also visible in the drawing, is what Walther (1935, p. 8) described as the central "leader column" (*Führersäule*), or "central nervous center of the folk body" that controlled and agitated the "whole life of the folk" so that the "last member of the Hitler youth felt involved in the leadership". Walther's leader column ensured that "through moral supervision within the social cells" a new "spiritual culture emerged": no activity was left to one's own interest and "conflicts of interest were already averted at the very bottom". Lastly, Walther (1935, p. 5) also emphasized that "the image of organic life" fitted the idea that those members of society that were unsuitable (*unverwendbar*) or harmful (*schädlich*) had to be eliminated (*ausmerzen*).

With the benefit of hindsight, one knows the consequences of monitoring the social cells and the elimination of the unsuitable: coercion and violence through the Gestapo, denunciations among the population, Karl Brandt's *Aktion T4*, and the elimination of undesired people in the extermination camps. In practice, Walther's idea of the true structure of the folk was what Ernst Fraenkel (1941/2017) described as the "prerogative state", a state that exercised "unlimited arbitrariness and violence unchecked by any legal guarantees".

Sombart was far away from claiming that his planning board could achieve a restructuring of society according to individuals' functions and he was repulsed by the idea of dividing the population into fit and unfit people. It is thus likely that he left Emmy Wagner's letter unanswered. In the 1930s, Sombart promoted reactionary plans that did not entail the establishment of new organizations like the NSBO cells, or the Hitler Youth. Instead, Sombart (1934, pp. 293, 264–265) recommended state-induced employment measures in the agrarian sector demanded a rejuvenation of agriculture and the taming of technology (vom Brocke, 1992, pp. 158–159). Sombart's demands were far too restrictive for the Nazi regime which promoted technological innovations for rearmament. Even "peasant leader" (*Bauernführer*) Richard Walther Darré (1895-1953), the Nazi Minister of Food and Agriculture, believed that Sombart's agricultural plans and his plea for the taming of technology were too conservative (Gies, 2019, p. 434).

5.5 Conclusion: the persistence of a colorful variety

Sombart's writings of the late 1920s and early 1930s do not make the case for a constructive borrowing from biology. On the contrary, Sombart dismissed to a large degree the principle of differentiation and integration as it was unfit to explain the almost infinite variety of economic organizations. Differentiation and integration, that is, the level of organization within a firm, was only one of several factors that affected the types and sizes of firms. Haeckel, from whom he borrowed the principle at the turn of the century, all but vanished from Sombart's writings.

By the late 1920s, Sombart had built himself another tool, or schema (*Schema*), that consisted of the three basic components: spirit, order, and technology. By locating these three components and their 12 subcomponents on a spectrum between two pairs of opposites, Sombart claimed to be able to characterize any economic system and pin down its stage of development. In his eyes, the Western capitalist economies were in a process of rationalization, or "spiritualization" (*Vergeistung*). The rise of cartels, concerns, forecasting institutes, and increasing state intervention signaled to Sombart that the capitalist spirit turned utmost rational and security-seeking. The economy had reached the stage of late capitalism and was transitioning into a socialist system. Yet, even in the late stage of capitalism, the colorful variety of economic organizations persisted.

Sombart left the field of using biological analogies in the social sciences to fascist and National Socialist economists who promoted a corporatist state by emphasizing the "organic inequality" in society. In the eyes of Spann, Walther, and Heinrich, society had to be restructured according to individuals' functions within the nation as a whole. Their hierarchical orders also included the subordination and sometimes elimination of individuals without function or "performance" (*Leistung*). As Hannah Arendt (1979, p. 470) reasoned, these corporatist thinkers did not want to know "what is", but authoritatively claim "what becomes".

Ending the thesis here would mean succumbing to a fatalistic understanding of biological analogies in German economic thought. The epistemological functions that Schäffle and Sombart recognized in the tissue analogy, the social nervous system, and the principle of differentiation and integration made room for the "organic inequality" that Spann and others transferred from biology to their economics. In many cases, Spann's borrowings from biology were turned into catchwords that facilitated the rise of National Socialist ideology. Yet, as we will explore in the third part of this thesis, there existed alternative ways to apply biological analogies in German economics during the Weimar Republic. Ernst Wagemann, the main character of the next three chapters, selected and adapted a different set of biological analogies for his study of the interrelationships within the economy.

Part III ERNST WAGEMANN'S QUEST TO REPLACE ENGINEERING WITH BIOLOGY

"[W]hile the American methods are those of engineering, and the Russian those of astronomy, the German institute represents the medical, or, better, the organic-biological point of view" (Wagemann 1930, p. 10).[1]

INTRODUCTION

In 1923, Germany was mutilated by the war, the seizure of land, the loss of population, the confiscation of raw materials and the fleet. According to the German Statistical Office, Germany was "a mere torso" (Statistisches Reichsamt, 1923, p. 5). Ernst Wagemann, who took over the presidency of the Statistical Office in 1924, did not see any value in describing the German economy as a "torso". In his eyes, the economy suffered from a "functional disorder" (*Funktionsstörung*), due to manifold reasons of political, social, technological, and psychological nature. Wagemann further argued that the "economic organism" showed "abnormal reflexes" as both the commodity and the monetary circuit behaved much differently than compared to pre-war times (Statistisches Reichsamt & Institut für Konjunkturforschung, 1925, p. 3).

Wagemann's descriptions of the economy as an "organism" in "functional disorder" seem like casual remarks in an official report. However, they had much more content to them than one might think. Wagemann was serious about thinking of the economy as an organism, and, in 1927, he claimed that the monetary circuit can be depicted by the image of the double blood circuit of the human body. A year later, Wagemann proclaimed that he adhered to an "organic-biological principle" in his attempt to forecast the course of the economy. The principle meant, that Wagemann (1928a, p. 12) considered

[1] In the German edition, Wagemann (1928a, p. 9) suggested: "*Wenn es nämlich erlaubt ist, von der ingenieurmäßigen Einstellung der amerikanischen Konjunkturforschung zu sprechen, und wenn es nicht zu gewagt erscheint, den russischen Arbeiten astronomischen Charakter zuzusprechen, so vertritt das deutsche Institut sozusagen das medizinische oder besser das organisch-biologische Prinzip der Betrachtung*".

the economy to be a "closed system with functionally connected parts" that reacts to stimuli with "autonomous motion".

Wagemann (1928a, pp. 7–9) contrasted the "organic-biological principle" with the "engineering approach" by U.S. economists like Irving Fisher and Karl Karsten that he wanted to overcome. In his eyes, the U.S. economists claimed to be able to discern causes and effects between economic variables by mathematical methods. In other cases, they tried to reduce economic phenomena to "single formulas" by eliminating disturbing factors. Instead, Wagemann believed that only functional relations between economic time series could be recognized. For Wagemann, the economy was too great a variety (*unendliche Mannigfaltigkeit*) to be represented by algebraic formulas.

In the ensuing years, Wagemann (1931) shaped the organic-biological principle into a "functional theory" (*Funktionaltheorie*) of the economy. The theory should reveal the strength of dependencies between different economic branches and other parts of the economy, without proposing unidirectional causalities between them. To form an idea about the strength of interconnections within the economy, Wagemann did not rely on a correlation analysis of different time series but started from the premise that firms had a "metabolism" (*Stoffwechsel*) like cells in a biological organism. By elucidating how strong the metabolisms of different branches were intertwined (*verflochten*), Wagemann hoped to build a network of manifold parts that were interconnected to greater or lesser degrees.

As the president of the Statistical Office, Wagemann disposed of a large amount of statistical time series that he made use of in his research. In 1925, Wagemann established the German Institute for Business Cycle Research (*Institut für Konjunkturforschung*, IfK), which he presided over until 1945. The IfK forged close ties with business associations and thus gained even more access to statistics. Wagemann's institute had the aim to smooth the business cycle by providing businessmen with information about the course of the economy. We will see how Wagemann made great efforts to render his publications more available to businessmen in the hope that they would change their behavior based on the IfK's statistics.

Wagemann and the IfK have drawn considerable attention from historians of economics (Wissler, 1954; Coenen, 1964; Krengel, 1986; Morgan, 1990; Kulla, 1996; Tooze, 1999, 2001; Fremdling, 2020), but only Armatte (1992), Chancellier (2006) and Rieter (1992) directed their focus on Wagemann's biological analogies. There is still much to be said about Wagemann's biological analogies, not least because Armatte and Chancellier did not go far beyond mentioning Wagemann's organic-biological principle, and Rieter (1992, p. 65) simply dismissed Wagemann's recourse to biology as "paradox" and "rather confusing than enlightening". The little attention given to

Wagemann's borrowings from biology is possibly owed to Pribram's (1983, p. 378) accusation that Wagemann used biological analogies in order to justify "political watchwords coined in support of nationalistic aspirations".

The purpose of the next three chapters is to show the opposite of what Rieter and Pribram claimed. Wagemann did not use biological analogies to justify political watchwords, and what he created with them was not paradoxical. In line with the previous chapters, I will show that Wagemann stood at the forefront of economic research where he encountered theoretical and methodological impasses. At these impasses, he resorted to biological analogies because they promised him an escape. We will see that with Wagemann, my claim that "variety" was the most important "positive feature" that economists recognized between biology and economics does not hold true in one important case. Wagemann's transfer of the human blood circuit was motivated by a different set of positive features. However, with the second case, Wagemann's borrowing of the cell metabolism, we have a prime example of an economist who was confronted with variety but was not able to handle variety with existing methods.

In Chapter 6, I will introduce Ernst Wagemann and show how his research institute, the *Institut für Konjunkturforschung* (*IfK*) became the dominant economic authority in the Weimar Republic. I will show how Wagemann set up the institute at the service of businessmen in the style of international business cycle institutes that emerged all over the world in the 1920s.

In Chapter 7, I will contrast Wagemann's monetary theory with Irving Fisher's quantity theory of money and reconstruct Wagemann's decision to use the double blood circuit to visualize the monetary circuit. In the next step, I will suggest that through this analogy, Wagemann generated new ideas about how to improve the monetary system. At the time of his borrowing from biology, Wagemann began making use of the ABC barometers of U.S. researchers at the Harvard Committee on Economic Research. Wagemann hoped to offer a new functionalist interpretation of the ABC barometers, but he eventually failed to avoid causal explanations in his forecasts.

In Chapter 8, I will introduce Wagemann's "organic-biological principle" that he established from his reading of German vitalist biologist Hans Driesch (1867-1941). This principle had an impact on the IfK's economic forecasts, but Wagemann could still not fully escape the causal explanations that he wanted to avoid. I will discuss how Wagemann hoped to overcome this difficulty by collecting more statistical data. Yet, I will argue that only with the analogy of the cell metabolism, Wagemann could live up to his idea of a functionalist understanding of the economy. We will further see that with a new way of forecasting the economy through barometers that reflected the metabolism of different economic sectors, Wagemann was pressed to innovate his publications. Most innovative were small booklets that the IfK distributed to businessmen. After 1936, these booklets and Wagemann's forecasts became obsolete, when the Nazi Regime re-organized the economy and set it on the path toward rearmament. Wagemann willingly helped leading National Socialists to reach their goals and only needed little adjustments to turn his biological analogies into watchwords for Nazification (*Gleichschaltung)*.

Chapter 6 Ernst Wagemann and the Institute for Business Cycle Research

It is mainly due to Adam Tooze's *Statistics and the German State* (2001) that Ernst Wagemann and the IfK came into the limelight of historical research. Tooze unearthed the fundamental role of the IfK in policy-making during the Weimar Republic and emphasized Wagemann's international renown. Wagemann can thus no longer be considered to be the "outsider" that Kulla (1996, p. 33) painted him to be. The following two sections will confirm that Wagemann and his IfK were all but outsiders, but very well connected to German politicians, businessmen, and economists alike.

6.1 Ernst Wagemann

Born in Chile to German emigrants, Ernst Wagemann (1884-1956) studied in Göttingen, Berlin, and completed his PhD at Heidelberg University in 1907. After teaching at the Institute of Colonial Economics in Hamburg and traveling for research in South America, Wagemann obtained his habilitation with Schmoller from the University of Berlin in 1914. In his habilitation about the Chilean economy and monetary system, Wagemann (1913) showed his early fascination for historical statistical research, which he coupled with a profound interest in monetary theory and inflation. The First World War gave Wagemann the possibility for a career in the newly established War Food Office (*Kriegsernährungsamt*). At the Office, he headed the statistical department from 1916 and gained a profound understanding of price statistics under war conditions (shortage and inflation). In 1919, Wagemann was recruited for the Economic Ministry (*Reichswirtschaftsministerium*) by state secretary Julius Hirsch, with whom he worked at the War Food Office. At the ministry, he was tasked with overseeing economic analysis and manage relations with the Reich's Statistical Office (*Statistisches Reichsamt*). Together with Adolf Löwe (1893-1995), Wagemann was responsible for preparing reports on the economic condition for the first president of the Weimar Republic, Friedrich Ebert (1871-1925). These reports contain early attempts at economic forecasting and notions about anticyclical economic policies. His job at the ministry was highly valued and led to a position as associate professor (*Extraordinarius*) at the University of Berlin, where he had been lecturing as *Privatdozent* since 1915.[1]

In 1923, Wagemann took control of the Statistical Office, where he replaced his later father-in-law Ernst Delbrück (1858-1933). In March 1924, he was officially inaugurated as the president of the office, which he extensively reorganized. A little over a year after Wagemann assumed the presidency, he founded the IfK in 1925, which he presided over until 1945. From 1925 until 1933, Wagemann led both institutions in personal union (*Personalunion*). The founding of the IfK ushered in a new era in German economics. Challenging what he called the "Krohn-James thesis", Tooze (1999, p. 525) claimed that the IfK transformed the public discussion of the German economy and altered the context of policy-making.[2] The scale of the IfK's empirical, policy-oriented economic research was unprecedented in German history and without parallel in contemporary Western Europe.

The IfK's publications quickly became the chief source of economic information for the Weimar cabinet and also led to tensions between Wagemann and the state apparatus in the 1930s (Tooze, 1999, p. 525). Its main publications, the *Quarterly Journals* (*Vierteljahrshefte zur Konjunkturforschung*, *VzK*) and the *Weekly Reports* (*Wochenberichte des Instituts für Konjunkturforschung*, *Wb*) also circulated widely among industrialists. Due to the influential businessmen he assembled in the IfK's governing board (*Kuratorium*), Wagemann was in constant direct contact with the powerful industrial elite.

Wagemann was an excellent networker and maintained close connections to influential politicians, industrialists, bankers, and union leaders alike. Hence, the IfK was "a combination of parliamentary government and technocratic corporatism" (Tooze, 2001, p. 22). His contacts to Wesley Clair Mitchell (NBER), Constantin McGuire (Brookings Institution), and his memberships of international

[1] To keep Wagemann from accepting a position as associate professor at the Giessen University, the Prussian Ministry of Education (*Ministerium für Wissenschaft, Kunst und Volksbildung*) urged the Berlin University to grant Wagemann the associate professorship. See HU UA, Phil.Fak.01, Nr. 1468, Bl. 53-54. Most of Wagemann's biography is known due to his curriculum vitae stored at the Humboldt University Archives (HU UA, Uk Personalia W9, Bd. 1, Prof. Wagemann). The IfK's headquarters in Berlin were destroyed during the allied bombings of Berlin in April 1945 (Krengel, 1986, p. 7). The sources on the IfK, but also on Wagemann are therefore widely dispersed. In a valuable collection, Reiner Stäglin and Rainer Fremdling (2014) classified most of the available sources on the IfK.

[2] Tooze (2001, p. 22) argued that the Krohn-James thesis claims a gulf between economic theory and policy making in interwar Germany. It is a conflation of the arguments by historian Claus-Dieter Krohn (1941-2019) who presented a picture of an economics discipline in disarray in the interwar period and Harold James (*1956), who claimed that interwar policymakers "operated in a theoretical vacuum".

organizations (International Statistical Institute and Royal Statistical Society) bear witness to his international reputation.

In his powerful positions as president of the Statistical Office, the IfK, and university professor, Wagemann repeatedly came into conflict with politicians, businessmen, and academics. In a position that mediated between industry, state, and unions, Wagemann got into disputes with Chancellor Heinrich Brüning, president of the *Reichsbank* Hjalmar Schacht, and industrialist Paul Silverberg. Wagemann accused Schacht, for example, of not having understood the concept of inflation (Staudinger, 1982, pp. 33–34). In cooperation with influential industrialists, Wagemann created a "credit-plan" (*Kreditplan*) to lead the German economy out of the Great Depression. The plan was judged to be inflationary and brought him into opposition with the state secretary at the Economic Ministry, Ernst Trendelenburg (1882-1945).[3] To his outspoken academic critics can be counted Albert Hahn (1889-1968), Arthur Spiethoff (1873-1957), Gustav Stolper (1888-1947), and Oskar Morgenstern (1902-1977).

After corruption allegations, Wagemann was placed on compulsory leave as president of the Statistical Office in March 1933 and replaced by Wolfgang Reichardt in July. His replacement was initiated by the newly appointed president of the Economic Ministry, Alfred Hugenberg who had opposed Wagemann's interventionalist economic policies, especially since the latter's credit-plan. Wagemann was compensated with a lower position as a government councilor at the Economic Ministry, but managed to keep the presidency of the IfK.[4] Due to his connections to the *Deutsche Arbeitsfront* (DAF), and by joining the NSDAP, Wagemann was re-elected by the IfK's governing board as its president. During the Third Reich, Wagemann collaborated with the Nazi Regime and became an adviser to Hermann Göring in drawing up the Four-Year Plan (*Vierjahresplan*) of 1936 (Tooze, 2001, p. 181). In contrast, the IfK lost its significance after 1936 and Wagemann turned from the leader of a powerful economic institute into an economic advisor. A pessimistic forecast of the economy in 1935 brought him again into conflict with the state and in 1937 the already heavily reduced forecasts were discontinued.

An indication that Wagemann had not completely lost his importance for the organization of the war economy can be gathered from an episode of 1943. In the autumn of 1943, Wagemann was denounced by the *Gauleiter* of Hannover for having proposed to end the war. After a talk in Hannover in summer,

[3] See "*Warum ging Trendelenburg?*", in *Sächsische Volkszeitung* 31, 204 (31. August 1932), p. 6.

[4] Wagemann was assigned *Regierungsrat, Besoldungsgruppe A 2 C*, which was a middle-ranked position at the Economic Ministry (Pickhardt, 2010). On Wagemann's replacement, see also Fremdling (2016).

Wagemann seemed to have remarked in a small circle that "now would be the right time to make peace" so that Germany could at least keep half of Poland, Italy and the Balkans. Heinrich Himmler suggested relieving Wagemann of his post and sending him to a concentration camp for half a year, where he could work as an accountant. But as the subsequent correspondence shows, as the head of the IfK, Wagemann was too vital for the war economy (*kriegswichtig*) and his sentence was reduced, and seemingly never served, to four week's imprisonment.[5] Wagemann remained in Göring's good graces and was appointed by him to the Nazi Research Council (*Reichsforschungsrat*) in 1944. Nevertheless, it was demanded that Wagemann be "observed very closely" due to his past infringements. After the Second World War, Wagemann emigrated to Chile to take up a position at the University of Santiago de Chile and continued to publish books on statistics and business cycle research. In 1954 he returned to Germany and died two years later in Bonn, the new capital of West Germany.

6.2 Establishing the IfK after Turbulent Years

With the stabilization of the German economy in 1924, Wagemann ventured a bold initiative to modernize and expand the Statistical Office. Shortly after being inaugurated as its new president, Wagemann introduced new methods of processing time series. The statistics were deseasonalized, detrended and plotted in graphical charts. As of October 1924, the written reports and statistical tables that informed the Reich's Chancellery (*Reichskanzlei*) were replaced by monthly graphical charts of the most important economic figures.[6] In a next step, Wagemann established the IfK in summer 1925 in the style of international business cycle institutes. The success of the ABC barometer by American economists Warren M. Persons (1878-1937) and Charles J. Bullock (1869-1941) from the Harvard Committee on Economic Research, and the prestige of Wesley Clair Mitchell's work at the National Bureau of Economic Research (NBER) prompted Wagemann to place the IfK's work in the intellectual tradition of U.S. business cycle economics.[7]

From the outset, Wagemann promised to put his institute at the service of businesses and to provide information for "the practical needs of the economy" (Statistisches Reichsamt & Institut für Konjunkturforschung, 1926). Wagemann knew well of the skepticism of industrialists towards the

[5] The episode described here can be found in BArch, NS 19/2053. See also Fremdling (2020, p. 181).

[6] See the first ten pages of the collection of the reports in BArch, R 43-I/2110.

[7] The private research organization NBER was founded by Wesley Clair Mitchell (1874-1948) in 1920. Based in New York, it became the government's official recorder of business cycles (Friedman, 2014, p. 176). As Friedman (2014, p. 148) remarked, Bullock and Wagemann collaborated after initial hesitation.

government's attempt to get insight into business affairs. Wagemann (1931, pp. 273–274) mentioned that "the failed attempts" to create a "communal economy" (*Gemeinwirtschaft*) by Walther Rathenau and Wichard von Moellendorff had proven that coercing industry to conform with the guidance of the state had only resulted in an alienation between business and government.[8] Since Wagemann (1919) had experienced impetuous state interventions during the First World War, he was very critical of centralized economic planning. Wagemann also doubted that the *Reichsbank* could steer the economy by changing the discount rate. According to Wagemann (1928a, p. 207), central bank interventions were too one-sided and could only act as a "palliative".[9]

Wagemann maintained that the self-governance of the industry should remain untouched and he shared the common hope of his supporters Julius Curtius (1877-1948), Hans Schäffer (1886-1967), and others at the Economic Ministry that the promotion of economic knowledge would moderate the need for coercive state intervention (Tooze, 2001, pp. 132–133). To gain the trust of industry for business cycle research, Wagemann first presented his plan to establish the IfK at the assemblies of the two most important associations of industry: the *Reichsverband der Deutschen Industrie* (RDI) and the *Deutscher Industrie- und Handelstag* (DIHT).[10]

Both associations pledged to support the IfK financially and offered cooperation in data gathering. With industry's backing, Wagemann was off to a promising path and soon, the Ministry for Economic Affairs, the States (*Länder*), the Reichsbank, National Railways and Councils of Municipalities, Agriculture, Commerce, Wholesalers, Retailing, Banks, Consumer Cooperatives and Trade Unions could be convinced to back the IfK. Representatives of these interest groups claimed one or two seats in the IfK's governing board (*Kuratorium*). Hence, the IfK became "an exercise in full-blown corporatism" (Tooze, 2001, p. 103).

The IfK profited in three ways from the participation of different interest groups. First, assembling the Weimar's power elite at the IfK's governing board protected the institute against charges of bias.

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[8] In an effort to guide production by state control, Rathenau and Moellendorff wanted to turn several crucial branches (like coal and iron) of the economy into compulsory cartels (*Zwangskartelle*) akin to war time efforts to guide production by state control (Bruck, 1924, p. 655). On Rathenau and Moellendorff's *Gemeinwirtschaft,* see also Fisch (2016). For a conceptual history of the term *Gemeinwirtschaft* that dates back to the 19th century, see Gieseke (1922).

[9] Similarly, Wagemann (1928a, p. 170) argued that the economy was mostly "free of the restraint of credit policy" as the "change in the volume of credit was rather determined by industry than by the banks".

[10] At the assembly of the DIHT, Wagemann (1925, p. 26) portrayed business cycle research as the main task of the national economy and he assigned businessmen the important role of helping to stabilize the economy. Wagemann also claimed that the independent status of the IfK allowed him to assess the condition of German industry differently than the state.

Including all relevant economic interest groups in the IfK's governing board (*Kuratorium*) was Wagemann's strategy to make the IfK a middle ground between the fronts of unions and business associations. Second, Wagemann could convince the interest groups to back his ambition generously. The budgeted income of the institute ranged from 201'000 RM in 1925 to 401'400 in 1929 and 249'900 in 1932. The peak amount of 1929 would be equivalent to 1.4 million EUR in 2019.[11] Starting in 1925, the private sector (business, agriculture, and labor) contributed more (55%) than the public (45%). This changed throughout the years 1926 until 1932, during which the contributions of the private sectors stayed always below the contributions of the state and varied between 40 and 49 % of the total budget. Of the private sector, business (industry, trade, and banks) contributed the largest share.[12] The contributions to the IfK fell dramatically during the Great Depression after 1931 and only in 1936 the IfK received again generous funding from the Nazi economic Chamber of Commerce (*Reichswirtschaftskammer*).

Large funding was needed mainly because of the IfK's modern empirical research methods. The collection and study of time series was very laborious and could not be done single-handed. To process (detrending, deseasonalizing, normalizing, plotting) the raw time series, new personnel and machinery was needed.[13] One of the IfK's first investments were two "Archimedes" calculating machines (Krengel, 1986, p. 4). By the late 1920s, the institute had a total full-time staff of 50, of which at least 30 were economists and statisticians (Tooze, 1999, p. 527). Much of the IfK's statistical material could be drawn from the far developed collection by the Statistical Office that boasted a threefold increase in staff (1'000 to 3'016) between 1924 and 1929.

A third benefit of the participation of interest groups in the IfK was that the members of the governing board provided relevant statistical data. The statistical time series were submitted on a weekly or monthly basis to the IfK where they were processed and subsequently published in the *Quarterly*

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[11] Calculated on basis of the Purchasing Power Parities of historical currencies by the *Bundesbank* (https://www.bundesbank.de/resource/blob/615162/3334800ed9b5dcc976da0e65034c4666/mL/kaufkraftaequivalente-historischer-betraege-in-deutschen-waehrungen-data.pdf, (5.20.2022)). Compared to another German research institute, the Kiel institute, the amount was very high. The Kiel institute disposed of 124'000 RM in 1930, 44'600 RM in 1931, and 20'000 RM in 1932 (Kulla, 1996, pp. 149–150).

[12] See the table on the IfK's budget by Tooze (2001, p. 140).

[13] The creation of business cycle institute posed similar problems in the U.S. Mitchell (1951, p. 4) noted that "What time series were available required laborious analysis before they could be utilized. Economists were accustomed to work single handed; and no individual was able to collect the masses of raw data pertinent to the study of cyclical behavior, segregate the cyclical components from movements of other sorts, and assemble the findings to form a realistic model of business cycles by which explanations could be judged."

Journals or *Weekly Reports*. Especially the industrial associations and the unions were crucial for up-to-date statistics on production, sales, and unemployment—statistics that the private sector hitherto had refused to provide to the Statistical Office. Branch statistics had already been set up in the early 1920s by large associations in order to provide aggregate data on sales or prices (Deutsch, 1928, pp. 146–152).[14] With the help of associations and business economists, Wagemann hoped to be able to open the branch statistics to every member of the governing board. Being the "center of calculation" (Latour, 1987, pp. 227–232) of a network of interest groups, the IfK could provide agriculture with information about the credit market, retailers on the monthly freight (*Wagenstellung*), industrialists with unemployment data, unions with the cost of living index. Due to its cooperation with its members of the governing board, the IfK was a data-sharing "clearing house" for economic information: "taking in raw data and supplying friendly business associations with processed indicator systems" (Tooze, 2001, p. 141).[15]

We will encounter the IfK's indicator systems, or barometers in the subsequent chapters. As Wagemann's inauguration speech of the IfK suggests, he did not only use the barometers to forecast the course of the economy, but also to convince his sponsors of the neutrality and political independence of the institute.[16] The IfK's sponsors had high hopes for the new institute and made their contributions dependent on how well they could use the barometers, and forecasts. The first *Quarterly Journals* in May 1926 and the *Weekly Reports* that followed in April 1928 were received enthusiastically. The German Industrial Paul Silverberg (1876-1959), leading member of the RDI, argued that under the guidance of the IfK, cooperation of labor and state-affirming industrialists would lead to the "cohesion of the whole economy" (*gesamtwirtschaftlicher Zusammenhalt*).[17] Similarly, industrialist Hermann Bücher (1882-1951) from I.G. Farben (*Interessengemeinschaft Farben*) believed that the IfK's publications were "a contributing factor to production" and helped orientating "private activity towards the economic whole" (Bücher, 1927, pp. 293–299). In the

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[14] The associations were crucial for the IfK's statistics on production, sales, and employment. As Löwe (1924) pointed out, Germany's statistics (especially on production) were not as far developed as in the U.S. Statisticians had to rely on the self-governance of business associations for an up-to-date flow of quantitative data. See also Vershofen (1924) for a short overview of the statistics of business associations in the early 1920s.

[15] See also Wilhelm Röpke (1932, p. 65), who argued that IfK was indeed a large economic laboratory where, "with a most refined apparatus of mathematical distillation, the raw material of statistical facts is worked up until we get the finished products in the form of all kinds of 'cycles,' […] of 'barometers,' of 'isolated time series' and what not".

[16] See Wagemann's 1925 inauguration speech in GstA PK, I. HA Rep 120, Nr. 33, Bd. 1, p. 6.

[17] See "*Deutsches Unternehmertum in der Nachkriegszeit. Die Programmrede Dr. Silverbergs auf der Tagung des Reichsverbandes*", in *Deutsche Allgemeine Zeitung* 1926, 413 (4. September 1926), Beiblatt.

bourgeois *Deutsche Tageszeitung* as well as in the socialist *Vorwärts* the early publications were praised for the inclusion of helpful charts and current data for practical application.[18]

Like the forecasters at the NBER, the IfK drove out entrepreneurial forecasters and gained monopoly status on economic information.[19] In 1928 the IfK's competitors like *Wirtschaftskurve*, *Der Deutsche Volkswirt,* and *Wirtschaftsdienst* discontinued their own forecasts.[20] The latter journal hosted the business cycle "barometer" by Wagemann's adversary business cycle economist Arthur Spiethoff, whom we will encounter again further below. By the late 1920s, the IfK was successful in securing the almost undivided attention of the business press and was considered the main authority on economic information. In late 1927, a poll among key figures of the peak associations of business showed that all expressed enthusiasm for the IfK's work (Tooze, 2001, p. 142). The *Quarterly Journals* quickly found a large audience not only amongst the IfK's sponsors. The first issue of 1926 sold almost 1'000 copies in bookshops and news-stands. In 1927, the circulation had risen to close to 4'000 and the figures and charts were multiplied by private media that increasingly commented on the state of the economy.

After the IfK's first inaccurate and pessimistic forecasts of spring 1927, criticism started to grow. Based on the ABC barometer, a three-curves forecasting tool that we will further explore in Chapter 7, the IfK had predicted that prices would fall in summer. However, prices remained high during the year, and only started to fall in late 1927. Hermann Bücher from I.G. Farben, who had previously praised the IfK, accused Wagemann of defeatism. Bücher (1927, pp. 293–299) maintained that with a pessimistic outlook, the upswing could be "talked to death".

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[18] See *Deutsche Tageszeitung* 43 (27. Januar 1926) and *Vorwärts*, 45 (23. Januar 1926).

[19] On the efforts by Mitchell and Hoover to counter entrepreneurial forecasters, see Friedman (2014). The 1920s were dominated by a surge in data and chart-driven business forecasting in economic journals. The *Frankfurter Zeitung*, the *Wirtschaftliche Mitteilungen* by the *Deutsche Bank*, and the socialist *Wirtschaft und Wissen*, for example, were filled with statistics and charts. The surge in publicly available forecasting was fueled by high expectations of the practical usefulness of economic research. For an overview of economic journals, see Weber (1957, p. 21).

[20] The quarterly *Die Wirtschaftskurve* (1922-1944) promised comprehensive statistics for practitioners, theoreticians, employers, and employees. After the establishment of the IfK, it focused on research and expansion of the IfK's material only and, according to its founder Ernst Kahn (1884-1959), it never wanted to challenge the IfK (Kulla, 1996, p. 169). The weekly journal *Der Deutsche Volkswirt*, published between 1926 and 1933 by Gustav Stolper, contained a section with a weekly report on the business cycle. As Kulla (1996, p. 41) pointed out, this section shows that weekly descriptions of the cycle did not contain much information. Several times, the section ascertained that no change to the previous week could be registered. Founded in 1926, the journal *Wirtschaftsdienst* with economist turned Japanologist Kurt Singer (1886-1962) as chief editor, was closely tied to the *Welt-Wirtschafts-Archiv* at the University of Hamburg and the Kiel Institute.

Criticism continued to pour in over the years and came to a head with the Great Depression.[21] In 1931, the IfK was blamed for raising false hopes and failing to foresee the gravity of the depression.[22] Chancellor Heinrich Brüning blamed Wagemann for the overly optimistic forecasts in the early 1930s, which he relied upon for the planning of the state budget (Tooze, 2001, pp. 149–154). The IfK's diagnoses were met with increasing skepticism, which also prevented businessmen from taking action on behalf of the institute's judgment. We will see in the subsequent chapters, that with continuous criticism from members of the governing board, the state, and economists, Wagemann shifted his attention from forecasting to creating ready-made statistics, charts, and booklets that could be used by businessmen in their day-to-day work. As Adolf Löwe (1929, p. 423) noted, the IfK's publications showed that "the institute […] has drawn the appropriate conclusions from its experience and today represents little more than a source of information for the broadest public". Löwe observed that Wagemann attempted to reach the public by other means than the presentation of forecasts, but his statements do not emphasize that the IfK's publications had a very distinct character. As I will show in Chapter 8, what kind of information and in what format it arrived the public became shaped by the IfK's adherence to the "organic-biological principle".

[21] German economist Arthur Salz (1881-1963) argued that practice did not receive any valuable "suggestions for action from science" and claimed that "too much caution and knowledge paralyzes" (Salz, 1927, p. 269). Similarly, Mises (1928, p. 78) considered barometers to be of no use. They were the result of "exaggerated expectations about the practical usefulness of economic research". The idea that bankers and businessmen would alter their behavior based on "a single glance at the barometer" was fundamentally flawed and inspired by the false hope to "mechanize bank politics and business". Austrian economist Oskar Morgenstern (1902-1977), for example, voiced a popular critique when he claimed that "of no country there are practical proofs" that excused "such blind tapping with the crutches of statistics" by business cycle institutes (Morgenstern, 1928, p. 1927).

[22] For example, German economist and dean at the Leipzig *Handelshochschule* Ernst Schultze (1874-1943), blamed the IfK, among others, for raising too high hopes about the economic development and failing to accurately forecast the depth of the depression (Schultze, 1931, p. 718).

Chapter 7 The Economic Blood Circuit

Next to his work at the Economic Ministry, Wagemann found enough time to expand on his interest in monetary theory. In 1923, he published a *General Treatise on Money* (*Allgemeine Geldlehre*), which he set out with a biological metaphor. Wagemann (1923, p. VII, 2) suggested to discern the "living connection between money and the economy" and analyze the "delicate tissue", instead of "dissecting the dead organism". Like his teachers Gustav Schmoller and Adolph Wagner, Wagemann conceived of the economy as a historically grown and interwoven entity, which might explain why he called up biological analogies. Yet, in his *General Treatise*, Wagemann did not become more concrete about the "living connection" and he did not further commit to the tissue metaphor.

Instead, Wagemann set out to develop a new monetary theory that he framed as a response to Fisher's (1911) quantity theory of money. While Fisher formed his quantity theory through the analogy of the mechanical balance, Wagemann transferred the balance sheet (*Bilanz*) to his analysis of the national economy. Only some years later, Wagemann returned to the use of biological analogies when he introduced the image of the human blood circuit in his monetary theory. As we will see, Wagemann's had no trouble transitioning from the balance sheet to the human blood circuit analogy because they shared striking "positive features" in the sense of Hesse (1966).

7.1 From Mechanical Balance to Balance Sheet

The most prominent feature of the *General Treatise on Money* was Wagemann's response to the quantity theory of money.[1] Put simple, the quantity theory of money built on the ancient intuition that the amount of money in circulation is somehow related to the general price level. The crucial step, which according to Wagemann (1923, p. 131) turned the intuition into a theory, was to assume a one-way causal relationship from money to prices. Accordingly, a higher supply of money resulted in higher prices (and not vice versa). Wagemann considered the American economist Irving Fisher (1867-1947) as the most skillful adherent to the quantity theory (incorporating a unidirectional explanation from money to prices).[2] This is a one-sided reading of Fisher's theory in the *Purchasing*

[1] Wagemann (1923, p. VII) planned to publish the book in two volumes, the first one treating money, the second one expanding the analysis to the economic circuit (*Kreislauf*). The second volume never appeared, but his analysis of the economic circuit is to be found in the books on business cycles (Wagemann, 1928a, 1931).

[2] See also Wagemann's (1931, p. 51) later rejection of the quantity theory, "which sees changes in the money supply as the cause of price fluctuations".

Power of Money (1911) and gives much weight to the paragraphs in which Fisher compares his quantity theory to physical experiments.[3]

Fisher explained the relationship between money and prices by visualizations of the mechanical balance. Like David Hume and William Stanley Jevons before him, Fisher used the balance to think about commodities hanging from one side and money hanging from the other side of the arm.[4] With the analogy, Fisher (1911, p. viii) claimed to reintroduce the abandoned quantity theory "into general knowledge".[5] More than only a pedagogical device, the mechanical balance helped Fisher to reason about monetary economics and gain new insights about the oscillation process after a change in prices and about the direction of causality (Morgan, 1999, 2012, pp. 206–207). By means of the balance analogy, Fisher could reduce a complex economic phenomenon to a simple "equation of exchange":

$$MV + M'V' = \sum pQ \quad (1)$$

Fisher (1911, pp. 149–152) suggested that prices (p) could only change as a result of changes in the other five elements of the equation: money (M), checks (M'), their respective velocities (V and V'), and volume of transaction (Q). The equation was held simple for a reason. It was Fisher's conviction that the value of his analysis consisted in "simplifying the problem by setting forth clearly the five proximate causes through which all others whatsoever must operate".

If one variable changed as a result of "antecedent causes" outside of the equation, one, or several other variables had to change in order to maintain the equilibrium. Provided the velocities (V and V') and the volume of trade (Q) were held constant, the only way prices (p) could vary was through the quantity of money (M and M'). Fisher noted that to disprove his theory, one had to show that an increase of the quantity of money (M and M') would exhaust all its effects in reducing the velocity of circulation (V and V') and could not produce any effect on prices (p). Fisher calculated that the velocities were indeed more or less constant over time. However, as Morgan (2007) highlighted, the velocity of money was impossible to measure directly and left much room for judgment.

[3] As Morgan (1999, p. 365) highlighted, Fisher also argued that during the short-run adjustment process the causality between money and prices is reversed.

[4] The analogy of the balance, as Wagemann (1923, p. 132) remarked, goes back to John Locke, who placed commodities and gold on either side of the balance. Locke's aim, however, was not to show the effect of an increased money supply on prices, but rather to show that bimetallism was futile, because keeping the value of silver and gold at a constant rate of exchange was not possible.

[5] With Knut Wicksell and Alfred Marshall, Fisher stood for the revival of the quantity theory of money at the turn of the century (Laidler, 1991).

To prove a unidirectional causality between money and prices, Fisher followed the same procedures of isolating the most probable cause in physical experiments. Fisher (1911, pp. 158-159) argued that "just as the effects of gravity upon a falling body are blended with the effects of the resistance of the atmosphere", other causes "may aggravate or neutralize the effect of M on the p's". Referring to Robert Boyle's (1627-1692) pressure experiments, Fisher thought that in the same way as the physicist "kept the velocity of gas molecules constant at a given temperature", the economist could assume the velocity of money constant. With other effects on p eliminated, Fisher (1911, pp. 158–159) hoped that the effect of M on p could be "seen alone".

In Germany, Fisher's quantity theory was mainly dispersed by Arthur Spiethoff, the Swedish economists Knut Wicksell, Gustav Cassel, and later reinforced by German economist Hans Neisser (1931).[6] By the 1920s, the "refined quantity theory", as presented in the equation of exchange above, was the "dominant approach" to the investigation of the price level (Hahn, 1920, p. 17). The dominance of the quantity theory can also be explained by the experience of inflation during the war. Cassel (1920, pp. 8–9), for example, publicly proclaimed that the "creation of an artificial purchasing power" by the government's issuance of paper money resulted in inflation. However, like many economists over the course of the decade, Cassel (1927, p. 410) became skeptical of Fisher's theory, which he deemed not useful in light of the evident complexity of price movements in the market.[7]

Wagemann (1923, pp. 139–142) not only doubted the validity of Fisher's theory, but also took issue with Fisher's method. The constricting ceteris paribus conditions, the impossibility to directly measure the velocity of money, and the unclear definition of the money supply convinced Wagemann that the quantity theory was condemned to "scientific infertility".[8] Furthermore, the causality between

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[6] Spiethoff (1905) already adhered to a "quantity theory" before Fisher's influential book. As several economists suggested, Spiethoff continued to hold on to the quantity thereafter (Zwiedineck, 1909, p. 155; Schumpeter, 1952/1917; Heinrich, 1928, p. 65). Wicksell (1913, p. 163) fully committed to the quantity theory, and, according to Wagemann (1923), suggested the theory as an "axiom" in economic research.

[7] See Schmölders (1934, pp. 23–33) for an overview of the economists who doubted the validity of Fisher's quantity theory in business cycle research. As Alfred Michaelis' (1929) study shows, by 1929 most German economists did not believe in the quantity theory anymore. Nowadays, the most famous critique of the quantity theory of money is Keynes's (1924, p. 80) "*In the long run* we are all dead" argument. Many of Keynes's ideas resonate well with Wagemann and seem to have emerged simultaneously. For Wagemann's employee Albert Wissler (1952, p. 93), however, it was evident that Keynes had "subterranean influence" on Wagemann's practical business cycle research. An in-depth analysis would be needed to support Wissler's claim, for which there is no space here.

[8] A similar argument was made by Schumpeter (1952/1917, p. 663), who argued that the "base of the quantity theory was robbed", because different varieties of money are constantly created and disappear. The velocity of money, however, remained a useful concept for Schumpeter (1952/1917, p. 671).

money and prices could be the inverse of what Fisher proclaimed. As the "Banking School" around Thomas Tooke (1774-1858) had shown, higher prices could be the cause of an increased money supply.[9] Still, Wagemann (1923, pp. 143–145) praised Fisher for the algebraic representation of the aggregate economy by the simple equation of exchange (*Verkehrsgleichung*) and his attempts to empirically verify the theory. Above all, he agreed with Fisher's (1911, p. 5) notion that "[a]ny property right which is generally acceptable in exchange may be called 'money'".

Fisher's definition of money was compatible with the monetary theory called "nominalism" that underpinned Wagemann's *Treatise*. The theory of nominalism was defined by the German economist Georg Friedrich Knapp (1923/1924, p. 1) who considered money a "creature of law". Accordingly, money had no intrinsic value, but drew its value from the edict of the state.[10] In Wagemann's (1923, pp. 213–221) reading of Knapp, in a modern capitalist economy, money could grow far beyond the "imperative of state power". State power receded "into the background in the face of the overwhelming importance of the major credit institutions […], the economic interconnections [*Verflechtungen*] and the rotational power of the economic circuit". The repeated experience of successful exchange with money, the "trust that no disruption will occur in the circuit of payments" gave money its validity.[11] Both Wagemann and Fisher understood money as a flow, servicing economic transactions. Money was not a commodity ruled by supply and demand as earlier economists had claimed.

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[9] This direction of causality is just as old as the quantity theory and was made popular by Tooke in his *History of Prices and of State of the Circulation* published between 1838 and 1857. Outside of Germany, which was a special case due to its hyperinflation, the 1920s also gave much reason to doubt the validity of the quantity theory on empirical grounds. The inflationary period in France after 1922 led several French economic observers to doubt the quantity theory (Patat & Lutfalla, 1990, p. 40). One of the critics was the renowned economist Albert Aftalion (1874-1956), who depicted graphically how the quantity of money in circulation "followed prices with a certain delay" (*les mouvements de la circulation s'effectuent avec un certain retard sur ceux des prix*) (Aftalion, 1927, p. 29). Thus, the "first form of the quantity theory" (*Première forme de la théorie quantitative*) was disproven by empirical "facts". Fisher's second version of the theory, where the variables M', V, and V' did not remain constant, however, was not "statistically verifiable" (*La vérification statistique, précieuse pour la première forme de la théorie, ne trouve plus comment s'employer pour la seconde*) (Aftalion, 1927, pp. 113–126).

[10] The 1920s saw a revival of Knapp's *The State Theory of Money* (*Die staatliche Theorie des Geldes*) from 1905. The overviews on monetary theory by Lederer (1920) and Van Dorp (1920) show that Wagemann was far from the only one who adhered to Knapp's monetary theory called "nominalism". Knapp's followers consisted, among others, of Kurt Singer (1886-1962) and Friedrich Bendixen (1864-1920).

[11] With such interpretation, Wagemann was much more aligned with Knapp's critic Andreas Voigt (1860-1940). Voigt (1906, pp. 334–335), a German mathematician and economist, argued that "in all times the value of money was based on ensuring its circulation" (*Zu allen Zeiten beruhte der Wert eines Geldes auf der Sicherung seines Umlaufs*).

Despite the compatibility of Fisher's and Wagemann's views on money, the balance analogy was too restrictive for Wagemann. The problem of measuring the variables on the left-hand side of Fisher's equation (1), prompted Wagemann to propose another equation. The economy could also be thought of as a "balance sheet" (*Bilanz*) with total revenue (price x output) on the active (assets) side and total monetary income on the passive (liabilities) side—Sombart's emphasis on accounting and double-entry book-keeping in modern capitalism seemed to have left a mark on Wagemann's thought. Wagemann (1923, pp. 151–152) announced that for his new equation, the rules of double-entry book-keeping were "transferred analogously from the private sector to the national economy": each entry on the assets side had to correspond to an entry on the liabilities side. This tautology was represented by the equation (2), which formed the basis of Wagemann's "accounting theory" (*Bilanztheorie*) of prices:

$$\underbrace{price \times output}_{assets} = \underbrace{total\ monetary\ income}_{liabilities} \qquad (2)$$

During the economic process, money was constantly changing sides on the balance sheet. Total monetary income was used to buy the output of production, which consisted of consumer goods and services, but also the means of production. [12] The means of production then served as the basis for the next period of production.[13] The idea to replace Fisher's variables M, M' and V, V' by "total monetary income" arose from Wagemann's (1923, p. 147) reading of Otto von Zwiedineck and Joseph Schumpeter. As early as 1909, Zwiedineck argued that despite the great transformation from "self-sufficient households" to an economy of "income earners", there was only little literature about the effect of income on prices (Zwiedineck, 1909, p. 133).[14] Building on Zwiedineck's emphasis on income, Schumpeter (1952/1917, p. 635) claimed that the "essence of the monetary circuit" in equilibrium was grasped by opposing the "sum of prices of all consumption goods" to the "sum of prices of all production goods", which equaled the "sum of all monetary incomes".

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[12] By the total monetary income (*Geldeinkommen*) Wagemann depicted aggregate household income. Wagemann presumed that all earnings in the process of production would ultimately end up in the hands of individual households.

[13] Wagemann's original German of the left-hand side of the equation is confusing when translated directly. Price x Output is termed "price times utility yield" (*Preis mal Nutzerträge*), by which Wagemann meant all goods and services that are consumed or invested during a distinct period.

[14] According to Zwiedineck (1909, pp. 145–146), increased average income led to a higher purchasing power and therefore higher prices. The value of money would fall respectively. Zwiedineck doubted that the quantity theory was valid because he did not see why increased money supply would lead to higher prices. Against Spiethoff, Zwiedineck argued that more money in circulation led to lower interest rates, but not necessarily to higher prices.

Wagemann's response to the quantity theory did not stop with a replacement of the right-hand side of Fisher's equation of exchange (1). In Wagemann's interpretation of his equation (2) there were no variables that could be held constant in order to single out the most probable cause. In equation (2), any imbalance between the two sides could lead to a change of the price level. An increase in money supply, which had an effect through incomes, was only one minor of several possible causes of an increase in the price level (Wagemann, 1923, p. 158). Income might be hoarded, exported, or remain in the stock market and thus reduce the liabilities side. At given output, prices had to fall to balance the two sides. Inversely, previously hoarded or exported money could suddenly flow back into the economy and result in higher prices.

On the other side of equation (2) new production methods, but also structural changes like organization of apprenticeships could result in higher supply of goods and services. The higher supply had to be bought with the same amount of income, which resulted in lower prices. Fluctuations in inventories, which depended on the organization of the economy, also had an effect on the amount of commodities in circulation. A war economy, for example, had larger inventories and less commodities in supply, which led to higher prices. A lesson from the war was that a sudden reduction of supply could lead to a disproportionally sharp increase in prices. This relationship was especially aggravated when food supply dropped, because it could lead to a price spiral.[15] In short, Wagemann adhered to a multicausal explanation in response to Fisher's reductionist approach: a higher general price level could not be reduced to a single cause, but was caused by several different influences.[16]

7.2 The Commodity and the Monetary Circuit

The accounting framework continued to play a guiding role in Wagemann's *Business Cycles* (*Konjunkturlehre*) of 1928. In the book, Wagemann divided the economy into the "commodity circuit" (*Güterkreislauf*) and the "monetary circuit" (*Geldkreislauf*). The commodity circuit should, according to Wagemann, be understood as a national balance sheet with assets and liabilities. To

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[15] The observation that a reduction of food supply can lead to a disproportionally large price increase has been termed the "King-Davenant Law"—an observation just as old as the quantity theory. In his study of war time inflation, Wagemann claimed that hunger was the "basis of the law of prices" (Wagemann, 1919, pp. 125–131). Due to scarcity of a commodity like potatoes, consumers with limited budgets could be pushed to switch to substitute goods like bread. A corresponding higher bread price could then lead consumers to switch to rice, or back to potatoes. The scarcity of one commodity could thus easily result in a price spiral of all food prices. Similar mechanisms in other commodities could result in a higher general price level.

[16] As Laidler (1991) explored, Alfred Marshall had similar doubts about the value of the quantity theory in practice. Marshall believed that the quantity theory holds, but that it was overruled by other factors operating on prices.

understand its assets side, Wagemann (1928a, p. 26) put himself in the position of a "Martian looking down to earth with a large telescope". The processes on earth were openly visible: coal was extracted, iron was produced in blast furnaces, fields were harvested. Commodities were transported on the surface, stored in warehouses, further processed, and finally consumed. This birds-eye view could be pictured as a floor plan with the main categories "production" (*Produktion*), "inventory" (*Lager*), and "consumption" (*Verbrauch*). As equation (2) showed, production (total output) had to equal total monetary income. Therefore, the amount of production could be estimated by income tax data. Adding up each sector of production, Wagemann arrived at an estimate of 55 billion Reichsmark for the total national balance sheet, which he interpreted as the national income.

Together with economist Gerhard Colm (1897-1968) and statistician Hans Platzer (1879-1961), Wagemann belonged to a new breed of economists who promoted the national income framework in Germany, arousing irritation among more established economists like Karl Diehl (1864-1943) and Alfred Amonn (1883-1962).[17] In retrospect, Wagemann's commodity circuit and the national income estimation on its basis received plenty of attention due to its similarity with Keynes' *General Theory* (1936) and modern macroeconomics (Grünig, 1950; Tooze, 2001). As Langelütke (1956, p. 158) argued, Wagemann's quantification of the commodity circuit made him "one of the precursors of national accounting". Tooze (2001, p. 126) lauded Wagemann for his "innovative national accounting framework".

The complementary circuit of the monetary side, however, has not been praised much. Quite to the contrary, it has been described as a mere "attempt that did not go beyond suggestions" (Grünig, 1950, p. 81). Wagemann's depiction of the monetary circuit as a human blood circuit might have contributed to the lack of attention. Another reason for its neglect might be attributed to Wagemann's practice of using both accounting statistics and numerical (time series) statistics when thinking with the monetary circuit. As we will see in the following, Wagemann thought of the monetary circuit as a double blood circuit with income on the left-hand side, and production on the right-hand side, but he also used it as a reasoning tool in his statistical forecasting. Hence, Wagemann's monetary circuit was a very specific and fine-tuned model of the monetary sphere that he could put to several practical uses.

Wagemann wanted to separately investigate the monetary circuit because various monetary elements like savings, investments, credit, interest, wages, and dividends were missing in the floor plan model

[17] The concepts of national wealth (*Volksvermögen*) and national income (*Volkseinkommmen*) occupied the assembly of the *Verein für Socialpolitik* in 1926. Especially Diehl (1926, p. 12) assumed an extreme position and argued that the "performance of a nation [*Leistungsfähigkeit eines Volkes*]" was "not measurable in terms of numbers". See Speich Chassé (2013, pp. 70–80) for a summary of the discussion on the two terms by the *Verein* in 1926.

of the commodity circuit. Such a division of the economy into a commodity (or "real") and a monetary sphere was commonplace in early 20th century economics, and not as novel as Tooze (2001, p. 119) makes it seem. Wagemann could have found the distinction in Schumpeter's (1911, pp. 1–102) work, in which the economy was divided into a monetary and a commodity circuit on the basis of Wicksell's (1898) "classical dichotomy" of barter economy and monetary circuit. A more immediate reference for Wagemann, however, was *Money* (1924) by the American economists William Trufant Foster (1879-1950) and Waddill Catchings (1879-1967). Wagemann's "view from Mars" was only a slight modification of their description of the commodity circuit.[18]

Where Wagemann differed from the American economists, was in his description of the monetary circuit. To investigate the monetary circuit, Foster and Catchings (1924, pp. 303–306) visualized a system of pipes and reservoirs filled with money circulating as some sort of liquid. In this "Circuit Flow of Money", reproduced in Figure 20, each sector of the economy (consumers, banks, retail etc.) had their own reservoir where the flows of money were stored for a certain time, before being released again into the circuit (the pipes). The reservoirs were placeholders for the idea that "[a]ll money is idle, except when it is actually used in exchange".

[18] In Foster and Catchings' flow of commodities, raw materials were "grown, extracted and graded, moved on to factories and prepared for final consumers, moved on to wholesalers, thence distributed by retailers, and finally turned over to consumers". In contrast to Wagemann, Foster and Catchings (1924, p. 299) did not close the circuit. In their description, commodities were "disposed of" and "withdrawn forever from the stream".

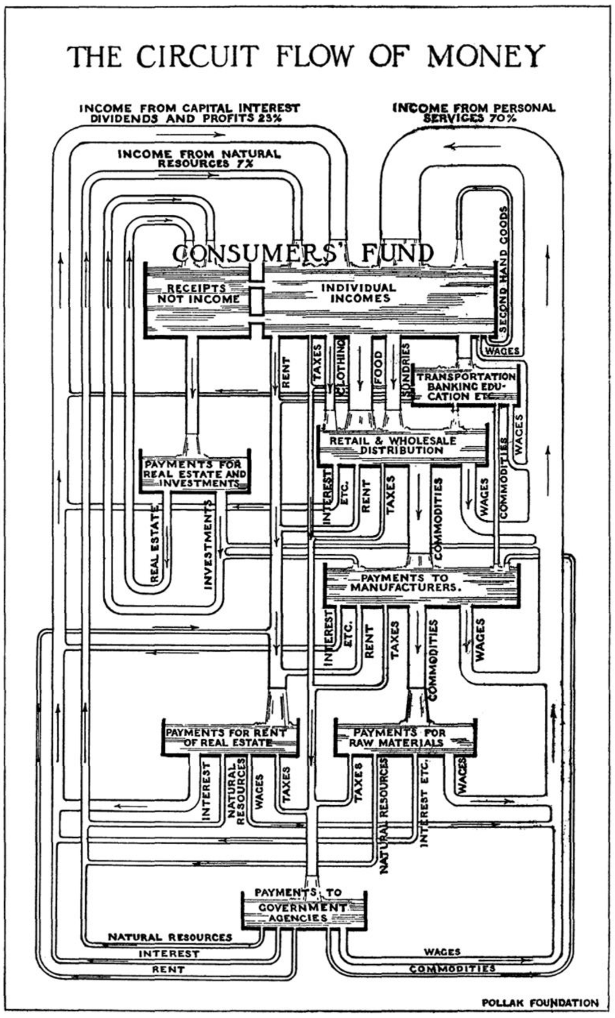

Figure 20: The Circuit Flow of Money as a system of pipes and reservoirs. Source: Foster & Catchings (1924, p. 305).

Wagemann (1928a, pp. 42–43) did not agree with how Foster and Catchings treated the monetary circuit. In a modern economy, argued Wagemann, money was not hoarded, but invested. Therefore, the consumer reservoir was misleading. Similarly, money that flowed into producers' hands was not stored, but invested into new stocks, machines, or securities on the stock market. As a result, money was constantly in transaction and continued to flow through the economy. Money was never "idle", and reservoirs were not a fitting picture. Using Mary Hesse's (1966) terminology, one could argue that Wagemann was not able to handle the "negative features" he perceived between the monetary system and the system of pipes and reservoirs. Instead of working out how to make the economics fit the analogy, Wagemann replaced the system of pipes and reservoirs by a biological analogy that provided him with more "positive features": the human blood circuit.

7.2.1 The double circuit of the human body and the economy

The human blood circuit consists of two circuits. The small "lung" circuit starts from the heart, goes through the lungs, fills up blood with oxygen and returns to the heart. The large "body" circuit supplies the body with blood. Those two circuits are the essence of Wagemann's monetary circuit that I reproduced in Figure 21. Wagemann used the image of the circuit for the first time in a speech he gave in July 1926. Several different versions were subsequently printed in his textbooks and the IfK's *Quarterly Journals*.[19]

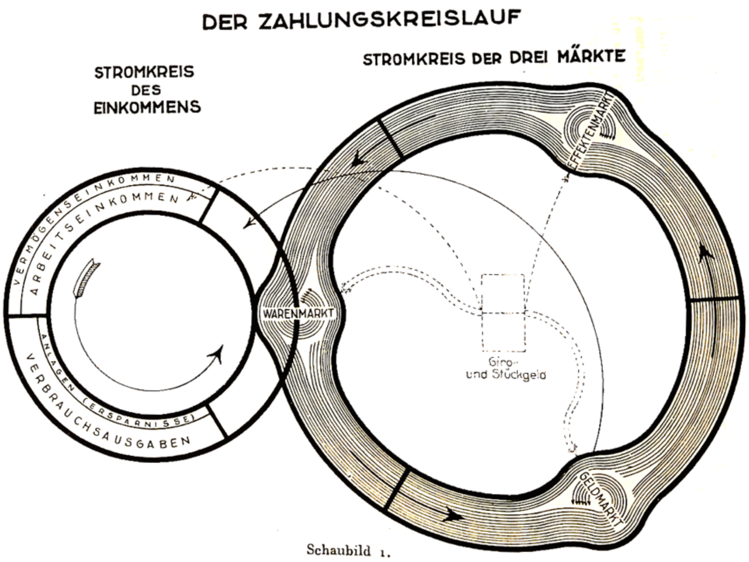

Figure 21: Wagemann's Monetary Circuit with the income circuit (*Stromkreis des Einkommens*) on the left-hand side and the producer circuit (*Stromkreis der drei Märkte*) on the right-hand side. Source: Wagemann (1927, p. 10).

The left-hand side of the circuit, the "circular flow of income" (*Stromkreis des Einkommens*) depicted the consumer's sphere, where "movements of money" in "thousandfold transactions" returned to the same hands that spent it: consumption on the commodity market generated new income, which was spent again in the next period. The circuit on the right-hand side represented the producer's sphere, the "circular flow of the three markets" (*Stromkreis der drei Märkte*), Firms sold their products and bought their means of production (raw materials and labor) on the commodity market (*Warenmarkt*) that was linked to the money and credit market (*Geldmarkt*), where firms borrowed money for their

[19] The visualization of the circuit has first been printed in *VzK* 1926, 3 (19. November 1926), p. 10, and shows up in different versions in Wagemann (1928a, 1929, 1930, 1940).

expenses on the commodity market. Both markets were linked to the stock market (*Effektenmarkt*), where shares and bonds were traded. The consumption sphere on the left and the production sphere on the right were linked up in the commodity market, where producers spent their capital on the means of production and consumers spent the income they received from wage payments on consumption goods (Wagemann, 1927, pp. 11–12).

In an almost justificatory manner, Wagemann (1928a, pp. 22–39) explained that "imaginations" from other sciences were needed to make sense of the "thousandfold interdependencies" (*tausendfaches Ineinandergreifen*) of economic actions. The image of the blood circuit helped to capture the "millions of monetary transactions in one diagram", and to abstract "from the actions of economic subjects".[20] Yet, it would be too strong to claim here that Wagemann conserved variety with the help of the biological analogy. Other "positive features" were more dominant.

Wagemann never reduced the circuit to a mechanistic understanding as it has been attempted by later economists who were lauded for giving more "precision" to the circuit.[21] For Wagemann's understanding of the monetary system it was important that there were two circuits that linked up at the commodity market. Thus, next to the positive feature of money being in continuous motion and not flowing between reservoirs, the previously used accounting analogy was crucial for the applicability of the human blood circuit to the monetary circuit. As Wagemann (1930, p. 48) put it:

> "[The] notion of the double stream of payments is and will always be no more than a metaphorical figure, which at best reflects the course of payments in a national economic system in the same way as double-entry bookkeeping reflects the course of business in a commercial undertaking".[22]

[20] One example of giving individual payments more room is Simon Newcomb's (1886, pp. 318–323) visualization of monetary transactions between different individuals. Newcomb also depicted monetary payments as a blood flow, but he highlighted the feature of blood circulation instead of the double circuit.

[21] The German economists Ferdinand Grünig (1933) and Carl Föhl (1937) extended the circuit analysis throughout the 1930s but refrained from the blood circuit analogy. As an engineer, Föhl approached the circuit in a mechanical way in which the different strengths of monetary streams could be calculated. In a whiggish fashion, Wissler (1953, p. 451) argued that these later treatments of the circuit gave more "precision" to Wagemann's "vitalist images (*Driesch'*s)". However, calculating the exact strength of the circuit was never Wagemann's intention. For Wagemann, the circuit was a model, but not a measuring instrument.

[22] In the German edition, Wagemann (1928a, p. 43) explained: "*Das Bild des Doppelstroms der Zahlungsvorgänge ist und bleibt nur ein Schema, das die volkswirtschaftlichen Zahlungsvorgänge höchstens so widerspiegelt, wie die doppelte Buchführung die Geschäfte eines kaufmännischen Betriebes*".

There is a striking similarity between the two sides of the human blood circuit and the accounting analogy with an income and production side used in his *General Treatise on Money* of 1923. In later years, Wagemann (1940, pp. 92–93) clarified again why he used the blood circuit in his monetary theory. He concluded that:

> "The analogy with the blood circuit goes as far as to distinguish between a large and a small circuit. The parallel hardly extends much further; but the image of two interconnected money streams by no means serves only as a guide but reflects a real state of affairs".[23]

It is true that the two streams are by far the most dominant elements in Wagemann's circuit in Figure 21. Yet, in his justification for using the biological analogy, Wagemann left out that the blood circuit was better able to visualize the perpetual motion of money than the accounting analogy—the initial reason why the blood circuit analogy was appealing to Wagemann. There are also several elements in Wagemann's circuit image that are not to be found in the accounting, nor in the blood circuit analogy. Wagemann's above explanation that "the parallel hardly extends much further" than distinguishing between a large and small circuit does not consider that he made an effort to integrate existing economic knowledge into the circuit image. As Morgan and Boumans (2004, pp. 375–376) point out, thinking in metaphors does not constrain the imagination much at first, they are like "one-dimensional models" with large degrees of freedom. When moving from the metaphor to a 2-D model, however, one has to make commitments about exactly what is meant. Confronted with the economic theories of his time, Wagemann had to specify what elements of the circuit corresponded with what piece of economic knowledge when he brought the circuit to paper.

In Figure 22, I tried to reconstruct how Wagemann gathered bits and pieces of economic knowledge and turned them into the circuit image as if he was "baking a cake" (Boumans, 1999) with seven different 'ingredients'. Five of them can be found as references in Wagemann's work on money (1923) and business cycles (1928a). For the first ingredient, the double human blood circuit (**1** in Figure 22), Wagemann had no specific reference. He might have found a blood circuit image in a popular book on physiology of the 1920s like Höber's *Human Physiology* (1920, p. 115). Wagemann rotated it counter-clockwise by 90 degrees, with the result that the small circuit was on the left-hand side (and not on top) and the large circuit was on the right-hand side (and not on the bottom). Whereas

[23] In the German original, Wagemann (1940, pp. 92–93) stated: "*Die Analogie mit dem Blutkreislauf geht so weit, daß man zwischen einem großen und einem kleinen Kreislauf unterscheiden kann. Viel weiter erstreckt sich freilich die Parallele kaum; aber das Bild zweier miteinander verbundener Geldströme dient keineswegs nur der äußerlichen Orientierung, sondern gibt einen wirklichen Sachverhalt wieder*".

Wagemann considered the heart to be the commodity market, he did not specify the function of the lungs, nor did he reflect on the notion of different levels of oxygen in the two circuits.

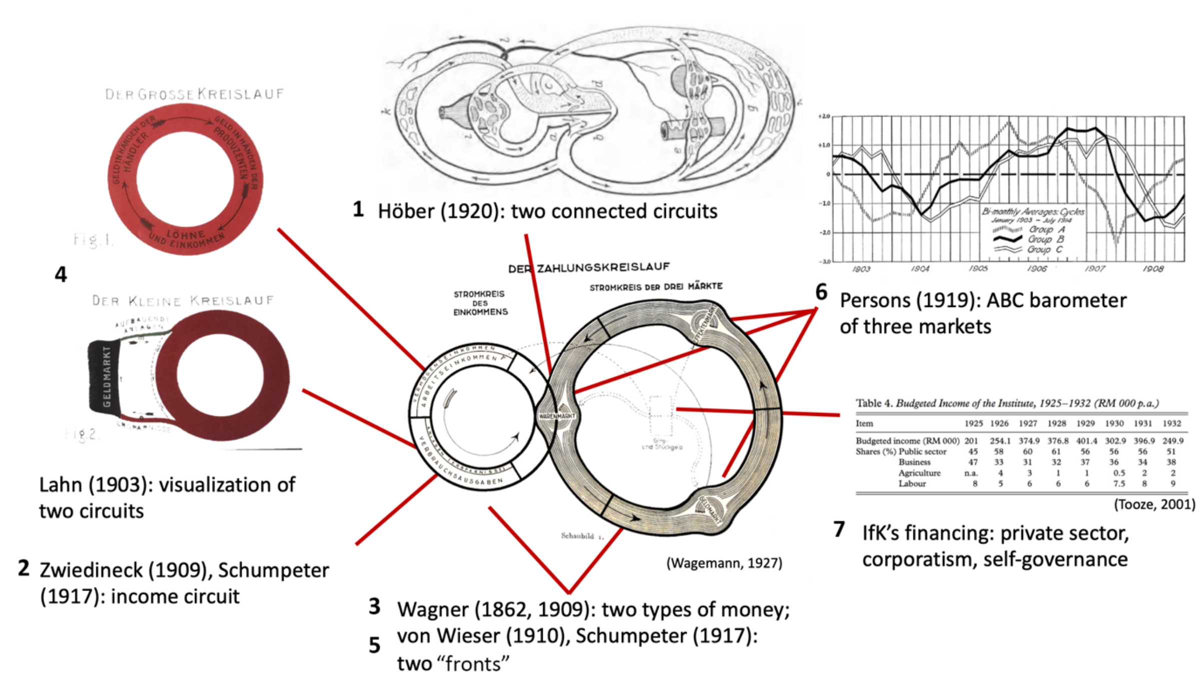

Figure 22: "Baking" Wagemann's circuit model with 7 ingredients.

The idea of a circular system was omnipresent in economic theory of the 1920s, but one can identify Schumpeter (1952/1917) and Zwiedineck (1909) as having given the impetus to begin the circuit with income (**2**).[24] Wagemann's small circuit started from the commodity market, where income was generated, and then split up into consumption and savings along the circuit. The stream of "consumers' money" (*Konsumentengeld*) returned to the commodity market, while savings flowed into the money market of the large circuit, where it turned into "producers' money" (*Produzentengeld*). This distinction between different 'types' of money is Adolph Wagner's (1862, 1909) contribution to monetary theory (**3**). However, the notion of two different circuits, cannot be found in Wagner's work.

Combining different types of money to the idea of economic circuit was the contribution by Wagner's student J.J. O. Lahn, a pseudonym for German businessman Nicholas Johannsen (1844-1928). In 1903, Lahn visualized an immensely complex monetary circuit consisting of more than 36 different categories. Next to its complexity, Lahn's circuit stands out from the circuit images of his

[24] See Lederer (1926) on the prevalence of circular systems in the economics of the 1920s.

contemporaries due to its two separate circuits (**4**).[25] Lahn (1903) denoted the circuit from laborers through merchants to producers as the "large circuit" (*Der grosse Kreislauf,* top left at **4**), which found its representation in Wagemann's small "income stream" (*Stromkreis des Einkommens*). Lahn's small circuit (*Der kleine Kreislauf,* center left at **4**), which showed the flow of savings from income to the capital market, was built in Wagemann's circuit image as the link between savings and the money market, a link that Wagemann only visualized in later years (See Figure 24 below). But in contrast to Wagemann's double circuit, producers' and consumers' money circulated in the same large circuit in Lahn's visualization.[26]

The missing 'ingredient' for the distinction of two separate types of money that transitioned from consumers' money to producers' money in the commodity market can be found in Schumpeter's reading of Friedrich von Wieser's monetary theory (**5**). Wieser's (1910, p. 507) attempt to define the "personal and economic [*volkswirtschaftlich*] value of money, suggested to Schumpeter (1952/1917, pp. 637–638) that consumers' income was "psychological income". The consumer subjectively assessed the income by how many commodities it could buy. Schumpeter argued that there existed another "front of income", which is turned towards the market of the means of production. In this market, enterprises exchanged money for labor and to them income was a mere "transit item of accounting" (*durchlaufende Posten*). There, any subjective valuation was replaced by "calculation" (*Kalkül*) in production (Wieser, 1910, p. 509). Wagemann simply extended Schumpeter's notion of the two fronts of income to the commodity market, which included both the means of production *and* consumer goods.

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[25] For the purpose of reconstructing Wagemann's image, I extracted only parts of Lahn's (1903) fine-grained circuit visualization. I reproduced Lahn's complete circuit in Appendix 2. His contemporaries Wicksell and Fisher, for example, visualized much simpler and singular circuits. In Wicksell's (1898) circuit image, only three agents exchange commodities, while a separate stream of money flows in the opposite direction. In his cash loop diagram, Fisher (1911, p. 453) depicted three agents in a single circuit and added the banking sector as the initiator of the flows of money.

[26] Another possible source of the double circuit idea is Schumpeter. In a 'classical dichotomy' fashion, Schumpeter (1952/1917, pp. 635–636) explained that the economy was like a vending machine (*volkswirtschaftlicher Automat*). Everyone threw in their contribution in the shape of the means of production (labor) and received "through the play of the mechanism" a corresponding quantity of consumer goods. Yet, this "pulse of the economic life" was "torn apart" by the introduction of money, creating one circuit of individuals exchanging their labor for income, and another one in which individuals used their income to buy consumer goods. But like in the case of Lahn, both of Schumpeter's circuits fitted into Wagemann's left circuit.

Wagemann could take over the details of the consumer's circuit from Lahn. Yet, neither Wieser, nor Schumpeter specified how the circuit on the producer's side looked like. In Wagemann's circuit, however, he clearly elaborated that money flowed from the commodity market through the money market, from there, it flowed to the stock market and then back to the commodity market. Wagemann took this ingredient from U.S. business cycle research. The American economists Warren M. Persons and Charles J. Bullock from the Harvard Committee on Economic Research were the first to visualize the economy as three distinct markets in a graphical chart (**6**).[27] The chart which has become known as the "ABC barometer" combined three different time series in order to forecast the trajectory of the economy. The barometer consisted of a time series of the stock market (A), commodity market (B), and money market (C). The fundamental idea behind the barometer was that the three curves followed a chronological sequence.

The movements of the A curve preceded those of the B curve by two to ten months, while the movement of the B curve preceded the movements of the C curve by two to eight months. As a result, each curve could be forecasted by the one preceding it. The main goal, however, was to forecast the B curve, which measured business activity. If the A curve showed an upward movement, for example, one would expect the B curve to follow its movement after several months. In the Harvard Committee's interpretation, the three curves represented only "symptoms" of undefined underlying causes.[28]

Wagemann agreed with the A-B-C sequence and took it over in his circuit model. Following the arrows in the large circuit, the stock market (*Effektenmarkt*, A) preceded the commodity market (*Warenmarkt*, B), which preceded the money market (*Geldmarkt*, C). Wagemann aligned the markets so that they obeyed the chronological sequence of the ABC barometer, but also the counter-clockwise direction of the human blood circuit. Yet, Wagemann (1927, p. 18) did not interpret the ABC curves as symptoms. As the markets were embedded within the "large circuit of payments" (*großer*

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[27] The Harvard Committee, later called Harvard Economic Service, was "most influential forecasting agency of the early twentieth century" (Friedman, 2014, p. 128). Its founders Bullock and Persons had roots at the Harvard University and were funded by the school's Committee for Economic Research and the Rockefeller Foundation. First published in a series of articles on forecasting methodology in the *The Review of Economics and Statistics*, the foundations of the ABC barometer were disseminated in a folio-sized volume *Indices of Business Conditions* (Persons, 1919).

[28] On the Harvard Committee's interpretation of the barometer, see Morgan (1997). This is not to say that the ABC barometer did not require theoretical and methodological commitments. On a theoretical level, as Schumpeter (1933) argued, the analysis of the economy by the ABC barometers was driven by the idea that time series can be decomposed into seasonal variation, trend, and business cycle. See Friedman (2014) on the background of the ABC barometer's creation.

Stromkreis der Zahlungen), money "flowed" between the three markets and they sequentially "filled up".

As a last ingredient, I included Wagemann's attitude toward state intervention and his guidelines for economic policy (**8**). As I have shown in the previous chapter, the IfK was to a large degree financed by industry and Wagemann sided with industrialists when it came to the assessment of state intervention and economic democracy (*Wirtschaftsdemokratie*). In the circuit model, there is thus no room for state control and intervention by the central bank. Hence, the central bank as the provider of money at the center of the right circuit almost vanishes behind the large "flow of finance capital" of the self-governing industry (Wagemann, 1930, p. 48).[29]

Wagemann's efforts to translate the blood circuit metaphor into a circuit model of the German economy give us much reason to believe in his strong commitment to biological analogies. What also speaks for Wagemann's commitment is that he continued to use the circuit model until the 1940s (Wagemann, 1940). The question that now arises is what the circuit model did for Wagemann's economics. Could Wagemann convey something with the analogy that he would not have been able to do without? In my opinion, there are two prominent consequences of Wagemann's use of the blood circuit. First, Wagemann gained a new perspective on inflation, which I will discuss only briefly. Second, Wagemann could reinterpret the ABC barometer by depicting the three markets within a stream of money and capital. Both were linked to how Wagemann visualized the economic circuit and thereby created new ways to understand the economy of his day. Wagemann's circuit model had "perceptual and cognitive consequences" (Morgan & Boumans, 2004, p. 392; Morgan, 2012, p. 406).

7.2.2 A new take on inflation

The first consequence of the double circuit was the creation of two distinct circuits of the economy in which different types of money circulated. Following Boumans' (1999) example of comparing model building to "baking a cake without a recipe", one could think of the double blood circuit analogy as working like a 'cake tin'. The biological analogy gave the model a distinct shape that contained: the idea of an income side and a production side by Schumpeter and Wieser, an income circuit described by Lahn, Zwiedineck, and Schumpeter, a producer's circuit, specified by the

[29] Even more pronounced, Wagemann (1928a, p. 170) argued that the economy was mostly "free of the restraint of credit policy" as the "change in the volume of credit was rather determined by industry than by the banks". In 1932, Wagemann explained that the Reichsbank's decrease of the discount rate did not have an effect on industry. Industry relied on long-term credit, which was not available during the banking crisis of the early 1930s. See *VzK* 1932, 7, 1 A (29. Mai 1932), p. 32.

Harvard Committee's three distinct markets, and finally Wagner's account of producer's and consumer's money. The resulting 'cake' was a double circuit of two interlinked circuits with different types of money in circulation.

One could also argue with Max Black's (1962, p. 42) theory of metaphor and claim that Wagemann used the blood circuit as a "filter" by highlighting some aspects of the existing bits of economic knowledge while suppressing others. In contrast to the ABC barometer, for example, Wagemann's circuit highlights distinctively that the commodity market (the B curve) is linked to the income circuit. At the same time, the precise lag lengths between the A, B, and C curves lost their importance. In either way, taking the biological analogy as a "cake tin", or a "filter" resulted in an image that was unparalleled among contemporary depictions of economic circuits. The circuit visualizations by Wicksell (1898), Lahn (1903), Fisher (1911), Foster and Catchings (1924), Marzell (1926, p. 20), Grünig (1933), Föhl (1937) do not show a separation between consumption and production circuits in which different types of money circulate between three different markets.

Wagemann (1940, pp. 92–98) noted repeatedly that he used the circuit image to understand the contemporary monetary system. According to Wagemann, its core notion of a consumption and production circuit was missing in the economic plans that were drafted in the early 1930s to overcome the Great Depression. Wagemann publicized his own plan in January 1932 in which he proposed a "Reform of Money and Credit" (*Geld- und Kreditreform*) to end Brüning's deflationary economic policy and escape the Great Depression. Among the "plethora of plans" (Balderston, 2002, p. 91) that emerged at the time, the "Wagemann plan" received the highest public attention and was intensely discussed among economists and politicians.[30]

The details of his reform plans are too complex to discuss here and have been investigated in many other places.[31] In short, Wagemann and several of his influential backers, aspired a reform of the *Reichsbank* that would re-establish trust in the banking system and facilitate loans given to the

[30] The most famous plans at the time were Heinrich Braun's measures to fight unemployment of early 1931, Wilhelm Lautenbach's proposition of public works and wage cuts of June 1931, and the "WTB plan", initiated by the socialist trade unionists Woytinsky, Tarnow and Baade who also suggested public works to stimulate the economy (Balderston, 2002). Even Werner Sombart, who usually refrained from commenting on contemporary economic policies, presented his ideas on the "Future of Capitalism" (Sombart, 1932).

[31] See the references in Tooze (2001). For a dense summary of the Wagemann plan and the reactions it provoked, see Meister (1991).

industry.[32] According to Wagemann, the root cause of the difficulty to recover from the depression was located in the banking system that was fundamental for the cashless transactions (*Giralgeld*) of the production circuit (the large circuit in Figure 21). By an increased gold backing of the cashless transactions, trust and issuance of credit could be strengthened. In order to increase the producer's circuit's gold backing, Wagemann (1932, p. 34) proposed to withdraw the gold backing of bills and coins (*Stückgeld*) of the consumer's circuit, which did not need to be backed by gold as it did not come into contact with foreign exchange markets. As Wagemann (1931, pp. 68–70) remarked, the distinction between the two circuits resulted directly from his double circuit model and convinced him that withdrawing gold backing from the left circuit would not lead to inflation.

Despite Wagemann's reassurance that his plan was not inflationary, his reform was not implemented due to fear of inflation and due to the tensions between Wagemann and Brüning.[33] Yet, several commentators to the plan remarked the novelty of dividing the monetary system into two different circuits.[34] In retrospect, the assessment of the Wagemann plan was more positive. Commenting on the plan, Langelütke (1956, p. 158) argued that it would have been "unquestionably the right approach to overcoming the depression". Klausinger (1998, pp. 195–196) concluded that the plan would not have been inflationary just as Wagemann always emphasized. Wagemann's proposals were only partly implemented during the Third Reich by its Banking Law of 1934. Finally, as intended by the Wagemann plan, a new law of 1939 "liberated the circulation of bills from the connection to the international economy" (Wagemann, 1940, p. 77).

[32] As Wagemann (1932) pointed out, he developed his plan in close cooperation with IfK employees, bankers (Heinrich Bachem of the Dresdner Bank), industrialists (Max Ilgner and Hermann Schmitz from I.G. Farben), and economists (Wichard von Moellendorff, Otto von Zwiedineck-Südenhorst).

[33] The president of the *Reichsbank* Hans Luther, who was already confronted with the plan in late 1931, discarded it as too inflationary (Meister, 1991). Fear of inflation also dominated the discussion between Wagemann and representatives of business associations and Chambers of Commerce. See BArch, R 11/1371, pp. 93-95 and pp. 7-103. In his memoirs, Brüning (1970, pp. 503–504) mentioned that even though Wagemann was a "smart and ingenious man", he couldn't trust his judgment anymore. An important reason for Brüning's distrust was Wagemann's overly optimistic forecast of spring 1930 and his several negative revisions to the forecast over the next years. The revisions interfered with Brüning's budget planning and contradicted the government's positive outlook on the economy (Meister, 1991, pp. 172–208; Tooze, 2001, pp. 159–160).

[34] Former president of the Reichsbank Hjalmar Schacht lauded Wagemann for his distinction between the circuit of consumption and production (Meister, 1991, p. 348). Wichard von Moellendorff (1932) made the distinction between different types of money the main argument in favor of the Wagemann plan. Landauer (1932), remarked the distinction but still felt that Wagemann's plan was inflationary.

7.2.3 Re-interpreting the ABC Barometer

A second consequence of the blood circuit analogy was Wagemann's reinterpretation of the ABC barometer. In its standard interpretation by the Harvard Committee, the ABC barometer suggested a strict sequence such that the A curve preceded the B, and the B curve preceded the C curve (Persons, 1919). As Morgan (1997, pp. 70–73) explained, Persons and Bullock interpreted the three curves as "symptoms" or "phenomenological regularities" by which the economic development could be forecasted.

In the very same way, Wagemann first hoped to be able to forecast the economy by the typical regularities of the three curves. In the first issue of the *Quarterly Journals* in 1926, Wagemann noted that the typical A-B-C sequence had been most pronounced in the pre-war period (1893-1913) and repeated itself twice over the period of 20 years. Although the curves showed shorter lags in the 1920s, the barometer remained useful and became the basis of Wagemann's economic forecasting. Wagemann noted that the curves revealed the "symptoms" (*Bewegunssymptome*) and created a "clinical picture" (*Krankheitsbild*). In his view, the barometers were much better suited to study the business cycle than the deductive theories that seek to find the pathogens before identifying the symptoms.[35]

Things began to change in late 1926, when Wagemann introduced the monetary circuit model as the basis for his forecasts with the barometer. Figure 23 shows Wagemann's ABC barometer of mid-August 1926. The charts show the constellation of the three curves for the German economy during the depression of 1926. Unlike the Harvard Committee that displayed the ABC curves in long sequences, Wagemann zoomed in on the curves to get a better picture of the delicate movements. The terms "symptom" and "clinical picture" disappeared. Instead, Wagemann (1927, p. 18) created a "stylized chart" (*Schema*) of the barometer on the left that he used to examine the "factual" (*tatsächlich*) curves on the right.[36] The right-hand side combined the deseasonalized and detrended

[35] *VzK* 1926, 1 (Mai 1926), pp. 5-33. See also Wagemann (1928a, pp. 189–190).

[36] Wagemann's detailed explanations about his method of forecasting were published only in 1927. The text dates to July 1926 and was part of a speech given at the *Weltwirtschaftliche Gesellschaft zu Münster*. Wagemann probably used the charts in his speech, but in the text, they also show the movements of the curves until mid-August. Wagemann termed the right image the "factual" (*tatsächlich*) situation of the three markets. The term "factual" hides the fact that the three curves were heavily processed indices. They were aggregations of several weighted time series and adjusted for seasonality and trend. In Figure 23, the stylized curves are printed next to the image to explain the procedure for demonstration. In the *Quarterly Journals*, the stylized charts were expected to be known by the readership and were reprinted from time to time as reminders of the typical sequence.

index of stock and bond prices (*Effektenmarkt*, A), the commodity price index (*Warenmarkt,* B), and the index for interest rates (*Geldmarkt*, C).[37]

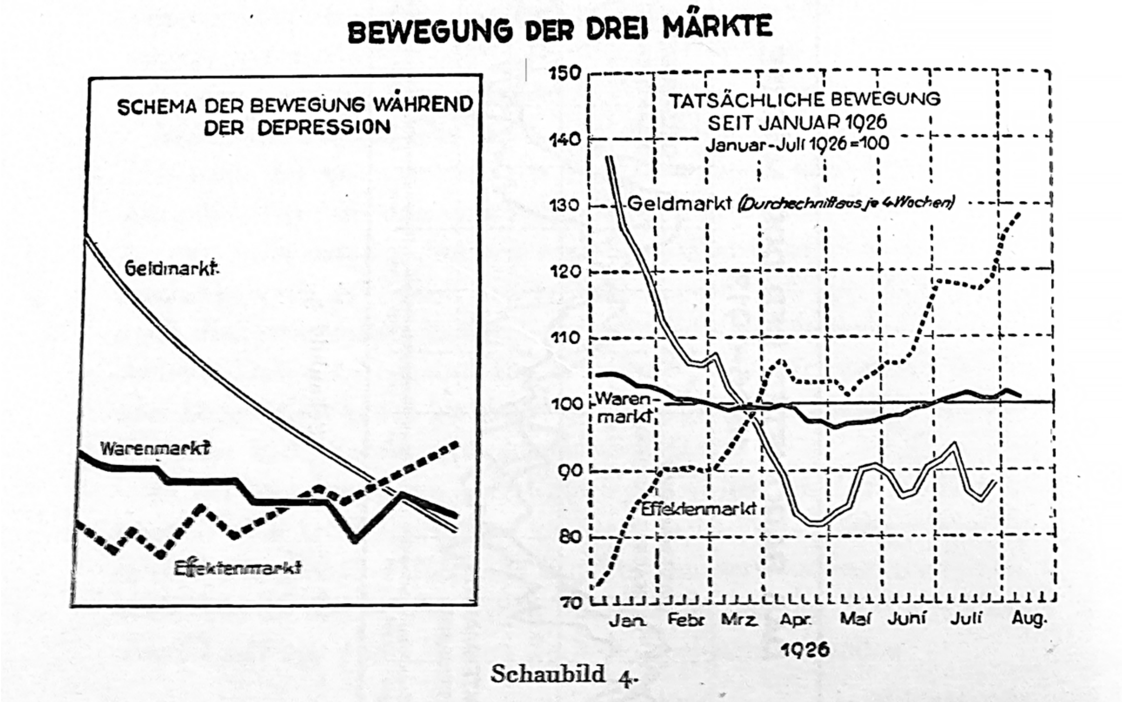

Figure 23: The "Movements of Three Markets"—The German ABC barometer. Source: Wagemann (1927, p. 18).

Wagemann (1927, p. 19) explained that the "factual movement" (*tatsächliche Bewegung*) of the economy on the right showed the typical constellation of a depression depicted on the left. The money market (*Geldmarkt*) was very "liquid", the stock market (*Effektenmarkt*) pointed slightly upward, and the commodity market (*Warenmarkt*) showed "slight activities". The stock market curve pointed upward because it started to fill up with capital that flowed in from the money market. An upward movement of the stock market indicated that the next period of the cycle began. The upswing would set in when capital from the stock market flowed to the commodity market. Hence, Wagemann (1927, p. 19) concluded that the economy was in the "second phase of the depression" and would soon enter into the phase of the upswing.

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[37] The money market curve (*Geldmarkt*, C) in Figure 23 is depicted as an inverse index of bond prices. Because of the inverse relationship between bond prices and their yield, the inversed C curve depicts the level of the market's low-risk interest rates. See Däbritz (1929, p. 20) for an explanation. A falling C curve thus meant falling interest rates. The interpretation of the C curve is exactly the opposite when depicting the C curve as an inverse of the discount rate. Wagemann did so when he followed the Harvard Committee by investigating the curves from a further distance. In charts that show the ABC sequence between 1893 and 1913, for example, the C curve is high when interest rates are low, because it should represent the high liquidity of the money market. See *VzK*, 1926, 1 (Mai 1926), p. 19.

Wagemann (1927, p. 18) noted that the idea of capital and money "flowing" from one market to another was only a "visual expression" (*bildhafter Ausdruck*). When on the one hand stock markets (A) rose, neither was the quantity of stocks increased, nor was the amount of available cash (C) diminished. It was simply an exchange between securities and currency. It is for this reason that Wagemann noted that the money market could remain liquid even when capital flowed to the stock market. When on the other hand producers invested in stocks rather than buying raw materials, capital was withdrawn from the commodity market and was tied up at the stock exchange. Through the stock market, capital flowed into the "passive sphere"—into the hands of those who do not invest their money in commodities.[38] The commodity market rose when producers sold their stocks and invested their money into commodities.

Though Wagemann forecasted the course of the economy by the typical A-B-C sequence, he held a different interpretation of the three curves than the Harvard Committee. Instead of the curves being "symptoms," he conceived of the curves as having a causal relationship. Money flowed in the circular bloodstream from market to market, which moved the curves sequentially. At the time, Wagemann was not alone with such an interpretation. One year earlier, the U.S. economist Karl Karsten (1891-1968) suggested a causal and vertical interpretation of the three curves, moving away from simply viewing the curves as symptoms.

Karsten (1926, p. 402) wanted to investigate the "direct and nearly simultaneous relationship" between the curves. Encouraged by his employer Irving Fisher, Karsten claimed to have found a causal link between the A and the B curves of the ABC barometer. Accordingly, the A curve represented a reservoir which was "controlled by the flow of money" evoked by the business condition (B). When the *inverted* B curve rose above its trend (representing bad business conditions), money flowed into the stock market (A) since it found better conditions to make a profit with shares The result was a higher "water-level" of A (Karsten, 1926, pp. 403–408). Thus, the B curve preceded

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[38] The notion of money being tied up in the stock market is very prominent in Lahn's (1903) description of the monetary circuit (See Appendix 2). Money could circulate without being productive. If stocks, or real estate were traded, the money market (black center) would register money being transacted without any additional stock being created. Lahn's idea built on the work of German economist Richard Hildebrand (1840-1918), an early opponent of the quantity theory of money. According to Hildebrand (1883, p. 39), in most cases a payment was not a "transport or change of location" of money, but only a change of ownership. Consequently, "all the mechanical and technological analogies are unfitting": the misleading term "rapidity of money" blurred the fact that the transfers between buyer and seller did not become faster, but only stated that more transactions occurred with the same amount of money within the same period.

the A curve in Karsten's new interpretation of the barometer.[39] Unlike the Harvard Committee, Karsten did not invert the C curve. Its level was caused by the cumulative demand for money by A and especially B (Karsten, 1926, p. 415). When the curves A and (in this case *non-inverted*) B rose above their trends, the demand for money surged, which resulted in higher interest rates and therefore a rising C curve.

Like Wagemann, Karsten gained a causal perspective by thinking about the flows between the markets. Yet, Wagemann (1930, 139-141) took issue with Karsten's claim that "finance capital represents a constant reservoir" and with his idea that "[e]very outflow of finance capital from one market must make itself as an inflow into another market". We have seen that Wagemann allowed for the possibility of the money market (C) remaining liquid even when capital flowed to the stock market. Wagemann (1930 112-113) also contended that despite capital being recurringly "withdrawn from the economic process of commodity production" by the stock market, this connection was "by no means rigidly predetermined". As described above, while Karsten claimed that the B curve preceded the A curve, Wagemann argued that producers could sell their stocks and buy commodities, which suggested a causal relationship from A to B. Hence, in Wagemann's eyes, money could flow both ways within the circuit that connected the three markets.

However, Wagemann's re-interpretation contradicted his model of the monetary circuit. Within the human blood circuit, and consequentially, within his circuit model, the streams only went in one direction. In Figure 21, Wagemann clearly indicated by the arrows that capital flowed in a sequence from stock (A) to commodity (B) to money market (C). In light of Wagemann's new claim that money could flow in both directions between the markets, the image did not fit anymore. In Hesse's (1966) words, what was once a "positive feature" between the statistical representation of the economy by means of the ABC barometer and the human blood circuit, turned into a "negative feature".

Wagemann noticed the issue and claimed in 1928 that the "mental picture" of the unidirectional flows of money, assumed a "different appearance" (1930, p. 111). To live up to his claim that money could flow in all directions, Wagemann adjusted the arrows in his depiction of the monetary circuit. In

[39] However, Karsten did not account for the movement of the B curve. It was merely the "generating force" (Karsten, 1926, p. 417). On Karsten's interpretation of the three curves, see also Boumans (2005, pp. 34–36)

Figure 24, where I reproduced Wagemann's altered version of the monetary circuit, the arrows point in both directions.[40]

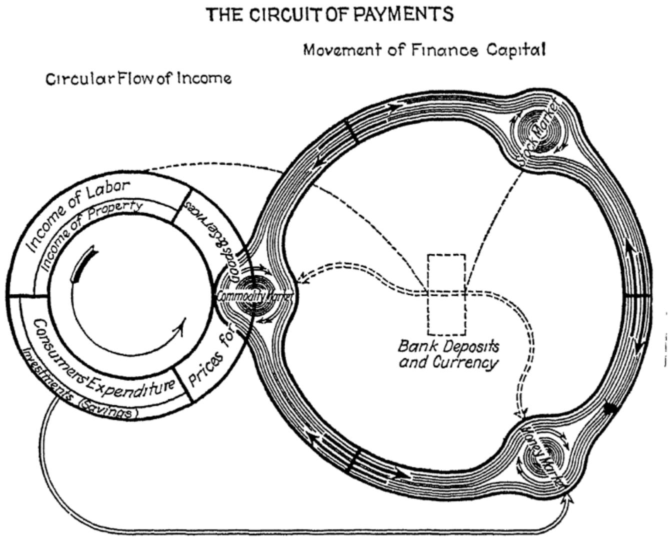

FIG. 2.

Figure 24 Wagemann's circuit model with arrows pointing in both directions between the three markets. Source: Wagemann (1930, p. 46).

The negative feature forced Wagemann to rethink his model and adapt it according to his new conviction that money could flow in both directions between the three markets. A further reason for Wagemann's decision to adjust his model was that the typical sequence of the Harvard barometer lost its empirical proof. By early 1927, Wagemann knew that the ABC barometers had already failed to forecast the course of the U.S. economy, which might explain why the ABC barometers receded

[40] I decided to reproduce Wagemann's circuit model from the English translation of his 1928 book on Business Cycles to make it easier for English readers to grasp the model. Apart from the English terms, the circuit model is the same as in the German original (Wagemann, 1928a, p. 41). Wagemann already altered the arrows in September 1926 as can be seen in his depiction of the circuit model in the *Quarterly Journals*. See *VzK* 1926, 3 (19. November 1926), p. 10. I preferred to take the later model, because it includes the arrow from "Investments (Savings)" to the "Money Market", an addition that I believe Wagemann took over from Lahn (1903).

noticeably into the background of his quarterly forecasts.[41] In the fourth issue of the *Quarterly Journal* in early 1927, Wagemann based his main diagnosis of the economy on a set of charts of the monetary side (prices, interest rates, share prices) and time series of the commodity sphere (production and inventories).[42] Throughout the year 1927, Wagemann occasionally used the ABC barometer when he saw fit, but mostly relied on other statistics and charts in his economic forecasts. Yet, he still believed in late 1927 that they showed the typical sequence in Germany.[43]

Eventually, the unreliability of the ABC barometer became apparent in early 1928. In November 1927, Wagemann claimed that the commodity market should soon follow the stock market's downturn of May 1927. Quite opposite to what Wagemann expected, commodity prices did not fall—a development that was also noticed by Wagemann's backers.[44] Walther Schreiber (1884-1958), the Prussian Minister of Trade and early supporter of the IfK, remarked that the forecast "did not materialize" (*nicht eingetreten*).[45]

By 1928, Wagemann (1928a, p. 114) noted that the barometer did not sustain its typical A-B-C sequence anymore and, as a result, was no longer able to forecast the course of economy. Yet, Wagemann was not dumbstruck by its failure. In his view, the limits of the ABC barometer resulted from its "false methodological claims", that is, to attempt to "capture the totality of the economic

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[41] Wagemann believed that in the U.S., anticipating entrepreneurs who used the barometer disrupted the chronological sequence, conflated the A and B curve, and thus rendered the barometer useless. See *VzK* 1926, 4 (21. Februar 1927), p.5. One can claim that Wagemann believed in what Donald MacKenzie (2006, p. 15) has termed "performativity in economics". The Harvard Committee had been struggling with the unreliability of the ABC sequence since at least 1922 and had to renew the interpretation of the curves (Lenel, 2018, pp. 398–405). The irregularity of the sequence also explains Karsten's (1926) efforts to interpret the curves vertically. In early 1928, the three curves of the U.S. economy dispersed so widely that the typical sequence could not be recognized anymore. The resulting inability to forecast based on the A-B-C sequence led to the discontinuation of the Harvard barometer in 1931 (Friedman, 2014, pp. 157–163).

[42] *VzK* 1926, 4 (21. Februar 1927), pp. 5-28.

[43] See GStA PK, I. HA Rep. 120, Nr. 33, Bd.1, p. 124.

[44] As the ABC barometer of early 1928 shows, the commodity prices continued to rise. See *VzK* 1927, 2, 4 (25. Februar 1928), p. 9. For the forecast of November 1927, the ABC barometer already played a less central role. See *VzK* 1927, 2, 3 (30. November), pp. 20-21.

[45] Schreiber received the minutes of the IfK's governing board as they were sent to Ministry of Trade and Commerce (*Ministerium für Handel und Gewerbe*). In the minutes of November, Wagemann explained again his forecast and that he expected the commodity prices to fall. Schneider noted next to the forecast, that it "did not materialize" (*nicht eingetreten*). See GStA PK I. HA Rep. 120, Nr. 33, Bd.1, p. 124. It seems as if the wrong forecast did not change Schreiber's positive assessment of the IfK as he still permitted funding of the IfK in early 1928 (GStA PK I. HA Rep. 120, Nr. 33, Bd.1, p. 134).

movement as a general barometer". Wagemann (1930, p. 9) believed that the ABC barometer was part of:

> "The American type of business service [which] is characterized […] by the fact that it treats economic life as essentially a mechanism, a powerful piece of machinery the course of which can be represented and foretold with the aid of mathematical methods of calculation, in such a manner that, in the last resort, it can be expressed within the limits of a simple formula."[46]

Wagemann (1930, pp. 130–131) maintained that "business, like all other vital processes, cannot be compressed within the limits of a single formula" and could not be comprehensively described by laying bare a single "cross-section" [*Querschnitt*] of the dynamic process of the economy". Instead, economists needed numerous sections taken both crosswise and lengthwise afforded by a "multiplicity of barometers". Wagemann continued to use the ABC barometer during the next years within the framework of what he called a "barometer system". We will encounter this system in the next chapter. What remains to be shown here, is the difficulty Wagemann posed for himself when he claimed that money could flow in all directions between the three markets.

Recall that Wagemann mainly struggled with Karsten's idea that the causal relationships between the three markets are "rigidly predetermined". Karsten's vertical and causal reading of the ABC barometer, by contrast, did not provoke any reaction on the part of Wagemann.[47] In Wagemann's interpretation of the ABC barometer of late 1928 (Figure 25), the lags between the curves (the horizontal sequence) became irrelevant.[48] Instead, Wagemann focused on the vertical movements of the curves and speculated whether their movements were interconnected. Wagemann first noted that

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[46] In the German edition, Wagemann (1928a, p. 8) claimed: "*Dieser amerikanische Typus des Konjunkturdienstes ist dadurch gekennzeichnet […], daß er das Wirtschaftsleben in der Hauptsache als Mechanismus, als gewaltiges Maschinenwerk betrachtet, dessen Gang mit Hilfe mathematisch-rechnerischer Methoden dargestellt und vorausberechnet werden kann, derart, daß er sich schließlich in eine Einheitsformel bannen läßt*". As Friedman (2014, pp. 109–110) noted, also U.S. economic forecaster John Moody (1868-1958) criticized the Harvard Committee for their "mechanical" interpretation of the curves. Like Wagemann and U.S. statistician Roger Babson (1875-1967), Moody believed that there was no exact equivalence between the ups and downs. Charles Bullock and William Leonard Crum (1894-1967) from the Harvard Committee thought at times that they needed a stricter "mechanical reading" of the three curves. Yet, when such reading was needed to accurately predict the Great Depression, they "doubted what they were seeing" (Friedman, 2014, p. 161).

[47] See, for example, Wagemann's (1928a, p. 99) vertical comparison between the A and the B curve, which he described as the "thread of capital" between the two markets.

[48] *VzK* 1928, 3, 3 A (28. November 1928), pp. 7-8.

the money market (*Geldsätze, saisonbereinigt*) pointed downwards as of mid-1928. The downward sloping money curve indicated falling interest rates, which, according to Wagemann, could be caused by lower demand for shares.[49] Yet, as the share price index (*Aktienkursniveau*) indicated, share prices did not fall, but remained more or less constant. Hence, the falling interest rates were more likely the result of reduced business activity (production, employment, inventories) indicated by the downturn of the index of sensitive commodity prices (*Reagible Warenpreise*). From this analysis, Wagemann concluded that the lower business activity in late 1928 was not a sign of a crisis, but only a continuation of a slow decline.

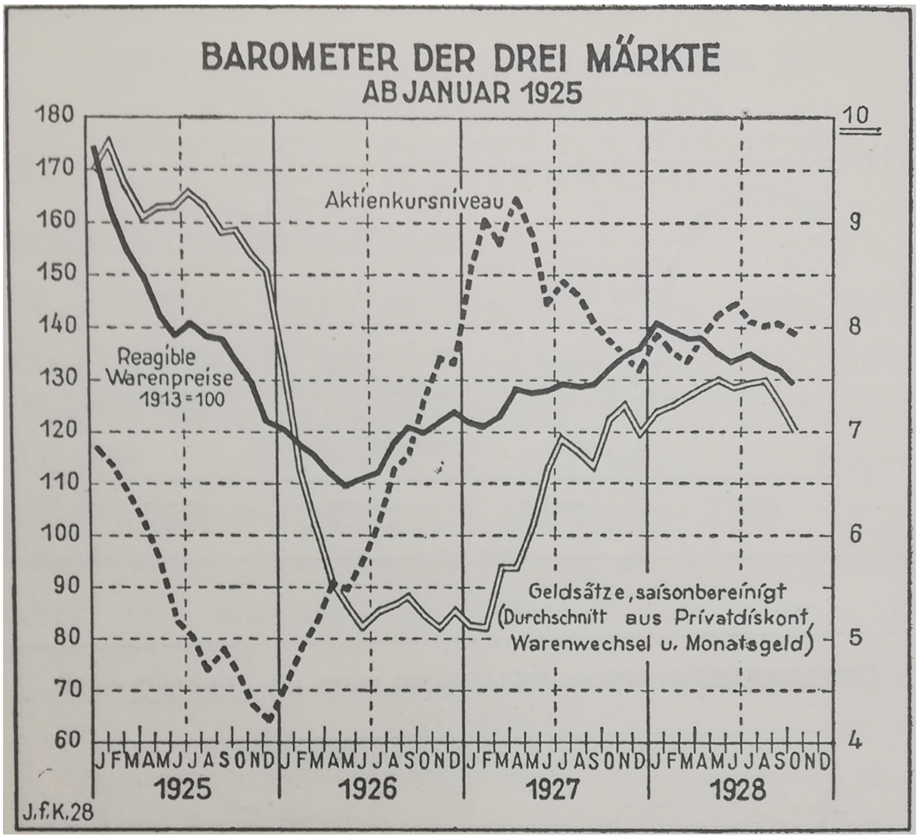

Figure 25: The German ABC barometer in late 1928. Source: *VzK* 1928, 3, 3 A (28. November 1928), p. 8.

One cannot fail to notice that Wagemann's interpretation of the ABC barometer did not differ substantially from Karsten's. Wagemann gave clear priority to the commodity market and did not ponder on why its curve declined. Activity in the money market (*Geldsätze*) resulted from activity in the stock market or the commodity market. Wagemann did not elaborate on whether the money market swayed the activities of the other two markets. Thinking of the two-way arrows in his

[49] This positive relationship between share prices and interest rates was suggested by Karsten (1926, p. 415), who considered the level of the C curve to be the "resultant of the demand for money". It is the opposite of Wagemann's (1928a, pp. 98, 211) notion (and conventional wisdom) that interest rates and share prices are inversely related.

monetary circuit (Figure 24), Wagemann would have had at least 8 different ways to think about the causal relationships between the markets, yet he chose to almost exactly follow Karsten's interpretation by defining the commodity market as the main cause of the economic movement.[50]

We will see in the next chapter, that the very issue described above haunted Wagemann throughout the late 1920s. By 1928, Wagemann assumed that no causal relationships between economic variables were predetermined. Instead, economic variables were only functionally connected, by which Wagemann meant that causality could run both ways between them. However, when trying to forecast the course of the economy, one-way causality always remained an issue. Wagemann had to select a leading indicator that caused the movements of other time series, or at least give one economic variable priority. This problem was not limited to the ABC barometers, but also arose with an extended set of barometers that Wagemann developed over the years. Aware of the difficulty of evading causality when interpreting relationships between economic time series, Wagemann searched for new ways to diagnose the economy and forecast its course following the directive of an "organic-biological principle".

7.3 Conclusion: from circular flow toward a functional theory

In this chapter, we have seen that Wagemann came into contact with biological analogies through a different "positive feature" than "variety". Wagemann borrowed the image of the human blood circuit in order to combine his own monetary theory with existing pieces of economic knowledge. Starting from Fisher's quantity theory, Wagemann developed his own equation of exchange based on the balance sheet analogy. To take into account his conviction that money is in perpetual motion, Wagemann resorted to the analogy of the human blood circuit and used it to construct a model of the monetary circuit. Since the human blood circuit consists of two separate circuits, it could be aptly combined with his accounting theory of money. While the balance sheet had two accounts that recorded the stocks of the economy, the human blood circuit had two circuits that represented the flows.

Despite Wagemann's claim that his borrowings from physiology did not extend much further than the visualization of two circuits, I have suggested that there were several elements of economic theory

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[50] I say at least, because, in principle, there are 26 different ways in which one can think of the three markets being causally related. If one allows for the possibility that one or two markets do not influence each other, there are 26 (3^3 -1) possibilities (excluding the possibility that none influence each other). In Figure 25, Wagemann established a causal link from the A and B curves to the C curve. The inverse was not true and, contrary to Karsten, the link between A and B remained unexplained.

that he built in his circuit model. The large circuit, for example, contained the three markets that the Harvard Committee had defined for the purpose of forecasting the course of the economy. The Harvard Committee used three curves in sequential order, which they interpreted as symptoms of underlying economic motions. At first, the idea of symptoms seemed to fit Wagemann's conviction that the economy was an organism that could be healed by economic experts. Yet, through the explicit physiological analogy, Wagemann gained a new understanding of the three curves. In his eyes, the three curves represented three markets within the circuit stream of money and capital. This mental image suggested that the three markets were causally linked through the stream of his circuit model.

Wagemann went a step further and suggested that money could flow in all directions between the three markets. Wagemann took issue with the strict causal interpretation between the three markets and wanted to replace it with a functional understanding. Yet, I argued that Wagemann was unable to go beyond the rigid causal explanation of the three curves by his contemporary Karl Karsten. Despite Wagemann's assurance that money flowed in all directions within the stream of the production circuit, in his forecasts, he had to choose a leading indicator that set subsequent economic variables in motion. As I will show in the next chapter, Wagemann aimed to find ways to build a barometer system that would do justice to the interplay between the manifold parts of the economy. For this endeavor, the "organic-biological principle" and his idea of taking aim at the "metabolism" of businesses proved to be central analogies.

Chapter 8 The Organic-Biological Principle and the Business Metabolism

In the second volume of the *Quarterly Journals* of 1926, Wagemann assessed the importance of exports for the German economy and estimated that only one-eighth of the total German workforce was connected to the export industry. Wagemann warned that attaching little importance to exports due to this insight would be the "same mistake as regarding the protein requirement of the animal organism as insignificant because it does not account for much more than ten percent of the total caloric intake".[1] Wagemann did not commit further to this specific analogy that echoes the "law of minima" by German chemist Justus von Liebig (1803-1873).[2] Yet, the example is telling how Wagemann endeavored to include any kind of statistics, however irrelevant it seemed to others, in his analysis of the economy.

Over the next two years, Wagemann became even more convinced that isolating economic phenomena from their larger context and reducing a collection of times series to one or two indices was wrong-headed. The failure of the Harvard barometers and the discontinuation of the "steel barometer" by his adversary business cycle economist Arthur Spiethoff in late 1928 assured him that reductionism in economics was to no avail. We have seen in Chapter 7 that the ABC barometer by the Harvard Committee could not live up to its claim to accurately forecast the course of the economy by means of three curves in sequential order. Likewise, Wagemann (1930, pp. 131–132) pointed out that Spiethoff's steel barometer was a "*reductio ad absurdum*" as it claimed to be able to forecast economic development by a sequence of merely two curves: the number of share issues that preceded steel consumption by several months.

Wagemann (1930, pp. 133–134) contended that such barometers put the part in place of the whole like a "medical theory" that claims to diagnose all physical ailments "from the condition of the eyes". Instead, Wagemann strove to create a "system of barometers which throws light from a number of angles on the whole business organism". To establish this system, Wagemann could rely on his

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[1] *VzK* 1926, 1, 2 (17. August 1926), p. 45.

[2] First popularized by German biologist Justus von Liebig (1803-1873), the "law of minima" meant that plants' growth is governed by those nutrients that are found in proportionally the smallest quantities in the soil (Mitscherlich, 1905, p. 249). As a result, one has to give the most attention to the smallest, or scarcest quantity. Wagemann specifically referred to the law only in 1954 when he highlighted that every single organ and function had to be nurtured regardless of size (Wagemann, 1954, pp. 117–120).

employees at the Statistical Office and the IfK who had to follow his conviction that the economy was a living organism:

> "The research work of the institute, like its observation of cyclical phenomena, is built up on the organic-biological principle—on the basic assumption that the economic system is a living organism, which has in common with the living organisms in the zoological and botanical worlds not merely the intimate interconnection of all its separate parts, arising out of the internal interdependence of its various functions. It also shares with them a peculiarity which may be defined as consisting in the power to regulate its own movement. This power has its immediate expression in an interplay of forces which is anything but mechanical, and which has in common with mechanical movement only the mere fact of movement association [*Bewegungsverknüpfung*]" (Wagemann, 1930, pp. 11–12).[3]

With Turpin's plant, and Humboldt's sketch that we encountered in the introduction, we have two images at hand that provide us with the pictorial representation of variety and the interconnection of separate parts. Wagemann did not bring to paper his image of the living organism. But, as we will explore in the following section, Wagemann compared his research to the work of botanists and his emphasis on the interdependence of the functions within the living organism resulted from his reading of German neovitalist Hans Driesch (1867-1941).

8.1 The Organic-Biological Principle and Hans Driesch's Vitalist Biology

Alluding to the emerging business cycle institutes around the world, Wagemann (1930, pp. 10–13) explained that the "American methods [were] those of engineering, the Russian those of astronomy".

[3] In the German edition, Wagemann (1928a, p. 10-11) explained: "*Wie die Konjunkturbeobachtung, so baut sich auch die Forschungsarbeit des Instituts auf dem organisch-biologischen Prinzip auf, auf der Grundanschauung, daß die Wirtschaft ein lebendiger Organismus ist, der mit der tierischen und pflanzlichen Lebensgestalt nicht nur die enge Verbundenheit aller seiner Teile gemein hat, die sich aus dem innigen Zusammenwirken, dem Ineinandergreifen all seiner Funktionen ergibt; hinzu kommt namentlich auch seine Eigentümlichkeit, die man als die Autonomie der Bewegung bezeichnen möchte. Sie äußert sich zunächst in einem Bewegungsspiel, das alles andere als ein Mechanismus ist und diesem nur in der Tatsache der Bewegungsverknüpfung gleicht, gar nicht jedoch in der Art dieser Verknüpfung*".

But the German institute represented "the medical, or better, the organic-biological point of view".[4] Accordingly, the national economy was "an organism with an inner life the course of which can never be adequately interpreted by concentrating attention on a single point of its external surface". Specifically, the IfK was guided by the "organic-biological principle", which implied that:

1. "All parts of the economic system are interconnected in an intimate functional union; the system thus formed is closed and compact and is subject to its own laws."
2. "Influences from outside, whether they proceed from non-economic spheres or from foreign economic organisms, affect the system simply as stimuli, which trigger movements of their very own law in the observed economic organism."[5]

When introducing the organic-biological principle, Wagemann (1930, p. 11) did not refer to Schäffle or Sombart, but to Carl Menger, of all people. We have encountered Menger in Chapter 2 as an adherent to the subjective theory of value who aspired to reduce variety to individual decision-making. However, Menger (1883, p. 139) also admitted that it is "obvious that a certain analogy […] exists between the nature and functioning of natural organisms and those of social structures". In particular, Menger observed in "organisms an almost impenetrable complexity of detail and […] a great variety of parts (or individual organs)" that also applied to "social phenomena". Just as attractive for Wagemann, who was critical of state intervention, seemed to have been Menger's claim that both

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[4] Wagemann's description of the U.S. and Russian approach to business cycle research was not unfounded. As shown in the previous section, U.S. economists like Irving Fisher, Foster and Catchings and Karl Karsten understood themselves as engineers who often resorted to the methods of physics. Russian economist Eugen Slutzky from the Moscow Institute for Business Cycle Research used mathematical methods from astronomy. In an article that appeared in Russian in 1927, Slutzky (1937) investigated the possibility of random fluctuations as the source of the business cycle. Mathematical methods by physicist and astronomer Arthur Schuster (1851-1934) were crucial in his calculations. As the special issue on Russian economic research (*VzK* 1929, *Sonderheft* 12) shows, Wagemann was well informed about the developments at the Moscow Institute.

[5] I took over the first part of Wagemann's definition of the organic-biological principle from the English translation (Wagemann, 1930, p. 13). I altered the second part based on the German original (Wagemann, 1928a, p. 12) because the English translation ignores Wagemann's emphasis on "own laws" (*eigengesetzliche Bewegung*). In the English translation, the second part states: "Influences from outside, whether they proceed from non-economic spheres or from foreign economic organisms, affect the system simply as stimuli, which cause to be set in operation the forces inherent in the economic organism under observation". In the German original, Wagemann (1928a, p. 12) defined the organic-biological principle as follows: "*1. Alle Teile der Wirtschaft stehen in enger funktioneller Verbundenheit. Sie bilden ein geschlossenes System, das eigenen Gesetzen unterworfen ist. 2. Einwirkungen von außen, sei es, daß sie aus nichtwirtschaftlichen Bereichen, sei es daß sie von anderen Wirtschaftskörpern stammen, wirken lediglich als Reize, die in dem beobachteten Wirtschaftsorganismus eigengesetzliche Bewegungen auslösen*".

in biological and social organisms, the "adaptation of all parts in relation to the whole" did not result from "a deliberate striving", or "positive legislation". Wagemann's (1930, pp. 11–12) belief in self-regulation reflected itself in his assertion that the "economic system is a living organism" that has the power to "regulate its own movement", which was "endogenous".[6]

Next to Menger, Wagemann (1930, p. 13) referred to his contemporary biologist Hans Driesch (1867-1941). Driesch studied under Haeckel in the late 19th century and turned into a popular neovitalist in the early 20th century.[7] Through his research on cell division in the 1890s, Driesch attained great fame because his experiments contradicted the hypothesis of a mechanistic and deterministic development of organisms that had been promoted by German biologist Wilhelm Roux (1850-1924). According to Roux (1890), who also studied with Haeckel, organisms were subject to "developmental mechanics" (*Entwicklungsmechanik*) that were determined from the start. Through his experiments with frog cells, Roux was convinced that the different parts of an organism obtained their structural form and function at the first cell division. Roux destroyed one of the first two cells after the initial cleavage with a hot needle and could then observe how the remaining cell developed into a half-embryo.[8]

Driesch did not agree with Roux's claim that only the first stage of development decided about the later organism. In Driesch's (1905, p. 189) terminology, the "prospective potency" of the cell was "not constant, but variable". With the help of his drawings of cells that I reproduced in Figure 26,

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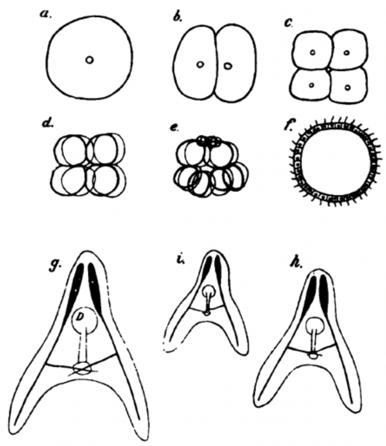
[6] As in the case of the blood circuit analogy, the "organic-biological principle" also had a political component. The "own laws" of the economy, and the "influences from outside" were used by Wagemann to express his beliefs in an endogenous business cycle. Accordingly, the "diagnoses and forecasts by the IfK were so far always made in complete disregard of exogeneous moments" (Wagemann, 1928b, p. 1252). Endogeneity meant for Wagemann that the German economy was only insignificantly influenced by foreign economic developments. Changes on the foreign credit market were "of random character" for the German economy. Therefore, the crisis of October 1925, for example, was not influenced by the inflow of foreign capital (*Dawes-Anleihe*) but was a "throughout local German process". Likewise, the upswing of 1926 resulted from "an inner balance of power", and not from the English coal strikes. Furthermore, endogeneity could be used to downplay the effects of a self-fulfilling prophecy by the IfK's forecasts. As Walther Däbritz of the IfK's Western Department explained in response to criticism from industrialists, the cycle could not be "made at will". See "*Gefahren der Konjunkturforschung für die Konjunktur?*", in *Deutsche Bergwerks-Zeitung*, 215 (14. September 1927), p. 1.

[7] On Driesch's popularity during the Weimar Republic and the Third Reich, see Harrington (1996). Harrington convincingly argued that Driesch's holistic biology offered a fund of metaphors that were easy to ally with the Nazi cause. Still, Driesch was one of the first non-Jewish German professors to be forcibly retired. As a pacifist, Driesch spoke out against militarism and the infusion of politics with biology. Driesch repeatedly remarked that his vitalism had nothing to do with mysticism or glorification of unreason, later of which he saw in academics' preoccupation with "feeling", "drive", and "instinct" (Harrington, 1996, pp. 188–193).

[8] On Roux's *Entwicklungsmechanik*, see Kirschner (2005).

Driesch explained that Roux's insight did not hold when experimenting with sea urchins. When detaching the first two cells of a sea urchin (b.), Driesch observed that two fully functional, albeit smaller, sea urchin larvae (*Plutei*) developed (i.). The two cells were not predetermined to turn into each half of the organism, but every cell could potentially become any part of the body. Thus, the function of a cell was not determined at the early stage, but by its position in the whole organism. As a result of his experiments, Driesch came to believe that organisms possess a non-materialistic inner force (entelechy) that formed them. Driesch thus gave new credence to vitalism in biology.



Figur 1. Aus der Entwicklung des Seeigels (Echinus microtuberculatus).
a—e Ei und Furchungsstadien bis zu 16 Zellen; f Blastula im optischen Schnitt; g—i Umriß des „Pluteus" aus dem ganzen, halben und viertel Ei. Alles ist schematisiert. Die Figuren a—f und g—i sind je in gleichem Masse vergrößert, letztere zumal geben also eine richtige Vorstellung der relativen Größen. In die Plutei (g—i) ist Darm (D) und Skelett (S) eingezeichnet.

Figure 26: Hans Driesch's drawings of sea urchin cells and their development. Source: Driesch (1905, p. 186).

Wagemann (1928a, p. 12) only mentioned Driesch's popular books *Philosophy of the Organic* (1909) and *Theory of Order* (1923) when he stated that the "adequate logic of organic processes should be transferred to our discipline".[9] Yet, passages from Driesch's *Philosophy of the Organic* (1909) are easy to find in the paragraphs where Wagemann introduces the organic-biological principle.[10] Driesch (1909, pp. 191–192) used the term "functional harmony" to describe the interrelations between organs. Accordingly, the "functioning" of an organ was not only related to itself but was concerned with the effect it had on the performance of other parts, or the whole organism. This idea

[9] I translate here from the German edition, where Wagemann (1928a, p. 12) explained: "*Es handelt sich lediglich darum, die den organischen Vorgängen adäquate Logik bis auf weiteres in gewissen Teilen auf unsere Disziplin zu übertragen*". In the English translation, Wagemann (1930, p. 13) stated: "I propose until further notice to apply, in part, the system of reasoning proper to organic subjects to the study of business cycles".

[10] Wagemann (1928a, p. 12) referred to the second edition of Driesch's *Philosophy of the Organic* (1921).

can be found in Wagemann's (1928a, p. 10) claim about the "interlocking" (*ineinandergreifen*) and "intimate interaction" (*inniges Zusammenwirken*) of all the functions of the parts.

Driesch (1909, p. 100) also criticized physicists for reducing causality to constant relationships by "mathematical functions". In Driesch's definition, the "cause" (*Ursache*) of an event was the "sum of all constellations of factors that must be satisfied for the event to occur". Similar statements can be found all over Wagemann's work. Wagemann (1928a, p. 8) opposed "single formula" (*Einheitsformeln*), "causal monism" (*Kausalmonismus*) and "monism of explanation" (*Erklärungsmonismus*). For Wagemann (1931, pp. 340–341), the Great Depression in the U.S. had to be explained by the discrepancy between consumption and production (*Unterkonsumptions- oder Überproduktionstheorie*). However, Wagemann emphasized that this discrepancy could only occur due to the larger circumstances in the world economy that affected the movement of commodities, capital, and their interrelationships. Finally, Wagemann (1928a, p. 11) added to the second part of the organic-biological principle (the conviction that external stimuli trigger an autonomous movement of the economy), that one could not determine a calculable equivalence between external influence and interior movement. A similar statement can be found in Driesch's (1909, p. 102) discussion of "stimuli" whose results were never quantifiable.

Wagemann has been repeatedly accused by his contemporary economists of following a non-theoretical, or purely inductive approach. For many, the modern statistical business cycle research by the IfK, was only "describing" the economy (Schneider, 1928a; Lutz, 1932, pp. 126–137), continuing the tradition of the "historical schools" (Peter, 1930, p. 49), and upholding an "aversion to the specific theoretical approach in business cycle research" (Stucken, 1929, p. 144).[11] Even Austrian economist Emanuel Hugo Vogel (1875-1946), who shared Wagemann's skepticism towards business cycle theories and expanded Wagemann's double circuit approach, believed that the IfK's work was merely "inductive" (Vogel, 1929).[12] Austrian corporatist Walter Heinrich (1928, pp. 160, 181) observed that Wagemann used "automechanism" (*Automechanismus*) to describe the endogeneity of the business

[11] Most of these critics were much harsher than Schumpeter's review of Mitchell's *Business Cycles* in which Schumpeter (1930, p. 154) mainly blamed Mitchell for not using a theory as an "analytical engine".

[12] Vogel's assessment is surprising as he expanded Wagemann's blood circuit model two years prior to the review. See Vogel (1927, p. 54).

cycle and concluded that Wagemann adhered to a mechanical understanding of the economic movements.[13]

These critics overlooked the influence of Hans Driesch and the organic-biological principle on Wagemann's theory of business cycles. German economist Albert Wissler (1904-1957), who worked at the IfK, was aware of Driesch's influence on Wagemann's research. Yet, Wissler (1954, p. 15) remarked that Wagemann had a certain "attitude" of the "old times" and indulged in "romanticism", which had no place in the "modern scientific work". Wissler (1953, p. 451) also claimed that later research on the economic circuit gave more "precision" to Wagemann's "vitalist images (*Driesch'*s)". Only Wagemann's colleague Günter Schmölders (1903-1991) drew attention to the organic-biological principle and the emphasis on functional connection it implied.[14]

Wagemann probably would not have minded replacing his models with more 'precise' ones if they had proven useful, for he did not cling to biological analogies out of romantic conviction. Wagemann (1930, p. 13) asserted that the organic-biological principle "proved itself very useful for practical purposes", while adding that there was "no telling whether at a later stage of investigation it will be necessary to abandon it". However, as we will see in the following sections, Wagemann never abandoned the organic-biological principle. Quite to the contrary, Wagemann strengthened his aversion against causal monism over the years and explored new approaches to do justice to his organic-biological principle.

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[13] See also Wagemann's (1928, p. 11) reply to Heinrich. Wagemann left it open if the business cycle was endogenous or caused by external stimuli. That Jan Tinbergen strongly advocated the endogeneity of the business cycle based on mechanical grounds was therefore not owed to Wagemann, but rather due to one of Wagemann's employees, Arthur Hanau. Hanau had shown that what he called "hog cycle" (*Schweinezyklus*) could be explained endogenously. On Tinbergen's endogenous cycle and his borrowings from Hanau, see Dekker (2021, pp. 86, 125–128).

[14] Schmölders (1934, p. 33) interpreted Wagemann's emphasis on the stimuli that trigger movements, as a business cycle theory that built on "psychological factors" like Pigou's *Industrial Fluctuations* (1927). However, Wagemann (1928a, p. 167) did not intend to find psychological laws, as "resorting to the 'psychology' of the economic subjects" would equal the "abandonment of economics as an independent science".

8.2 Rejecting Causal Monism

In the 1920s, economists were far from united in their explanation of the business cycle.[15] Yet, many agreed that searching for the initial cause of the cycle was necessary to improve economic forecasting.[16] Wagemann (1930, pp. 17–18, 253–254) did not see much value in the search for causes and argued that even economists who agreed that monetary elements were the driving force behind the cycle, contradicted each other, or ended up in a circular argument. Pointing to the collection of essays on business cycle theories edited by German economist Karl Diehl (1864-1943), Wagemann (1930, pp. 14–15) remarked that contradictory statements were omnipresent.[17] It remained highly controversial, for example, whether interest rates determined the volume of credit, or vice-versa.

Wagemann also pointed to an essay by his former colleague Adolf Löwe who had drawn attention to the widespread circular arguments among business cycle theorists (1926). In many explanations of the course of the cycle, the depression itself created a low rate of interest, which in turn spelled the end of the depression and led to prosperity. Prosperity then caused the interest rate to rise to such unsustainable heights that it led to a collapse with an ensuing depression. In short, the depression eventually caused the rise in the interest rate that subsequently caused the depression. While economists like Wagemann's employee Arthur Hanau (1902-1985) and Dutch economist Jan Tinbergen (1903-1994) regarded this circularity as a possibility to create endogenous and mathematical models of the business cycle, Wagemann (1930, p. 254) considered that such findings

[15] As Wagemann's contemporary Günter Schmölders (1990, p. 112) explained, refraining from a business cycle theory in the 1920s was also a strategic decision. There were "six or seven different theories of the business cycle" in the 1920s. In such an atmosphere of competing opinions, it "would have been too dangerous if the young *Privatdozent* Wagemann felt the need to palm off a new business cycle theory on the older generation of economists". Like Wagemann, Stucken (1929, p. 146) noted, there existed not even consensus among those economists who agreed on a monetary explanation of the business cycle. See also Burchardt (1928) for an overview of the variety of monetary business cycle theories in the 1920s.

[16] The importance of causality was most prominently voiced by Irving Fisher, Karl Karsten, Arthur Spiethoff, but also Emanuel Hugo Vogel (1927, pp. 46–47), David Francis Jordan (1921, p. 5). See also Sommer (1929, pp. 263–269) on the importance of causality in forecasting. As Schneider (1928, p. 691) noted, in the late 1920s, there were either "logical-causal", or "symptomatologic" approaches to forecasting. Former would encompass Irving Fisher and Norman J. Silberling (both quantity theory), Arthur Spiethoff and Emil Brezigar (both overproduction of the means of production), or Lewis Henry Haney (elasticity between prices and volumes).

[17] The book was a collection of essays by prominent business cycle economists within the scope of the *Verein für Socialpolitik* (Diehl, 1928).

called for a "functional theory" and a thorough inductive investigation "on similar lines to biology" (Wagemann, 1930, p. 13).[18]

In early 1928, Wagemann ushered in a new era of economic forecasting that went beyond the investigations of symptoms. Wagemann claimed that the IfK had established the "fundamentals of business cycle symptomatology" and could now investigate the functional dependencies between different time series.[19] Wagemann hoped that over time, these efforts would result in a "functional theory" of the business cycle. Wagemann (1930, p. 219) asserted that, if at all, causes were to be found only at the end of a thorough investigation of these functional relationships. At first, the economist had to see through the interconnection (*Verknüpfung*) and interlacing (*Verflechtung*) of the different movements of the curves "on purely symptomatologic lines". In a next step, he had to establish an "internal functional interrelationship between movements". Finally, to determine causes he had to "take a step further and to select one […] of those phenomena as primarily determinant or to refer the whole complex of interrelated phenomena back to some quite separate underlying cause."[20]

An analysis of "business symptoms", for example, would start with recognizing that home trade stagnated, foreign trade slightly increased, money markets were liquid, and unemployment was high. If these "constellations" had an "inner connection", they were in a "functional connection" (Wagemann, 1928a, p. 191).[21] Wagemann did not explain in detail how he could know which of these ever-changing variables had an inner connection to each other. To a large extent, it must have been Wagemann's years of experience as a statistical economist that allowed him to know which time series moved in conjunction with, in opposition to, or independently of each other. These relationships were also constantly changing due to the organization of the economy, political decisions, and social

[18] Wagemann's "functional theory" has only little in common with Austrian economist Karl Polanyi's (1886-1964) "functionalist theory of society" (*funktionelle Theorie der Gesellschaft*) elaborated in the early 1920s. For Polanyi (1922, p. 403), the "functionally organized socialist transitional economy" (*Ein angenommener Typus einer funktionell organisierten sozialistischen Uebergangswirtschaft)* consisted of a "democratic system of representatives" (*demokratisches Vertretungssystem*) that met at a "congress as a functionalist association of the whole industry and other official branches […] on the same footing as the commune".

[19] According to Wagemann, the IfK had established the "fundamentals of business cycle symptomatology" (*Grundlagen der Konjunktursymptomatik*) in 1928 and could now venture into the investigation of functional dependencies. See *VzK* 1927, 2, 4 (25. Februar 1928), p. 3.

[20] This "further step" of selecting the primary phenomena is similar to Tinbergen's (1967, pp. 30–31) "causal ordering" of equations to arrive at a "logical structure" in the system of mathematical equations.

[21] I quote here from the German original because the English translation obscures Wagemann's explanations.

habits. Consequently, Wagemann had to be well aware of any of the national and international factors that could alter the interpretation of the curves.

In certain cases, Wagemann (1930, p. 202) also calculated correlations between two time series to measure their interrelationships, for example between the prices of raw materials and semifinished goods, or between the employment level and the prices of consumer goods. Wagemann (1941a, pp. 122–125) maintained that correlation coefficients might help to discover certain hidden (linear) relationships, but voiced concerns about their usefulness in analyzing dependencies between time series. Wagemann (1941a, p. 125) noted that correlation coefficients had been developed for comparing the variability within data sets. They were helpful in biology, for example, because the "arrangement of the elements" was irrelevant in the "comparison of certain traits of a plant species".[22]

By contrast, in business cycle research, the data consisted almost entirely of time series which meant that temporal sequences mattered. Yet, correlation coefficients reduced the movements of two time series to one simple coefficient.[23] The coefficient did not allow the economist to investigate the horizontal relationship (lag), or vertical distance (tension), between the curves nor could he interpret the shapes of the curves. With curvilinear (=non-linear) relationships, for example, a U-shaped relationship, between two time series, the correlation coefficient was misleading. Hence, Wagemann (1941a, p. 122) doubted that "the mathematical methods really allow to look deeper into the connections of reality than the natural eye of the unimpaired human mind".[24] Like Mitchell (1927, pp. 265–266), Wagemann (1941a, pp. 126–127) doubted that Karsten's and Fisher's method of transforming and shifting curves to find the highest correlation coefficients between time series was of any help.

Wagemann's aversion to analyzing relationships by means of correlation was part of a greater skepticism towards the mathematical expression of relationships. Like Driesch, Wagemann held the view that mathematical functions were too reductionist and could not account for the apparent variety of economic phenomena. Wagemann (1931, p. 173) asserted, for example, that the interdependencies of the economy could never be reduced to "strict mathematical formulas". Yet, it is important to note that Wagemann only opposed a specific type of mathematical reasoning that reduced economic relationships to simple equations from which unidirectional causalities could be determined. As we

[22] By the reference to plants, Wagemann alluded to the biometric background to the development of correlation techniques. See Porter (1986) on the history of correlation coefficients.

[23] See Morgan (1997) for very similar arguments about the limits of correlation coefficients.

[24] Similar arguments can be found in Keynes' criticism of Jan Tinbergen's method of identifying direct causal relations (Boumans, 2019).

have seen, Fisher's equation of exchange represented one of such reductionist economic relationships. Another example was the estimation of demand functions as a (linear) relationship between quantities and prices.[25]

However, Wagemann and the IfK were at the forefront of econometric research in their application of mathematical methods to statistics. Wagemann's employee Paul Lorenz (1950, p. 421) professed that the IfK "made ample use of mathematical methods". From early on, Wagemann (1927, p. 6) stressed that forecasting was a "matter of the rational calculating mind". The time series gathered by the IfK had to be detrended and deseasonalized for their use in forecasting. With Hermann Hennig, Arthur Hanau, Paul Lorenz, and Otto Donner, the IfK had skilled statisticians and mathematicians who could deal with contemporary econometric questions. The IfK sponsored innovative research projects like the estimation of multiple linear regressions for the prediction of individual commodity prices, the explanation of short-term fluctuations of the discount rate, or novel approaches to trend calculation.[26] Wagemann did not innovate mathematical statistics, but he published two works on statistics and supported mathematical research throughout his career.[27]

From what we have learned so far, we know that Wagemann discarded single barometers, refrained from defining the main causes of the cycle, and avoided the calculation of correlations between statistical time series. Instead, he claimed to have teased out the functional relationships between a large set of statistical time series. How could he possibly forecast the economy by knowing about functional relationships? I have explained in the previous chapter that the ABC barometer receded into the background over the course of 1927 and only played a role (in a vertical interpretation of the three curves) as one of several indicators that Wagemann used in his forecasts.

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[25] We know from Lorenz (1950) that Wagemann was very critical of demand functions. There are however many cases in which employees of the IfK estimated supply and demand functions because they were interested in the price elasticities (of cotton, grain, and meat). As Boehm's (1950, pp. 413–416) overview of the IfK's mathematical methods shows, changing from an analytical to a numerical investigation of elasticities, however, also meant to make stringent assumptions (for example constant elasticities, or equating inventories (*Vorräte*) with supply).

[26] Hanau's famous study on the hog cycle has been published in the IfK's special issues (*VzK* 1927, *Sonderheft* 2, *VzK* 1928, *Sonderheft* 7). Donner's study on cotton prices was published as a special issue in 1930 (*VzK* 1930, *Sonderheft* 15). The same methods of multiple regressions used by Donner and Hanau can be found in Tinbergen's (1939) work on investment activity, where he referred to Otto Donner's mathematics. New methods to detrend time series were published by Lorenz in the special issues in 1928 and 1931 (*VzK* 1928, *Sonderheft* 9, *VzK* 1931, *Sonderheft* 21). Lorenz's Fourier decomposition of the discount rate series can be found in *VzK* 1928, 3, 4 A (27. Februar 1929).

[27] See Wagemann's preface in Hans Gebelein's (1943) work on mathematical statistics and his book on statistical methods (Wagemann, 1941a).

As of mid-1927, Wagemann insisted on the necessity for a "system of barometers"—a term he loosely applied to refer to single charts, or combinations of time series in one chart. For his forecasts in the *Quarterly Journals*, Wagemann distinguished between barometers of the monetary and the commodity side. The condition of the commodity side could be assessed by a comparison of production and consumption, storage, and foreign trade. On the monetary side, Wagemann used the ABC barometer for a vertical *and* horizontal comparison of the three markets and analyzed their relationship to income statistics.[28] In the forecast of late 1927, for example, Wagemann noted that imports of raw material soared, storage was increasing, and incomes and the rate of employment were high. At the same time, new orders started to decline, prices at the stock market were falling, and interest rates were at a high level.[29] Based on these observations, Wagemann diagnosed the height of the upswing (*Hochspannung*). A downturn had to be expected soon.

Wagemann's diagnosis clearly went beyond simply using the sequence of the ABC barometer to forecast the course of the economy. However, even with his system of barometers at hand, Wagemann could not evade narrowing down the causal factors that would push the economy into the next phase. In his forecast of late 1927, the decline of new orders was crucial for his diagnosis of an impending halt of the upswing. Likewise, the fall of the stock exchange led him to believe that the commodity market would follow soon (a forecast that, as we have seen before, did not materialize).

Wagemann was aware of this burden and hoped to overcome it by collecting more time series. By 1928, he had collected enough data to use an even more comprehensive system of eight to twelve barometers which he could build from combining 42 "important curves" (*Wichtige Wirtschaftskurven*). In Figure 27, I reproduced the first half of these charts, which included indices on production (1), orders (2), electricity consumption (3), and many additional time series.

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[28] See also Wagemann (1930, p. 146) for an explanation of his barometer system.

[29] *VzK* 1927, 2, 3 (30. November 1927), pp. 5-31.

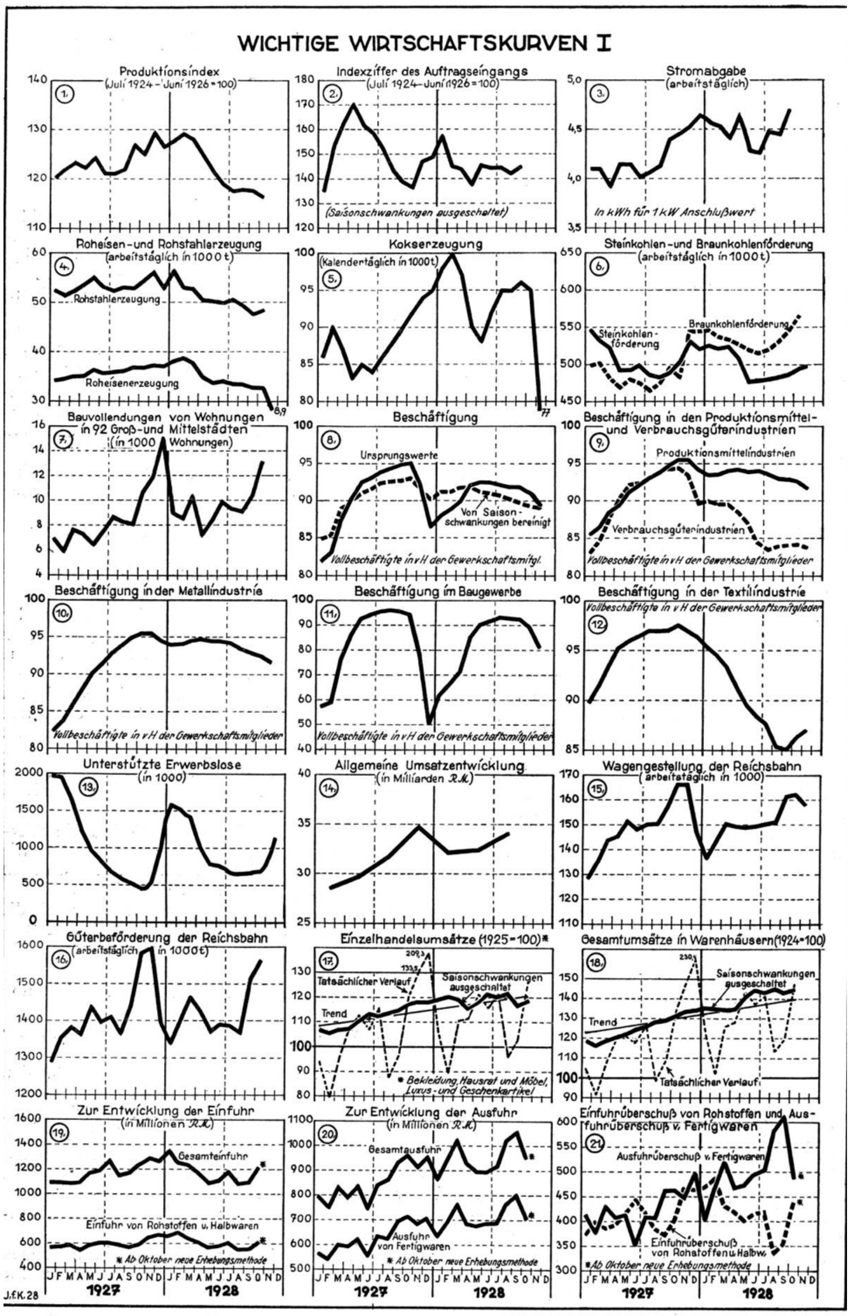

Figure 27: “Important Curves I” (*Wichtige Wirtschaftskurven I*) that Wagemann used to build his barometer systems. Source: *Wb* 1928, 38, p. 158.

As Wagemann (1931, p. 173) later explained, by gathering massive amounts of time series, he hoped to escape the “causal monism” (*Kausalmonismus*) of business cycle economists. Ideally, his economic forecast should not define a “leading indicator” (*Primat*) to forecast the economy. Yet, as Wagemann (1930, p. 174) had to realize, even with a multitude of barometers and without giving any variable priority, he had to choose a starting point for his investigation. Relying on a multitude of barometers still did not sufficiently adhere to the organic-biological principle that implied a preference for functional over causal relationships.

A similar problem arose when Wagemann tried to verify whether his forecasts were correct. As proof of the accuracy of his forecasts, Wagemann (1930, p. 222) typically referred to the rate of employment, which he defined as the "best general index of the course of the national business cycle". Even though the rate of employment was a more general expression of the total economy than the commodity market (the B curve), it did not give much weight to possible alternative developments in different branches. The rate of employment was still a general index that put a part of the economy in place of the whole, which did not meet the requirements of his organic-biological principle.

Hence, Wagemann (1930, p. 162) came to the conclusion that the system of barometers of the late 1920s was still "imperfect" because it was not a comprehensive system that could "permit us to arrange economic fluctuations as a whole". In consequence, Wagemann (1928a, p. 142) thought of an alternative way to arrange the time series that promised to overcome these shortcomings. He believed that a more promising "principle of ordering" (*Ordnungsprinzip*) was provided by:

> "[The] business analysis of the individual enterprises, since these, as cells of the economic organism, enclose, so to speak, all starting points for the moving forces of the business cycle."[30]

Starting from the premise that enterprises were like cells of an organism, Wagemann went on to establish a new barometer system that was built on the analogy of the metabolism (*Stoffwechsel*) of businesses. We will see in the subsequent sections that with these metabolism barometers, Wagemann was able to establish a functional theory and make forecasts that obeyed his organic-biological principle.

8.3 Business Metabolism and Functional Theory

Wagemann's interest in businesses was not rooted in the work of Sombart. We have seen that Sombart went to great lengths to explain how capitalist firms develop like organisms. Instead, Wagemann (1928a, p. 217) argued that businesses were the "cells" of the economy and the "carriers of the business cycle" (*Träger der Wirtschaftsbewegung*). In drawing such analogies, he was far from alone. Since at least 1914, businesses have been depicted as cells within an ever-changing economic organism. German business economists (*Betriebswirtschaftler*) like Paul Mombert and Robert Liefmann (Mombert, 1914, 1921, p. 134), Enno Heidebroek (1923, pp. 4–7, 107), Fritz Schmidt

[30] Wagemann (1928a, p. 142) explained in the German edition: "*Ein solches Ordnungsprinzip liefert uns die Betriebsanalyse der einzelnen Unternehmungen, da diese als Zellen des wirtschaftlichen Organismus sozusagen sämtliche Ansatzpunkte für die bewegenden Kräfte der Konjunktur umschließen*".

(1926, 1927), Alexander Hellwig (1926, p. 131) adopted the view that businesses were cells that connected to the overall economy (*Gesamtwirtschaft*) through their balance sheets.[31] For Paul Deutsch (1928, p. 80) of the *Handels-Hochschule Leipzig* the "businesses themselves created the economic conditions they feared" in the first place.[32]

However, Wagemann (1930, pp. 162–163) became specific about how the business cells connected to the whole. In their efforts to make a profit, businesses took up and disposed of goods and services. Yet unlike the cells in natural organisms, the business cells of the economic organism were part of the money economy. On the one hand, businesses took up capital, and credit, and bought commodities, raw materials, and labor. On the other hand, they granted credits and sold goods and services. Wagemann argued that these activities were reflected in the "trading account" (*Erfolgsrechnung*) of a business as expenditures and receipts. These could be classified into six "dependencies" of a business (raw materials, wages, means of production, credit and interest, domestic market, and exports).

Wagemann's task was not to delve into the accounting data of the businesses' trading accounts but to find out the nature and extent of these dependencies in different branches of the German economy. Some branches depended more on credit than others or relied more on exports and raw materials. Wagemann (1930, p. 165) claimed that the most important object of the IfK's research was to bring to light all these dependencies of the whole national economy. Only then, one could obtain a "conception of the intercomplexity of movements [*Bewegungsverflechtungen*] which will enable us to measure a variation at one point in the business process in terms of its reactions on other points".

In late 1928, Wagemann (1930, p. 165) admitted that the IfK's work on this new "system" of interdependencies was still in its infancy, and it took several years until Wagemann presented the fruits of his new ordering principle. Between 1928 and 1931, Wagemann still relied on the established system of ten to thirteen barometers in his general forecast and was far from consistent in its use. In early 1929, for example, the ABC barometer was again interpreted as if it followed the typical A-B-C sequence, despite Wagemann's assurance that the barometer would not fit the German economy

[31] See also Alfred Müller (1926, p. 80), and Othmar Spann (1929, pp. 44–45) for two more examples on the business cell analogy.

[32] Through business economists like Hans David Brasch (1925, 1927) the business cycle and its forecast gained a great deal of coverage in business journals like the *Betriebswirtschaftliche Rundschau*, or *Annalen der Betriebswirtschaft*.

anymore.[33] In mid-1930, Wagemann presented an altered set of ten barometers of the commodity and monetary side, and of barometers that combined curves from the two sides.[34]

It was not until 1931 that Wagemann (1931, pp. 173–176) became more specific about how his new system, or as he then called it "network" (*Netzwerk*), might be constructed. Wagemann argued that by focusing on the "most important functions" of businesses, he could subdivide (*aufspalten*) and group "the whole variety of the economic movement" (*die ganze Mannigfaltigkeit der Wirtschaftsbewegung*). Wagemann claimed that the functions of these smallest economic units could be divided into separate stages of their metabolism (*Stoffwechsel*).

Wagemann (1931, p. 175) reasoned that in their metabolism, businesses take up capital, goods, and services (*Aufnahme von Geldkapital einerseits, Güter und Dienstleistungen andererseits*) based on the possibility to make a profit (*Ertragsprinzip*). They then use these resources in the process of production (*Einsatz der Mittel und Kräfte*). And finally, businesses sell their produce (*Abgabe der Mittel und Kräfte*). The metabolism depended on economic variables external to the business itself and thus allowed Wagemann to construct a "system of mutual dependencies".

Wagemann again took inspiration from the accounting analogy to depict the metabolism of businesses as expenditures and receipts. Yet, Wagemann (1931, pp. 173–174) also claimed that by the functions of the cells, he could construct an "organic whole" similar to "the botanist who arranges the plant world into a system". His idea to combine the "function" and "metabolism" of the cell and link them to the "organic whole", can also be traced back to Driesch's *Philosophy of the Organic*. According to Driesch (1909, p. 191), a "part of the organism 'functions' […] when it performs the kind of specific metabolism that is normal for it; the totality of all the normal metabolic performances [*Stoffwechselleistungen*] of the parts of the organism is its 'normal functional state'". Driesch (1909, p. 16) further clarified that "every organic function is rooted in the metabolism [of the cell's protoplasm]". For Driesch, the metabolism of the cell was defined as the "exchange of material with the surrounding medium", and like all living things, the cells "take in and give off material, but their shape can remain unchanged in the exchange".

In 1931, Wagemann (1931, pp. 175–178) took a step further than in 1928 and tried to detail the dependencies on both the uptake and output side of the metabolism of businesses in different branches. Wagemann argued that depending on the branch of a firm, the factors that decided whether a business started the process of production had different weights. Clothing, furniture, and luxury

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[33] *VzK* 1928, 3, 4 A (27. Februar 1929), pp. 8-9.

[34] *VzK* 1930, 5, 2 A (30. August 1930), p. 9.

food industries were largely dependent on consumer spending and income. Both the glass and toy industries were dependent on foreign sales. The toy industry relied on cheap labor. Other industries like construction were closely connected to the conditions on the capital market. The textile industry, in contrast, was more interlinked with the prices of raw materials like cotton. The idea of the business metabolism thus provided Wagemann with an ordering principle for his time series that went far beyond the Harvard Committee's practice to create the ABC indices "from a purely mathematical and computational point of view" (Wagemann, 1931, p. 178).[35]

In June 1931, Wagemann published his first set of barometers that was built on his new ordering principle of the three stages of the business metabolism.[36] Figure 28 shows the resulting set of barometers that Wagemann split into three "profit barometers" (*A. Ertragsbarometer*), two "production barometers" (*B. Produktionsbarometer*), and four "sales barometers" (*C. Absatzbarometer*).[37] The barometers allowed Wagemann (1931, p. 176) to "view the economic dynamics from the point of view of a business".

[35] Hence, Wagemann drew attention to the fact that the Harvard Committee created the ABC indices based on a correlation analysis. For example, the Committee "included those series that had the highest correlation with wholesale prices in his index of business activity" (Friedman, 2014, p. 138).

[36] *VzK* 1931, 6, 1 A (5. Juni 1931), p. 32.

[37] In 1932, a fourth category of barometers, the credit barometers (*Kreditbarometer*), was added to the set. See *VzK* 1931, 6, 4 A (3. März 1932), p. 33.

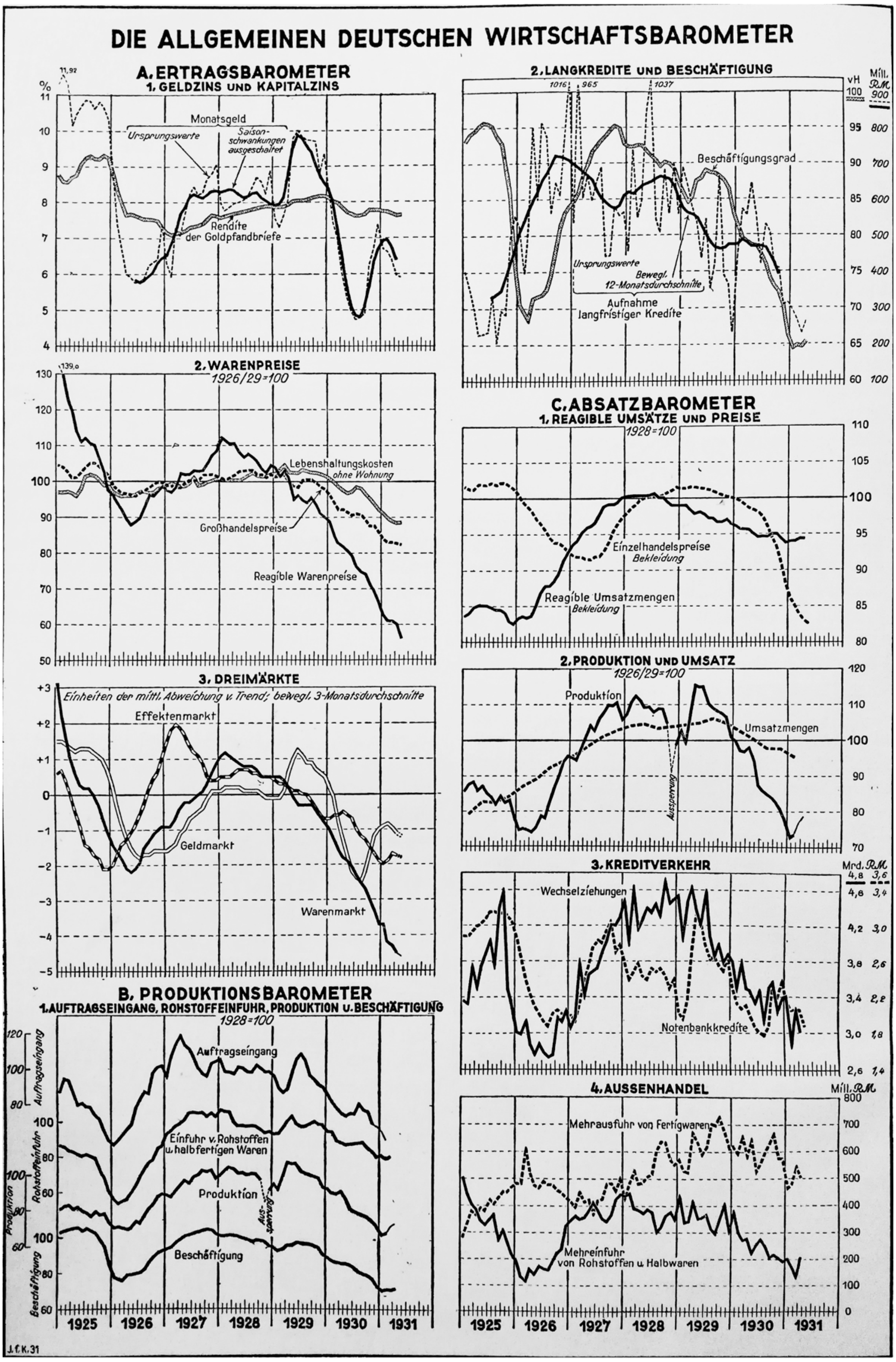

Figure 28: The "metabolism" (*Stoffwechsel*) barometer system, consisting of three "profit barometers" (*A. Ertragsbarometer*), two "production barometers" (*B. Produktionsbarometer*), and four "sales barometers" (*C. Absatzbarometer*). Source: *VzK* 1931, 6, 1 A (5. Juni 1931), p. 32.

The profit barometers (*A. Ertragsbarometer*) showed under what conditions firms could take up the means of production and they indicated whether profit was possible under current conditions.

Knowing the short-term (*Monatsgeld*) and long-term (*Goldpfandbriefe*) level of the interest rates was crucial for borrowing on the credit market (A 1). For the consumer goods industry, it was also important to know the spread between the sensitive, wholesale (*Reagible Warenpreise, Großhandelspreise*) and retail prices (*Lebenshaltungskosten*) to estimate the possibility of making a profit (A 2). The larger the spread between the prices, the greater the opportunities for making a profit and the more likely it was for firms to become active. The third profit barometer was the Harvard Committee's ABC barometer (A 3). The three curves depicted the short-term interest rates, the share prices, and the wholesale prices, which were all "of particularly great importance for the entrepreneur's planning" (Wagemann, 1931, pp. 177–178).

Just as important for business planning were the sales barometers (*C. Absatzbarometer*) that showed how well the output could be sold on the markets. A comparison of prices (*Einzelhandelspreise*) and sales (*Umsatzmengen*) indicated the price sensitivity of consumer products, in this case clothing (C 1). By reducing prices, especially of elastic goods like clothing, more sales could be generated. Comparing production and sales (*Umsatz*) provided an indicator of how well products could be absorbed by consumers (C 2). Similarly, a comparison of circulating bills of exchange (*Wechselziehungen*) and central bank credit (*Notenbankkredite*) indicated how much production and consumption were aligned (C 3).[38] Finally, a fourth sales barometer depicted the development of net exports of finished goods in relation to net imports of raw materials (C 4). On this basis, businesses could assess the importance of the foreign market against the domestic market (Wagemann, 1931, pp. 179–180).[39]

A somewhat different role was reserved for the production barometers (*B. Produktionsbarometer*). Wagemann (1931, p. 178) claimed that these barometers served the IfK to know what businesses were actively doing and how they employed their means of production and resources The production barometers indicated whether entrepreneurs acted upon what they saw in the two other barometers. New orders, imports, production, and employment allowed an assessment of firms' production and activity in general (B 1). Absorption of long-term credit and employment gave an idea about financing

[38] Bills of exchange reflected the activity of producers (*Erwerbswirtschaft*), while central bank credit to private banks was a proxy for circulating bills in the consumers' circuit (*Verbrauchswirtschaft*). According to Wagemann (1931, p. 188), when the demand for money by consumers increased, commercial banks needed more credit from either the central bank or from foreign countries.

[39] See also Wagemann's explanations in *VzK* 1931, 6, 1 A (5. Juni 1931), p. 36 and *VzK* 1931, 6, 2 A (1. September 1931), p. 35.

and expenses (B 2). In some sense, they gave Wagemann an indication of the processes within the metabolism of the businesses.

Wagemann interpreted the barometers differently depending on whether a business was operating in the sector of consumption goods (*Verbrauchsgüterindustrie*), or production goods (*Produktivgüterindustrie*). According to Wagemann, the German consumer goods industry, for example, was more dependent on imports of raw materials than the production goods industry. Knowing of these dependencies meant that he had to pay increased attention to the index on raw materials (*Einfuhr v. Rohstoffen u. halbfertigen Waren*) in barometer B 1 when assessing the consumer goods industry. In contrast, the index of new orders (in B 1) was more important to assess the condition of the production goods industry as it mainly included the statistics on new orders by this particular industry. In the economic diagnosis and prognosis, these specificities had to be taken into account.

The second production barometer (B 2), for example, showed that borrowing of long-term credit (*Langkredite*) was low, and the first one (B 1) indicated that new orders were still decreasing. Yet, the import of raw materials (in B 1) started to rise gently. Such a constellation of curves indicated that the consumer goods industry prepared itself for increased production. Based on such knowledge about dependencies within individual sectors as well as by observing the movements of different time series, Wagemannn aimed to establish branch barometers for every single branch of the economy (*Barometer einzelner Wirtschaftszweige*).[40]

Each branch had other dependencies in their uptake of materials and expulsion of products and services. The profit barometers for the iron industry, for example, comprised local and international iron prices, coke and iron ore prices. Its sales barometer contained time series on the export and consumption of rolling iron (*Walzeisen*) and the uptake of long-term credit by the public and private enterprises, which preceded consumption of rolling iron by a year.[41] The barometers for the construction industry consisted among others of rent indices, mortgage prices, material costs (profit barometers) and production indices of important industries (sales barometer). For the textile industry,

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[40] *VzK* 1931, 6, 1 A (5. Juni 1931), pp. 32-38.

[41] Ibid., pp. 38-39.

prices of cotton, yarns, flax, fabric (profit barometers) and income, sales, retail prices and storage (sales barometer) were relevant.[42]

To assess the dependencies between a branch and other times series like prices, interest rates, and new orders, Wagemann could rely on a huge set of employment indices from 120 branches. Since 1928, this system of branch observation has been organized through cooperation between the IfK, business associations, and the Chambers of Commerce. It is likely that Wagemann compared the movements of the employment indices of each branch with the movements of other curves like exports, new orders, or prices of raw materials to gauge the strength of the branch-specific dependencies. Inputs from businessmen and the leaders of the business associations that took seats in the IfK's governing board might also have helped him to pin down the most striking dependencies of different branches.

Wagemann (1931, pp. 177, 194) also referred to the United States production census when assessing the dependencies between branches. As Tooze (2001, p. 191) has pointed out, in the U.S., firms were required to declare not only the value, but also the physical quantities of output. On such basis, the interrelationships of different sectors of industry could be studied by investigating the physical flow of goods. Wagemann ordered his staff to begin preparing a similar census of industrial production for the German economy in 1927. However, due to budget cuts by Chancellor Brüning, this exercise was interrupted, with the result that a German industrial census that traced the physical quantities appeared only in 1933 (Tooze, 2001, pp. 130, 191–196). Wagemann possessed only the industrial census of 1925, which gave him a measure of the importance of each branch for the overall economy. Such knowledge could be used to weigh the significance of a change in the rate of employment in a branch when assessing the whole economy.[43]

How Wagemann forecasted the course of the whole economy based on the new barometer system is complex enough in its own right and we will see how he did so in the next section. Here, I want to first outline Wagemann's aspirations with the metabolism barometer system. Since every firm's metabolism was interconnected with the whole, Wagemann could use the uptake and the expulsion of the firm to assess how strongly different time series were interconnected. The time series of sales

[42] *VzK* 1931, 6, 1 A (5. Juni 1931), pp. 39-41. Wagemann's analysis of the textile industry based on the metabolism barometer deviated substantially from earlier investigations into the reasons that sway textile sales (*Bestimmungsgründe des Baumwollwarenabsatzes*). In 1928, Wagemann claimed that production in the weaving and spinning industries was not strongly dependent on world market prices for cotton, but rather on the national cycle (*Deutsche Gesamtkonjunktur*). See *Wb*, 1928, 10, pp. 38-40.

[43] *VzK* 1927, 2, 4 (25. Februar 1928), pp. 17-37.

or employment of a textile company, for example, were closely interconnected with cotton prices on the uptake side of the firm's metabolism. On the expulsion side, the sales were strongly interconnected with labor income. The short-term interest rates, however, had much less influence on textile sales. It was therefore not included in the branch barometer of the textile industry.

By creating similar connections throughout all branches and time series Wagemann (1931, pp. 173–176) gave flesh to what he called a "functional theory" (*Funktionaltheorie*). Wagemann imagined his functional theory as a mesh (*Verflechtung*), or network (*Netz*) between all branches, the banking sector, the state, the stock market, and foreign markets with threads of varying strengths. If this network tightened at one point, countless other shifts would follow.[44] Wagemann (1930, p. 165) conjectured, for example, that a technological improvement in one sector could lead to a higher demand for certain raw materials from another sector. The resulting higher prices could then affect over time any other sector that depended on the same raw materials.

The functional theory was Wagemann's (1931, p. 173) response to the "mechanistic" barometers of the Harvard Committee and of Arthur Spiethoff. At the same time, the functional theory reaffirmed his rejection of monocausal business cycle theories. According to Wagemann (1930, pp. 165–166), the "survey of the interlacing of movements possesses the advantage that it does not bind us to any single theory on the causes of business cycles; it thus permits us to vary the object of our study at will". By avoiding singular causal relationships, he could investigate, for example, the factors on which the interest rates depended, and conversely, could estimate the reaction of a change of money rates on some other factor like exports or the labor market.

Wagemann (1936a, p. 13) explained that his functional theory took into account that economic variables like interest rates and the level of profit in different branches tended to be mutually dependent. Interest rates for productive credit could not be set at will by banks, because the interest rate level depended on entrepreneurs' possibility to make a profit with borrowed capital. The matter was further complicated because, as the metabolism barometers showed, firms' possibilities to make a profit also depended on various variables on both the uptake and expulsion side of a firm.

[44] Wagemann's functional theory had no equivalents. Economists of the Harvard Committee or at the NBER were interested in the different branch cycles. Yet, statistics (sales or production) of individual industries were predominantly compared to the movements of the A, B, or C curves in order to establish the lag length between different industries and the Harvard barometer. Examples are the barometer by the Simonds Saw & Steel Co. (Brasch, 1926, p. 102), or the business barometers discussed by Schäfer (1927). Mitchell (1927, p. 107), despite being interested in the "factors affecting business profits", was far from establishing a detailed barometer system based on the functional connection of businesses' inputs and outputs.

Agricultural prices were another example of why functional relationships had to be taken into consideration when analyzing economic phenomena. A study by the IfK on the dependencies of agriculture on other economic variables showed that most farms were highly dependent on debt (Vogel & Boehm, 1937; Wagemann, 1937). Based on this insight, the IfK could explain why lower prices of agricultural products had the opposite effect of what classical theory would predict: lower prices led to increased production. Lower prices meant that farmers had to produce more in order to be able to pay interest on their debt. Economic explanations only satisfied Wagemann's functional theory, or organic-biological principle, by an investigation of functional dependencies and when embedded in a larger context of economic phenomena.

Driesch's biology thus helped Wagemann to gain a more concrete understanding of the term "functional". Wagemann's contemporaries like Austrian economist Alfred Amonn (1925, pp. 320–322), for example, thought that a causal theory of prices would explain the change of prices based on a "chronological succession" of variables. A functional explanation would then simply emphasize the "simultaneous dependencies of phenomena", where causality was possible "in both directions".[45] Yet, for Amonn "considering the 'function' of prices in the economy and its relevance for the economy" was "of course something completely different" than a functional understanding of prices and demand. In Wagemann's understanding of functional relationships, the two categories that Amonn teased out collapsed into one. The function of a firm, by which he meant the uptake, production, and expulsion of material and commodities, allowed Wagemann to gauge the strength of a firm's functional dependencies.

The similarity to Driesch's work is even more striking when considering how Wagemann distinguished his understanding of the term "function" from a mathematical function, or from statistical correlation. Like Driesch, Wagemann (1931, p. 173) considered that a mathematical function would reduce a complex and ever-changing interdependency to a fixed quantitative relationship—the "organic whole" could never be mathematically comprehended because it was a mesh of "infinite variety". As shown in the example of agriculture above, a functional relationship was only complete when taking the whole into consideration. Certain interdependencies, like the reliance on debt, were also hard to quantify, or to express in a mathematical function.

[45] By reducing causality to the direction of time (causes occur prior to their effects), Amonn adhered to the "standard view on the direction of causation" (Schaffer, 2016). The weight on "temporal ordering" in causal analysis has been dominating since David Hume and continues to play an important role in economics through the "Granger causality test" (Hoover, 1993).

Wagemann's rejection of mathematical functions has been interpreted as his unwillingness to work with modern econometric methods. German economist Hans J. Schneider, for example, who was first on good terms with Wagemann, turned into an outspoken critic of the IfK's research program.[46] In a series of three essays, Schneider (1928a, 1928b, 1929) claimed that Wagemann's research had no theoretical foundation and that the organic-biological principle only led astray. Instead, he considered the "stochastic empirical methods" like linear and non-linear multiple regressions by Arthur Hanau or by Russian economist Nikolai Kondratieff (1892-1938) much more promising.

Wagemann was well aware of the work of both Hanau and Kondratieff. Hanau worked at the IfK and Wagemann knew of the mathematical methods by the researchers at the Moscow Institute for Business Cycle Research led by Kondratieff. Yet, Wagemann had good reasons to not follow a multiple regression approach. Despite the possibility to fit nonlinear relationships between variables by polynomial and nonlinear approaches, regression analysis had a major disadvantage for Wagemann. Even with multiple variables, one had to first define one dependent and several independent variables—a step Wagemann wanted to avoid in order to preserve the ability for causality going both ways. As Carl Boehm (1950, pp. 416–418), another employee at the IfK, later emphasized, the multiple regression approach by Hanau and Donner was only applicable to one branch at the time. Besides, the approach was only promising when applied to those branches in which the "uniform reactions" of the masses of market participants led to "external regularities", like in the cotton, grain, and meat markets.

Wagemann stuck to his method of analyzing the curves with "the natural eye of the unimpaired human mind" when diagnosing the economic condition and forecasting its course. As I have indicated, Wagemann's use of barometers and charts was fairly inconsistent in the late 1920s. Yet, it was the nature of economics that functional relations were unstable. During a certain period, one direction of causality between two time series was dominant but was negligible at other times. Sometimes causes reinforced themselves, and sometimes they cancelled each other out. In some cases, the curves' lags were important, in others the vertical distance, or tensions (*Spannungen*), gave off information about the course of the economy. Like the social statisticians of the late 19th century who worked without the mathematical concept of correlation, Wagemann did not possess a "well-articulated uniform conception of causal analysis or method of causal inference" (Morgan, 1997, p. 61).

[46] Schneider wrote an in-depth study on the iron market for the RDI, which he then extended for the *Quarterly Journals* of 1927 by the encouragement of Wagemann. The study titled "On the analysis of the iron market" (*Zur Analyse des Eisenmarkts*) was published as the first issue of the *Quarterly Journal's* special issues (*VzK* 1927, *Sonderheft* 1).

However, I believe that with the new system of metabolism barometers, Wagemann went some way to overcome the shortcomings of his eclectic approach of selecting different times series as leading indicators or defining the most dominant causes during a certain period of time. As of 1931, his diagnosis and forecasts were based on a thorough investigation of the metabolism of businesses in different branches.

8.3.1 Forecasting by assessing the business metabolism

We have seen how Wagemann (1931, p. 176) believed that with his new barometer system, he could assess the economic condition "from the point of view of a business". The new system of barometers showed the condition under which a business of a specific branch could take up material and give off its products. If the conditions on both sides were such that a business could make a profit, Wagemann expected the entrepreneur to take action, invest, and produce, and thus set the "paths towards the upswing".[47] For Wagemann, it was the "entrepreneurial activity" (*Unternehmertätigkeit*) and their possibilities for taking up capital (*Kapitalaufnahme*) and expansion of production (*Produktionsausweitung*) that decided the course of the economy.[48] The scope of entrepreneurs (*Spielraum der Unternehmer*), and their stimulation decided if the "healing powers" would "form themselves".[49]

Remember that Wagemann's image of the economic organism differed substantially from how the Harvard Committee or Karl Karsten represented the economy. For the Harvard Committee, the economy consisted of three markets that were represented by a set of three curves in a regular sequence. For Karsten, these three markets were like reservoirs filled with water that spilled over to the next market as soon as the curves exceeded their trend line. In contrast, Wagemann's economy was a network of cells that were interconnected through their metabolism. Hence, Wagemann's forecast started with an assessment of the conditions on both the uptake and output side of the metabolism in each branch, instead of defining one leading indicator that predicted the movements of other curves.

Wagemann's ultimate forecast relied on a long analysis of all the different branch barometers until a final verdict about the course of the economy could be reached. In some cases, Wagemann broke down the analysis in the forecast summary of the *Quarterly Journal* to a distinction between the

[47] *VzK* 1931, 6, 1 A (5. Juni 1931), pp. 34-35.

[48] *VzK* 1932, 7, 2 A (27. August 1932), p. 90.

[49] *VzK* 1932, 7, 4 A (10. März 1933), pp. 189-191.

consumer goods and production goods industry.[50] Due to its brevity, the forecast summary can serve here as an example to understand Wagemann's attempt to assess the business condition from the point of view of a business. By mid-1932, for example, the barometers showed that incomes were falling. The consumer goods industry reacted elastically to incomes and could not hope for a quick recovery of demand. The sales barometers for the metal industry indicated by contrast that the production goods industry profited from increased foreign orders. Furthermore, falling prices of raw materials allowed producers to fill up their storage. However, prices of finished goods remained low, which reduced the possibilities for profit. Finally, as the profit barometers showed, the credit markets were too restrictive for taking up capital. Hence, there was little hope that producers would actually take up credit or buy raw material. In conclusion, the path out of depression towards a sustained upswing was not yet given.

In his forecast, Wagemann adhered to his conviction that all functional relations of different branches had to be considered before a judgment could be made. He estimated that the consumer goods industry faced dire conditions, which meant that no push towards the upswing could be expected from this branch. The situation in the production goods industry seemed more promising as new orders came in and the prices of raw materials were low. Yet, one decisive dependency restricted the recovery. Businesses in the production goods industry found poor conditions on the credit market, which meant that no impetus could be expected from them either.

Although the barometer system freed Wagemann from defining leading indicators, he realized that his forecasts encountered a new fundamental issue. The actual decision processes within a firm were not known. It could well be that businesses reacted to the economic conditions in a different manner than Wagemann expected. This issue had already been highlighted in 1927 by Otto von Zwiedineck-Südenhorst. In an essay on causal and functional explanations of prices and demand, Zwiedineck-Südenhorst (1927, p. 286) argued that in order to understand the effect of prices on demand, one would need to know if the "the brains of entrepreneurs" functioned "lawfully homogenous" when certain "market situations are available as data".

Indeed, whether entrepreneurial action was a lawful result of the constellation of different time series was the decisive factor in the accuracy of Wagemann's forecast. Wagemann (1931, p. 178) was aware of this issue and ascertained that it was "difficult to determine directly if the profit prospects actually influence entrepreneurial activity". As Wagemann later remarked, the "crucial problem in assessing future economic development", was whether "private initiative" seized upon the chances created by

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[50] *VzK* 1932, 7, 2 A (27. August 1932.), pp. 89-92.

the "stability of the conditions" and the government measures such as tax reduction and job creation programs.[51] Wagemann (1931, p. 178) contended that solving the issue by "continuous interviews" was practically impossible, which meant that he had to rely on the "production barometers" of his barometer system as an "indirect method" of estimating whether businessmen took action.

Wagemann faced this issue head-on from the early 1930s. Wagemann's efforts to build a metabolism barometer system were accompanied by his tireless attempts to induce businessmen to use the IfK's publications. As we will see in the next section, the IfK published *Weekly Reports*, simplified methods to handle statistical data, distributed handy booklets and forged close ties with centers of business education (*Betriebswirtschaftslehre*). By making the IfK's publications more useful and applicable (*praktisch*) in daily business, Wagemann hoped that businessmen would base their decisions on the information that the IfK provided to them. If they based their decisions on information from the IfK, chances were that business activities would align with what Wagemann was reading from the metabolism barometers.

8.3.2 Coordinating the cells through the dispersion of information

By the 1920s, there was a consensus among economists that the business cycle constituted something inherent in the capitalist system. As eliminating the cycle was considered tantamount to central planning, most economists preferred the option of smoothing the fluctuations by anti-cyclical public spending, or by incentivizing businessmen to anticipate the cycle (Schmölders, 1934, pp. 24–25). For Western business cycle institutes, the economy largely consisted of, in Veblen's (1904/1932) words, the "business enterprises". Hence, in their efforts to smooth the cycle, the institutes targeted businesses directly. The NBER's declared purpose was to provide guidance to businesses. Herbert Hoover and Mitchell hoped that if businessmen had better knowledge of future economic fluctuations they could adapt their behavior in the present and smooth the business cycle (Friedman, 2014, pp. 166–170).

They believed, for example, that the ABC barometer by the Harvard Committee, could bring about a more stable economy. In a collection of essays edited by Mitchell, Stone (1923) showed that the Harvard barometer could serve businesses to optimize the stockpiling of raw materials. When knowing about the future trajectory of the economy, firms could avoid large inventories at the turn of

[51] *VzK* 1933, 8, 2 A (4. Oktober 1933), pp. 83-84.

the cycle, remain liquid, and thus avoid bankruptcy during a downturn of the economy[52]. The ABC barometers were an attempt to reverse the arrow of causality by guiding businesses along the business cycle.

As a convinced technocrat, Wagemann had similar aspirations with his barometer systems and wanted to mitigate the fluctuations at the level of the firm.[53] Yet, in his eyes, no businessman would simply follow the guidance by the ABC barometers. When he presented his own ABC barometer for the first time, Wagemann (1927, pp. 22–23) warned that even with "indispensable tools like the compass [*Kompass*] and the lighthouse, an incompetent navigator would still shipwreck". However, by 1929, when Wagemann had developed his first barometer systems, he called for the businessmen's "fingertips" to be replaced by the IfK's accurate "compasses" (*Zirkel*).[54]

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[52] Stone (1923, p. 128) showed that the Harvard barometer had been linked to a "purchase barometer" by the Dennison Manufacturing Company. As the ABC barometer forecasted the turning point of prices, the firm could know about the optimal point for purchasing jute. When prices were below the trend, the company would buy up to twelve weeks' supply, when above not more than two week's supply. Stone (1923, p. 127) argued that the constant study of the cycle "becomes imperative for any house which prefers intelligent guidance to blind and dangerous guessing. The businessman who watches the cycle will become cautious when a boom develops and put on the brakes. Reducing purchases during the boom will find him with practically no inventory to write down when the crisis occurs". The notion the stock of enterprises was related to the business cycles can also be later found in Keynes (1930/1950, p. 145) work when he argued that the "efforts to get rid of surplus stocks aggravate the slump, and the success of these efforts retards the recovery".

[53] When firms filled up their warehouses during the upswing in the expectation of a continuously increasing demand, they could endanger the whole organism once the cycle turned. When the upswing stopped, while ordered commodities still flowed in, firms became illiquid. These payment difficulties propagated from retail trade to wholesale, then to production, and finally brought down the whole economy. See "*Zum Problem der Lagerhaltung*", in *VzK* 1926, 3 (19. November 1926), pp. 42-45. Wagemann (1928a, p. 207) also acknowledged other forms to mitigate fluctuations like fiscal policies (*kreditpolitische Interventionen*).

[54] Wagemann (1929a, p. 1) complained that "the German businessman still considered "his fingertips more precise than the tips of the compasses". With fingertips (*Fingerspitzen*) Wagemann meant *Fingerspitzengefühl* (feeling in the fingertips), which can be translated as "gut feeling", or "intuition", but also "presentiment". Wagemann referred to compasses (*Zirkel*) because he wanted to emphasize the precision of statistics, charts, and the barometers. In the late 1920s, it was common practice among economists to insist on the superiority of statistics over intuition. The *Frankfurter Gesellschaft für Konjunkturforschung* (1926, p. 3), for example, demanded a replacement of the intuitive feeling of the cycle (*Konjunkturgefühl*) by barometers. Oskar Mohrus (1928, p. 6) of the *Dresdner Bank*, argued that the "current transformation of the economic organism allowed a direct influence on the private sector". The "instinctive, spontaneous economic activity" should be replaced by "the mental control [*geistige Beherrschung*]", and "gut feeling [*Fingerspitzengefühl*] should make room for knowledge".

Wagemann continuously switched in his analogical descriptions of the curves and charts. As barometers or compasses (*Zirkel*) they were more accurate tools to register the economic conditions. As a compass (*Kompass*), a barometer could be used to register the movement of a business in relation to its sector, or the overall conditions. In May 1928, Wagemann gave an example of how the IfK's barometers could be used in the sense of a compass (*Kompass*). At the General Assembly of the Mining Association (*Verein für bergbauliche Interessen*), Wagemann (1928b, pp. 1249–1253) pledged that his research was "at the service of the businessman". Wagemann countered the wrong idea of "today's businessman" that by only following his own interest "the economic whole flourished by itself". Instead, the businessman needed some orientation toward the "left and right" that the IfK's individual branch barometers provided. According to Wagemann, the IfK's barometers could not only relieve the economy of its "paralyzing and unhealthy hypochondria" but would also benefit an enterprise by providing insight into the partial movement of its own branch.[55]

Especially during the Great Depression, Wagemann was convinced that he could lead the economy out of the slump with his superior knowledge. Looking back at this period, Wagemann (1954, p. 71) explained that "neither the statesman, nor the entrepreneur could rely on their feeling of the fingertips". Hence, it was the IfK that took on the task to lead businesses out of the slump towards prosperity by providing "compasses" (*Zirkel*) to align the private interests with the common goal of a stable economy. Yet, the IfK was more than a provider of statistics and charts. Walther Däbritz (1881-1963), the president of the IfK's Western department, noted that during the depression, the IfK changed its role "from a passive-prognostic into an active-therapeutic" (Däbritz, 1931). When the first signs of "forces of recovery" started to become visible in late 1932, businessmen were instructed to "take great care" as the national economy was still in the phase of "convalescence".[56]

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[55] With the help of the branch statistics, Wagemann expected individual businesses to compare themselves to their branch and verify if their actions taken were neither too moderate nor too extensive in comparison. A clothing retailer, for example, could evaluate the statistics of his branch published in the weekly reports to verify if his individual business reacted the same way to economic variables (for example employment and general level of production) as the entire branch. By simply dividing the current monthly sales by the previous year's, the retailer could deseasonalize the sales figures and make the firm comparable to the deseasonalized branch statistics published in the weekly reports. Then, the sales figures could be used in combination with the profit barometers of the specific branch. Following the logic of the profit barometers, the sales of clothes was most dependent on labor income. Based on this dependency, Wagemann claimed that entrepreneurs could forecast the sales figures, because sales followed a change in labor income by a lag of three to six months. Due to the falling incomes in late 1928, for example, a decrease in sales (lower sales than in the previous year) had to be expected for the near future. The manager could now prepare his business accordingly: he could wait to restock if prices were high or wait with employing new staff. See Wagemann's explanation in *Wb* 1928, 27.

[56] See *Wb* 1932, 29, p. 115.

In the late 1920s, Wagemann struck fertile ground with his idea to provide more detailed statistics and barometers to entrepreneurs. Business economists were convinced that more statistics improved the course of business.[57] It comes as no surprise that business economists like Konrad Mellerowicz (1928, p. 812), Alexander Gutfeld (1928, p. 118), and Gloger (1928, p. 118) were the first ones to use and expand on the IfK's barometers. In 1928, leading German business economists founded the Commission for the Promotion of Cooperation between Business and General Statistics (*Kommission für die Förderung des Zusammenwirkens der allgemeinen und der betriebswirtschaftlichen Statistik*). The commission campaigned to make business statistics available to the IfK (Morgenroth, 1929, p. 346). Through Walther Däbritz, who was a member of the commission, the IfK was already closely connected to business economists. Wagemann also established cooperation with business education departments at the Universities of Berlin, Cologne, Heidelberg, Münster, Kiel, and Jena.[58] Journals and handbooks of business education dealt extensively with business cycle research (Ruberg, 1968, p. 411).[59] As of 1930, the IfK was a firmly established authority in business handbooks like Rudolf Seyffert's (1932) *Handbook on Retail Trade* (*Handbuch des Einzelhandels*).

The IfK's methods also inspired Erich Schäfer's Institute for Economic Observation of the German Finished Goods (*Institut für Wirtschaftsbeobachtung der deutschen Fertigware*) to work with branch-specific barometers throughout the 1930s (Schäfer, 1953, p. V). Just as Wagemann intended, Schäfer (1953, p. IX) promoted the barometers as tools for a constant confrontation between the 'inside' and the 'outside' of the firm. Taking the business cycle into consideration helped the firm to know if its branch "reacted early or late in response to a general economic fluctuation".[60]

Next to his efforts to build close contacts with the business education centers, Wagemann sought out possibilities to make the IfK's publications practical, or, to use a more recent term, make them more user-friendly. User-friendliness of the IfK's publications was a major demand by the members of the

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[57] Business economist Brasch (1926, pp. 101–102), for instance, proposed 30 different statistics for the determination of the business cycle in the bicycle industry. Next to the Harvard barometer and prices of raw materials, even the number of members in bicycle associations of each district, or the number of cycle paths had to be considered. See also Alfred Isaac's (1929, pp. 354–356) detailed breakdown of business statistics (*Betriebsstatistik*).

[58] On the formation of German business education, see Tribe (1995), Chapter 5.

[59] See the vast numbers of articles between 1927 and 1930 on business cycle research in journals like the *Betriebswirtschaftliche Rundschau*, *Annalen der Betriebswirtschaft*, *Zeitschrift für Betriebswirtschaft* and *Die Betriebswirtschaft*.

[60] Schäfer (1953, pp. 314–315) took the paper industry as an example of an industry that reacted rather late to an upswing. A rise in production led to increased shipping activity, which increased the demand for packaging material and paper. Similarly, telegrams were seen as signals (*Vorbote*) of shipping, as telegrams were used to order raw materials.

IfK's governing board. After all, the IfK was to a large degree financed by business and had to prove its usefulness to avoid funding being withdrawn.[61] Wagemann started publishing *Weekly Reports* as of April 1928. These reports should remedy the problem of slow data reporting by up-to-date statistics.[62] While the *Quarterly Journals* published the overall forecast, the *Weekly Reports* focused on branches rather than on the whole economy. The *Weekly Reports* claimed to summarize all information necessary for the assessment of business conditions for every week on four-pages.[63]

Despite the IfK's tireless efforts to venture into business education and disseminate user-friendly publications, criticism prevailed. From 1927 onwards, the IfK had been subject to considerable criticism from businessmen, associations, business economists and members of the governing board. Increasingly, business economists disapproved of forecasts and demanded more facts (Kulla, 1996, pp. 104–105). Industry representatives were anything but pleased with the IfK's attempts to forecast individual time series like cotton prices.[64] The 90-page *Quarterly Journals* had turned into a bulky 160-page journal in late 1927. For planning, let alone decision making, the journal became too

[61] Wagemann (1935a, pp. 10–11) described the IfK as a "scientific monarchy tempered by [the threat of] economic assassination", indicating that the members of the governing board could withdraw their funding at any time.

[62] As Kulla (1996, p. 42) remarked, the plan to publish *Weekly Reports* took shape in discussion in the governing board in late 1927 around the issue of more up-to-date publications. The *Weekly Reports* were published between April 1928 and December 1942 and replaced the *Deutsche Wirtschaftszahlen* by the Statistical Office. The governing board's reaction to the reports was divided. Paul Silverberg praised Wagemann's efforts to publish up-to-date statistics. Other members of industry and business were less convinced of the new material. The *Weekly Reports* were criticized on grounds of similar reservations brought forth against earlier publications. The Dortmund Chamber Commerce refused to subscribe to the letters because a weekly assessment of the economic condition would lead to wrong and harmful conclusions.

[63] The advertisement of the *Weekly Reports* claimed: "*Eine schnelle und in kurzen Abschnitten erfolgende Berichterstattung ist eine Notwendigkeit für die geschäftlichen Dispositionen. Auf nur vier Druckseiten werden übersichtlich alle Momente zusammengestellt, die für die Beurteilung der Wirtschaftslage und Konjunktur wichtig sind*" (Deutsch, 1928).

[64] Otto Donner's attempt to forecast the cotton prices in 1930 (*VzK* 1930, *Sonderheft* 15) was met with fierce rejection. In a letter of March 1930 to the *German Association of Cotton Millers*, the president of the *Association of South-German cotton industrialists*, remarked that Donner's publication was a "rich compilation of figures". Yet, the price forecast was "completely off the mark", which indicated "the impossibility of predicting prices, even if based on scientific research". The IfK was therefore "unnecessary" and its research "harmful". See BWA V8/1078 (*Verein Süddeutscher Baumwollindustrieller*.

technical, and the forecasts were unreliable (Kulla, 1996, p. 40).[65] A missing feature for the members of the governing board, was the immediate applicability of the IfK's publications. In their eyes, the statistical material should not only become visible through intensive study of the tables but should already be offered in a "processed" state.[66]

The lack of direct applicability of the IfK's publications might explain why Wagemann (1929a, p. 1) complained in late 1929 that "the German businessman still considers his wrist more reliable […] than the graphic curve, his fingertips more precise than the tips of the compasses [*Zirkel*]".[67] With the new metabolism barometers that Wagemann began developing in 1928 and published in 1931, the issue that businessmen did not use the IfK's material became even more pressing. Remember that Wagemann had to estimate "from the point of view of a business" if the conditions on both the input and output side were favorable. Hence, his forecast was dependent on how well he anticipated the behavior of entrepreneurs based on his barometers. If businessmen used the same barometers as the IfK, they were more likely to take the actions that Wagemann anticipated, which would make his forecasts more accurate.

Wagemann now took further steps to make his publications more user-friendly. In the first step, he expanded the sales figures on retail trade. As part of the monthly economic figures (*Monatliche Wirtschaftszahlen*), the IfK published sales indices of clothing, household goods and furniture since

[65] Following the Harvard Committee's example, the IfK published special issues of the *Quarterly Journal* in which IfK's scientific staff Hermann Hennig, Paul Lorenz, and Otto Donner disclosed their methods on detrending and deseasonalizing time series. Wagemann expected businessmen to use these methods and adjust their time series to make them comparable to the IfK's branch statistics and barometers. However, the statistical methods were too complex and labor-intensive for the readership and the members of governing board. In late 1928, business associations expressed its dissatisfaction with the publications by the IfK, notably due to the lack of applicability for the practical man (Kulla, 1996, p. 52).

[66] Economist Joseph Schenk (1878-1967), a Bavarian delegate in Berlin, reported from his attendance at the IfK's governing board that many members demanded the IfK's publications to be more "processed" (*verarbeitet)*. See Schenk an Staatsministerium für Handel, Industrie und Gewerbe, 20. Juli 1928, in BayHstA, MHIG 1074.

[67] In the original, Wagemann (1929a, p. 1) remarked: "*Der Deutsche Kaufmann hält immer noch sein Handgelenk für zuverlässiger, für vertrauenswürdiger als die graphische Kurve, seine Fingerspitzen für exakter als die Spitze des Zirkels*".

May 1928.[68] By 1932, the IfK disposed of more than 30 series on retail trade.[69] The idea behind these detailed retail statistics was not only to allow an individual firm to compare itself with its own industry. Wagemann argued that entrepreneurs could use the indices to assess the conditions in branches on which they depended and thus draw conclusions about their own sales opportunities.[70] With these detailed series, Wagemann also targeted smaller businesses, which were still responsible for a large part of investments.[71]

In the second step, the IfK published a new category in the weekly reports called "business index card (*Konjunktur-Kartei*)" in early 1931. It consisted of a one-page analysis in text-form of a particular branch in Germany or abroad. These analyses appeared periodically and were designed to be cut out of the *Weekly Reports* by the readers.[72] In the third step, Wagemann demanded his staff to make the calculations for detrending and deseasonalizing time series easier and less time consuming.[73] In the fourth and final step to make the use of the barometers as straight-forward as possible, Wagemann distributed thousands of handy booklets to businessmen and business associations. The booklet, titled *Curves and Numbers* (*Kurven und Zahlen*), started as a special supplement to the *Weekly Reports* in

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[68] See *Wb* 1928, 5. The sales indices compiled from hundreds of individual companies were published with a lag of one to two months (*Wb* 1930, 28, p. 109).

[69] See *Wb* 1932, 3. The sales indices also show the IfK's advantage over its competitors. Without close ties to industry and commerce and their willingness to share their data, the IfK would not have been able to provide a detailed account of the development of sales. As Kurt Singer (1926, p. 819) from the economic journal *Wirtschaftsdienst* explained, when Spiethoff tried to construct the Harvard barometer for Germany he had to rely on the number of bills of exchange in order to represent the sales, because "a better representation of sales" was not available in Germany. The majority of the IfK's sales statistics were published as indices because firms did not want to have their absolute numbers publicly released. The IfK also had to encode the raw numbers on employment by the major industries (Tooze, 2001, p. 142). See Klein (1997) for an account of how to hide information with indices.

[70] See *Wb* 1931, 26.

[71] Wagemann claimed that small technologically advanced firms were responsible for 1/7 of total investments in the early 1930s. Wagemann also believed that small firms were more stable during economic crises than large industries. See "*Hilfe für das Handwerk*", in *Sächsische Volkszeitung*, 32, 24 (28. Januar 1933), p. 1.

[72] The index card on the woodworking industry (*Holzbearbeitende Industrie*), for example, was published twice a year. When the *Weekly Reports* were restructured in 1932, the IfK explained that "in response to a frequently expressed wish", the business index cards were printed on one side only to allow the readership to cut them out without damaging the rest of the report. See *Wb* 1932, 50.

[73] Wagemann presented a new method of deseasonalizing by "periodogram" (*Periodogramm*) and a simpler way of calculating trends in his *Business Cycles* (Wagemann, 1928a, p. 236). A shorter edition of Wagemann's main work, including "periodogram" templates, appeared shortly after (Wagemann, 1929b). Simplified methods to calculate the trend were elaborated by Paul Lorenz by using tables of polynomials that saved calculating time (*VzK* 1931, *Sonderheft* 21).

1932.[74] The booklet contained the central time series and charts with which Wagemann's barometer system could be constructed. A second edition, which appeared in 1935, also included sales figures for retail trade in a separate booklet. The three booklets are shown in Figure 29, opened on one of more than 20 pages that show a table on the left-hand side and the corresponding chart on the right-hand side. The 1935 retail trade booklet on top shows the (deseasonalized) indices of the turnover in "office supply" (*Bürobedarf*). The 1935 booklet in the center shows the change in deposits in savings banks (*Veränderung des Einlagenbestands*). The 1932 booklet on the bottom depicts the rates of employment in the consumer goods and production goods industries (*Beschäftigung in der Industrie*).

[74] Subscribers to the weekly reports received a free copy and further copies could be ordered directly from the publisher *Reimar Hobbing* (*Wb* 1932, 38/39). As the weekly reports had a circulation of several thousand issues, the booklet was widely distributed.

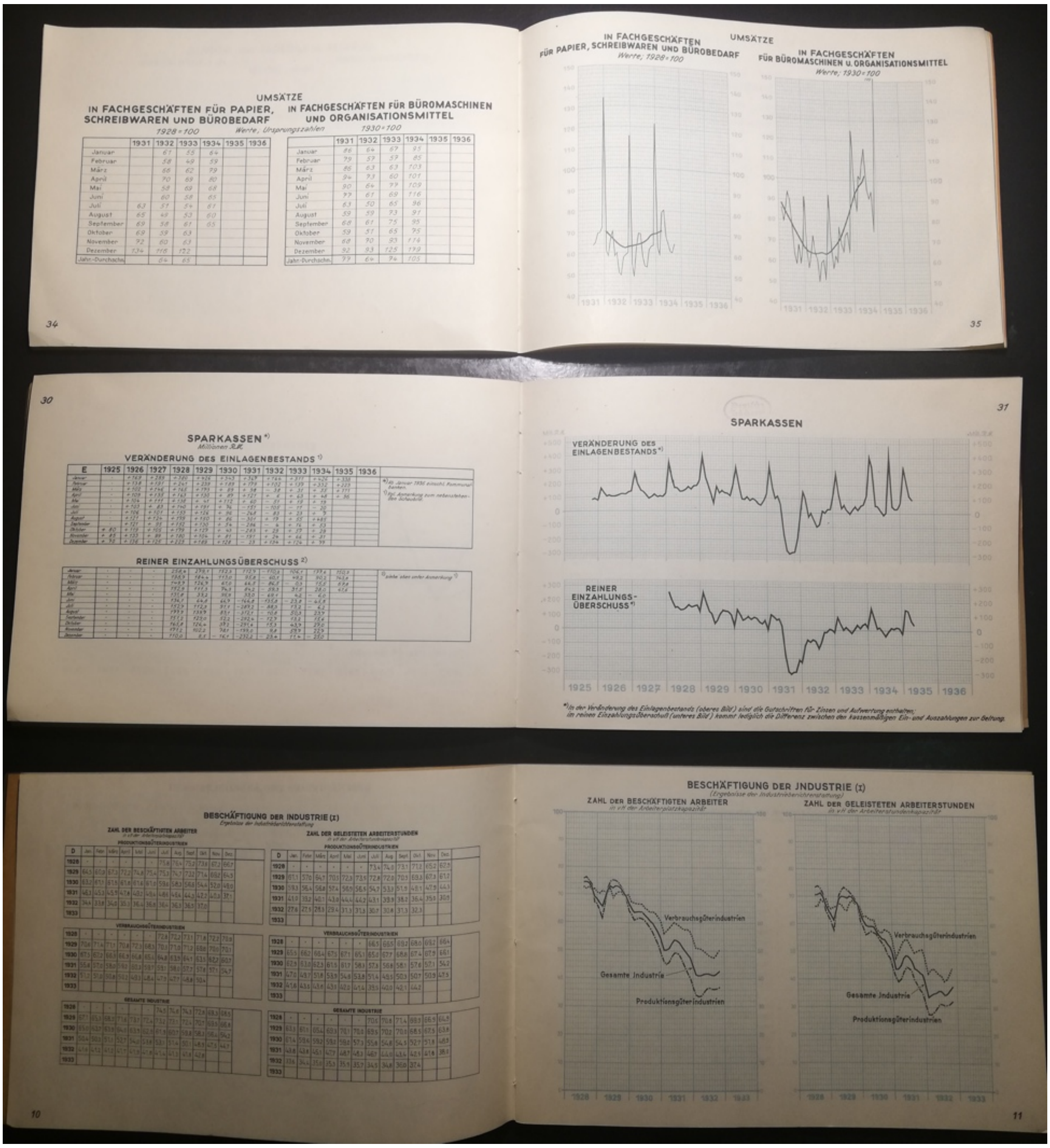

Figure 29: The three editions of the *Curves and Numbers* (*Kurven und Zahlen*) booklet. On top, the 1935 booklet on retail trade. In the center, the 1935 edition with general statistics. On the bottom, the 1932 edition. Source: *Deutsche Nationalbibliothek Leipzig*.

These charts could be used, for example, by an office supply retailer to assess his output side. The businessman could investigate the curves (in the top booklet) and conclude that the demand for office supplies (left chart) might continue to rise in the future because the sales of office machines (right chart) have surged. He might also derive from the other two booklets that savings and employment were low, which indicated that consumers might not be willing to buy office supplies.

Wagemann advertised the booklets by claiming that "the display in curves proved to be the best tool" for the "observations of the economic development". Yet, collecting statistics and drawing the curves, needed "preparatory work that was too cumbersome for an individual businessman". The booklets relieved the businessman from such cumbersome work by providing a template in which the curves could be drawn by hand.[75]

The booklets contained a collection of economic curves and their corresponding overviews of numbers, which could be updated monthly. As of 1932, the monthly economic numbers in the *Weekly Reports* were replaced by six supplements (*Zahlenbeilagen A-E)* that were published throughout the month, with the result that they were "available to our readers much earlier than before".[76] Every week one of four monthly tables was attached to the weekly report. Each contained several series that could be transferred to the booklet by hand. These series were marked with a black dot (•) to simplify the process.

Figure 30 shows two pages of the 1935 general booklet once owned by German economist Richard Sieben.[77] The three curves on the right-hand side show one of the profit barometers (A 2 in Figure 28), here called "price tendency" (*Preistendenz*). The table on the left-hand side with the cost-of-living index (*Lebenshaltungskosten*), wholesale prices (*Grosshandelspreise*), and sensitive prices of raw materials (*Reagible Warenpreise*) could be monthly updated by the statistics in the *Weekly Reports*. Based on the tables, the curves on the right could then be continuously extended (in this case even until 1937).

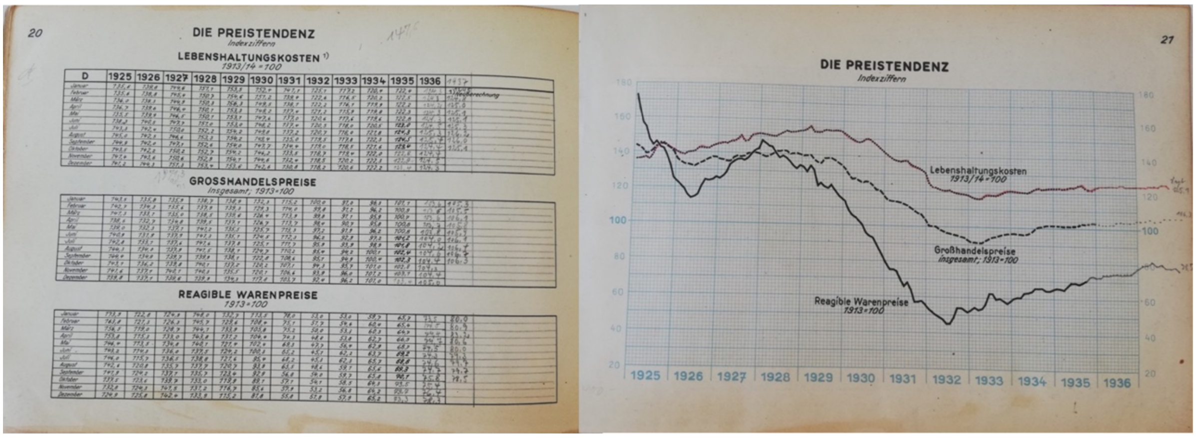

Figure 30: Two pages of the 1935 booklet *Curves and Numbers* (*Kurven und Zahlen*) with general statistics. The booklet belonged to German economist Richard Sieben. Source: own possession.

[75] See the advertisement in *Wb* 1932, 38/39.

[76] See the cover page of *Wb* 1932, 50.

[77] Richard Sieben (?-?) wrote his dissertation on advertisement for consumer products (*Gemeinschaftswerbung für Konsumfertigwaren*) in 1936 and was an expert on retail trade. He later published a book on trade between East and West Germany (*Interzonenhandel*) and assisted Kurt Leopold, the head of the *Treuhandstelle West für den Interzonenhandel.*

The booklets allowed subscribers to the weekly report to carry around an up-to-date current state of the economy in the shape of 20 tables and curves. A businessman now possessed ready-to-use barometers that he could involve in his decision-making process. The booklets also had much significance for Wagemann. As he did not have the "possibility to shine a light into the profit opportunities of businesses" (Wagemann, 1931, p. 177), he could only estimate that profit opportunities would arise when the conditions on the input and output side of the businesses were favorable. With the booklets, Wagemann could bridge this information asymmetry not by gaining more insight into the "brains of the entrepreneurs" but by imposing his knowledge of the economic conditions on them. In other words, he knew the actions of the entrepreneurs, because he offered to them the guidelines about when to take action.

Wagemann's efforts to render his publications more user-friendly seemed to pay off at first. By 1929, the Dortmund Chamber of Commerce, which refused to subscribe to the weekly reports earlier, saw its members becoming avid followers of the IfK. Newspapers printed the IfK's charts to such an extent that Wagemann considered charging a fee for reprints (Tooze, 2001, p. 152). Bankers and industrialists appreciated the statistics as they provided an unrivaled overview of the state of the national economy. In early 1930, the Central Association of the German Banking and Financing Industry (*Centralverband des Deutschen Bank- und Bankiergewerbes*) knew from its members that the IfK's publications were "a treasure trove [*Fundgrube*] of information about the economic development". Accordingly, "the banking world made extensive use of the material [and the] same would also apply for other branches".[78]

The same success was probably not bestowed on the handy booklets. By the mid-1930s, Wagemann (1935b) still came to the verdict that businessmen shied away from the IfK's publications. The booklets were seldom mentioned in the IfK's governing board and business economists did not refer to them. That businessmen used the booklets, let alone based their decisions entirely on them, was an elusive goal. I have not been able to find evidence of the active use of a booklet by a businessman.[79] It is likely that the IfK's charts in the booklets remained too broad for the unique conditions a single company faced in daily business. The managers of the Auto Union AG in Chemnitz, or the Schocken

[78] See BArch, R 8127/15040, pp. 1-2.

[79] The only used booklet I was able to find is the one by Richard Sieben, who was not a businessman.

AG in Zwickau, for example, extracted some statistics or other pieces of information from the IfK's *Weekly Reports* and combined them with very specific peculiarities of their market.[80]

Anticipating the unique conditions of a great variety of businesses remained impossible after all—giving much credence to Sombart's analysis of the landscape of firms in Germany of the 1920s that we have encountered in Chapter 5. As we will see in the next section, the only way to anticipate the behavior of the private sector was to force businessmen into behaving in accordance with the authorities. With the rise of the National Socialists, coercion of businessmen intensified and even Wagemann's biological analogies turned into watchwords.

8.4 Biological Analogies as "Watchwords" for *Gleichschaltung*

The terminological similarity between the "organic-biological principle" and the National Socialist "organic construction" (*organischer Aufbau*) of the economy, tempted Austrian economist and historian of economic thought Karl Pribram (1877-1973) to deem Wagemann not only a romanticist, but even a forerunner of National Socialism.[81] Pribram's assessment is of importance because it is representative of a widespread opinion about historically inclined economists of the early 20th century. Pribram (1983, pp. 372–378) assigned Wagemann a place among "Organismic Economics" (as part of the category of the Historical School) due to his studies under Schmoller and Wagner and his affinity to biological analogies. On the one hand, Pribram argued, Wagemann followed an "ambitious organismic scheme" to research the "'organic' structure of the German economy". On the other hand, Wagemann conducted a "purely descriptive, statistical business cycle analysis" independent of "any theoretical foundation". By theoretical foundation, Pribram primarily meant Fisher's quantity theory of money, which was "ignored by German economists".

Apart from the wrong claim that the quantity theory was ignored in Germany, and Pribram's use of ill-defined terms "organismic", or "organic", there is an apparent contradiction in his assessment:

[80] In the documents surrounding the financial statement of 1936/1937 by *The Auto Union AG*, three ripped-out pages of a *Weekly Report* show up. Its reader highlighted the statistics on the sales of motor vehicles. Yet, as the report by the administrative department shows, the Auto Union did not have a subscription to the IfK's *Weekly Reports* (SächsStA, 31050 Auto Union AG, Chemnitz, Nr. 3886). Similarly, the Schocken Department Stores (*Kaufhaus Schocken*) had much more interest in the country overviews (*Länderberichte*) in the *Weekly Reports* of the 1940s than in the statistics (SächsStA, 31451 Schocken AG, Zwickau, Nr. 312).

[81] The "Law on the Preparation of the Organic Structure of the German Economy" (*Gesetz zur Vorbereitung des organischen Aufbaus der deutschen Wirtschaft*) of February 1934, authorized the Economic Ministry to recognize, establish, dissolve, or merge business associations and chose their leaders (Deutsches Reich, 1934, p. 185).

Wagemann followed an "organismic scheme", while at the same time lacking any theoretical foundation. Pribram could make his claim, however, because he saw in Wagemann's "organismic scheme" only a collection of "watchwords". Together with members of the Historical School, Wagemann thus "prepared the soil […] for the subsequent acceptance of the National Socialist creed" (Pribram, 1983, p. 378). By assigning biological analogies a mere rhetorical, or ideological role, Pribram did away with what could be called Wagemann's theoretical framework and was therefore able to claim that there was none.

Without a doubt, Wagemann had nationalist aspirations that he justified by biological analogies. As the second part of the organic-biological principle stated, the economy had an inner life, and "foreign economic organisms affect the system simply as stimuli". Many of Wagemann's paragraphs also resemble the writings of fascist economists like Othmar Spann, Nazi ideologists like Gottfried Feder (1883-1941), high-ranking Nazi officials like *Gauleiter* Josef Wagner (1899-1945), not least because they contain analogical comparisons between the biological and the social. In a letter to Hitler concerning his demission as president of the Statistical Office, Wagemann emphasized that he had "developed thoughts and a system in the state sciences [*Staatwissenschaften*], which go back to [Hitler's] fundamentals". Wagemann also made sure to emphasize that he entertained "a close exchange of ideas with men like [Gottfried] Feder and [Walther] Funk".[82]

Wagemann's appeal to Hitler's fundamentals might have been motivated by his intention to avert the accusations that he was a socialist economic planner. However, if one compares certain fundamental beliefs of Hitler and Wagemann, his statement seems to be accurate. Economic historians highlighted that the economic principle of National Socialism was built on private property and the self-governance of industry (Temin, 1991; Fremdling, 2020). As we have seen, Wagemann had always emphasized self-governance and limits of state intervention. Towards the Nazi seizure of power, Wagemann's contacts with Gottfried Feder intensified (Tooze, 2001, p. 175). In late January 1933, Wagemann published an article on deflation in Feder's journal *German Weekly* (*Deutsche Wochenschau*).[83] Re-emphasizing the need for a stable credit system that he already voiced in 1932, Wagemann claimed that the "entrepreneurial state" (*Unternehmerstaat*) needed a credit organization

[82] See Wagemann an Reichskanzler Hitler, 23. März 1933, in BArch, R 43-II/1157e, p. 31-33.

[83] The weekly journal (first published in 1923) devoted one page titled "folk and economy" (*Volk und Wirtschaft*) to economic issues. Next to several contributions by Gottfried Feder himself, the segment contained articles by *Reichsbauernführer* Walther Darré (1895-1953), and economist S*taatssekretär* Fritz Reinhardt (1895-1969).

in which "public interest stood before self-interest" (*Gemeinnutz steht über Eigennutz*).[84] Only one week before, Hitler had published a short article in Feder's journal, where he stated that:

> "The healing of the serious catastrophes afflicting our people is not possible through emergency decrees, but only from the depths of the people. This movement must be taught on a small scale what the people should also possess on a large scale. I have therefore educated a movement in which, from the very beginning, from the smallest to the largest, I have burned out democracy and replaced it with authority."[85]

Recall that Wagemann had similar aspirations with the IfK. The barometer system, the booklets, the *Weekly Reports*, and forecasts aimed to educate and alter the behavior of the smallest units, the businesses, to benefit the whole. Wagemann also rejected one-sided emergency decrees, or state interventions, and entrusted the well-functioning of the economy to the entrepreneurial state. The similarity of Wagemann's research and the National Socialists' economic agenda is also reflected in the fact that the seizure of power by the National Socialists in 1933 at first did not greatly affect the IfK's work (Krengel, 1986). Wagemann continued to publish his forecasts, handed out booklets, and promoted his barometer system. His metabolism barometer system was published in the main part of the *Quarterly Journals* until late 1933 and then became obsolete due to the extended branch analysis in the B parts of the *Quarterly Journals*.[86] That Wagemann could pursue his work and continue to give guidance to businesses supports the commonly accepted idea that there existed a "first phase" of

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[84] "*Wie lange noch Deflation?*", in *Deutsche Wochenschau*, 10 Jg., Nr. 3 (21. Januar 1933), p. 5.

[85] In German, Hitler claimed that: "*Die Heilung der schweren Katastrophen, die unser Volk heimsuchen, ist nicht durch Notverordnungen möglich, sondern nur aus der Tiefe des Volkes. Dieser Bewegung muss im Kleinen beigebracht werden, was das Volk auch im Großen besitzen soll. Ich habe also eine Bewegung erzogen, in der ich von Anfang an, vom Kleinsten bis zum Größten, die Demokratie ausgebrannt und durch Autorität ersetzt habe*". See "*Warum nicht mit Gewalt..? Der Weg der deutschen Freiheitsbewegung*", in *Deutsche Wochenschau*, 10. Jg., Nr. 2 (14. Januar 1933), p. 2.

[86] This renewed restructuring of the journals was not due to a fundamental change of the barometers but owed to Wagemann's efforts to reduce the size of the main part (A) of the *Quarterly Journals*, which from 1934 contained only a brief overview of the economy.

the Third Reich, where state controls over private companies were rather loose (Plumpe, 2003, p. 266).[87]

It is therefore not surprising that Wagemann contributed a chapter to the first *Yearbook of National Socialist Economy* (*Jahrbuch für nationalsozialistische Wirtschaft*) in 1935. In the chapter, Wagemann reiterated the importance of the self-governance of industry in combination with leadership (*Führung*) by his barometers. The cell analogy was perfectly suitable for an economic agenda that defied central planning and that was congruent with National Socialist ideology:

> "It is one of the basic ideas of National Socialism that, just as the family is the cell of the national community [*Volksgemeinschaft*], the enterprise is and remains the natural cell of the national economic working community [*Arbeitsgemeinschaft*]"[88]

It is fair to say that Wagemann "prepared the soil" (Pribram) for the acceptance of the National Socialist creed. However, as we have seen, his biological analogies were not just "watchwords" but the fundament of his functional theory of the economy that he started to develop in the second half of the 1920s. In the mid-1930s, Wagemann's functional theory and his barometers became part of the diverse National Socialist economic agenda next to Spann's corporatist state (*Ständestaat*), the NSDAP's doctrine "public interest before self-interest" (*Gemeinnutz vor Eigennutz*), Feder's distinction between "estate" (*Stand*) and "function" (*Funktion*), and the generally held belief in self-governance (*Selbstverwaltung*) of industry. As German historian Rainer Zitelmann (1991, p. 18) fittingly put it, the "National Socialist economic system" was a "brushwood" (*Gestrüpp*) of different ideologies that altered over time through the impetus of leading National Socialists (Hitler, Göring, Ley, Todt, Keppler, Rosenberg, Speer).

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[87] While a complete submission of industry was never achieved or intended by the National Socialist regime, control and planning intensified especially with the Four-Year Plan headed by Göring in 1936. While the New Plan (*Neuer Plan*) of 1934 already restricted the trade of raw materials and semi-finished goods, the Four-Year Plan set up severe restrictions to boost autarky and prepare for war. Quotas on raw material, steering of investments, and job creation were the main tools of the Four-Year-Plan (Petzina, 1968). Wagemann (1940, pp. 136–137) considered the price controls (*Preisstoppverordnung*) of 1936 to be a harsh restriction. A cap on prices implied steering of commodities (*güterwirtschaftliche Lenkung*) through quotas on raw materials, control of investments, exports, and consumption. The debates on the effectiveness of state control during the Third Reich are still ongoing. See Buchheim and Scherner (2006) for a discussion on the latest developments.

[88] Wagemann (1935b, p. 61) claimed that: "*Es gehört zu den Grundgedanken des Nationalsozialismus, dass, so wie die Familie die Zelle der Volksgemeinschaft ist, der Betrieb die natürliche Zelle der volkswirtschaftlichen Arbeitsgemeinschaft ist und bleibt*". As is well known, Hitler also made use of the cell and body analogy, when he claimed that the family was "the germ cell of our folk- and state body" (Zitelmann, 1991, p. 13).

It has long been argued that this National Socialist brushwood was dominated by a "characteristic duplicity" of "backward political romanticism and glorification of technical scientific modernity" (Bracher, 1982, p. 11). Gottfried Feder merged this duplicity into one worldview that is almost impossible to disentangle. The matter is further complicated by the fact that Feder added to the duplicity the element of coercion of the "prerogative state" (Fraenkel, 1941/2017).

On the one hand, Feder (1933) inquired into the "functional role" of money and credit in the German economy along the lines of Wagemann. On the other hand, he outlined a new order of the German "organic economy" based on Spann's corporatist state (Feder, 1931). At the 1933 Nuremberg rally, Feder presented his ideas of a new order in which the "cross connections" (*Querverbindungen*) between economic actors (*Arbeiterschaft, Angestellte, Beamte, Unternehmer, Syndikate*) should be replaced by vertically structured corporations (*Stände*). Under technological guidance by engineers and businessmen (*Führungsanspruch der Technik*) each branch, or corporate (*Stand*) decided about their specific "task" (*Sachaufgabe*) instead of being controlled by a "parliamentary system". Feder's "organic economy", which in some sense found its representation in the *German Labor Front* (DAF), could only be implemented by force, that is, by the destruction of the existing unions.[89]

Feder left unexplored the interconnections between different actors and economic forces (prices, quantities, money, interest rates). Instead, he demanded the abolition of currency and interest rates, granted no "estate" to the "typically Jewish" commerce, reiterated Spann's "mystery of reciprocity" and plunged into the glorification of the Middle Ages. His reminiscence of the "well-ordered, well-structured economy" of the Middle Ages described in Richard Wagner's *Meistersinger von Nürnberg* show the romanticist side of Nazi ideology that "consisted of emotions, ressentiments, and dreams" (Broszat, 1976, p. 49).

As with other cases of National Socialists' appropriation of political and economic knowledge, it remains ambivalent what goals Feder aspired to when taking over Wagemann's ideas about a new

[89] Feder's speech "*Gedanken zum ständischen Aufbau. Eine authentische Antwort auf die Frage: 'Wie wird der ständische Aufbau der deutschen Wirtschaft aussehen?'*" has been published in his journal *Deutsche Wochenschau* in three parts (Part 1: 10. Jg., Nr. 36 (9. September 1933); Part 2: 10 Jg., Nr. 37 (16. September 1933); Part 3: 10. Jg., Nr. 38 (23. September 1933)). Feder emphasized that the "lowest cells" of the economy were the companies and that the corporatist state (*Ständestaat*) brought the disorderly "economic conglomerate" into a planned and clearly differentiated organism" (*planvoll gegliederter und gegeneinander klar abgesetzter Organismus*). In a pamphlet (1931), Feder re-emphasized his disdain for cross-connections (*Querverbindungen*) and argued that in the "organic economy", the "general interest" of the national economy is protected against the "special interest" of individual branches (for example by prohibiting exports of textile machines that could endanger the German textile industry). On Feder's influence on the NSDAP's economic program, see Plöckinger (2018).

credit system, or Spann's corporatist state. On the one hand, they might have been motivated by Feder's genuine intentions to build a new economic order.[90] On the other hand, they could have been, and probably were, catchwords for coercive measures, Anti-Semitism and "magic words that are destined to produce certain affects and to stir up certain emotions" (Cassirer, 1946, p. 283).

If this "characteristic duplicity" can be regarded as a spectrum, Wagemann is to be placed at the opposite end of "backward political romanticism", that is, in the "glorification of technical scientific modernity". Over the course of the 1930s, Wagemann adopted the terms "organic economic concept" (*organische Wirtschaftsauffassung*) and "mystery of reciprocity" (*Geheimnis der Gegenseitigkeit*). However, Wagemann did not advocate a medieval corporatist structure of the economy and, above all, did not think that the interrelationships between the parts of the economy should remain a mystery. Based on his functional theory, Wagemann (1936b, pp. 123–124) worked out the concrete interdependencies between economic variables and discovered the close interrelationship between imports and exports and other "insoluble relationships of simple and complex kind".

By 1936, Wagemann's ideas to empirically study the economic organism and induce from it the strength of interconnections had made room for the National Socialists' aim to shape the economy towards rearmament. The IfK's journals declined in significance as forecasting had fallen out of favor with the government. As of 1935, the forecasts took up less space in the *Quarterly Journals*, only to be abandoned in 1937 together with the branch barometer system. The IfK gained a significant number of employees by 1939 but had turned into a consultancy agency that was called in for planning advice. As Walther Däbritz explained, during the National Socialist planned economy, the IfK transformed from a "resource of information for individual companies" into an "instrument of state leadership". The IfK's focus on the business as a cell was lost in the transition towards the "development of long-term economic plans".[91] In the 1937 edition of the *Yearbook of National Socialist Economy*, Wagemann is no longer present. The book is dominated by jurists instead of economists, giving flesh to Julia Kahn's (2006) thesis that the National Socialist economy was "steered by law".

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[90] As German historian Heinz Duchhardt (2008, p. 129) argued, German jurist Karl Freiherr vom Stein (1757-1831) has been instrumentalized by the National Socialists, although vom Stein's "municipal political ideas had aimed at precisely the opposite of what the Nazi laws imposed on the municipalities". However, as Wolfgang Stelbrink (2003, p. 218) highlighted, there are many signs that the Nazi adherents to Stein did not have "purely manipulative intentions", but were genuinely interested in establishing self-governance according to Stein's ideas.

[91] See "*Wirtschaftsforschung an der Ruhr*", in *Kölnische Zeitung mit Wirtschafts- und Handelsblatt*, 14, (15. Januar 1944).

Yet, to rearm Germany, the National Socialists could draw on an initiative started by Wagemann in the late 1920s. The industrial census that Wagemann ordered in 1927 could be completed in 1935. It tracked all types, quantities, and values of commodities and raw materials in each sector and served as the "basic reference for all future attempts at wartime macroeconomic planning" (Tooze, 2001, pp. 130, 178, 265). The rearmament efforts based on the census meant "to abstract from the individual firm and to concentrate on the overall flow of production". According to Tooze (2001, p. 265), "this was no longer Konjunkturforschung of the 1920s. This was a truly totalitarian vision of surveillance and control".

Remember that Wagemann's barometer system gave the entrepreneur a crucial role in deciding about the course of the economy. In order for the transformation of raw materials into commodities to actually take place, the right conditions had to be met—conditions that could be assessed by the entrepreneurs by consulting the barometers in the booklets. The census of 1935, however, traced the physical quantities of commodities or raw materials that ran through the industry. With the census, Wilhelm Leisse (1886-1944), the head of the Department of Production Statistics in the Statistical Office, could focus on the flow of scarce raw material and steer resources to those industries that worked towards the National Socialists' goal of rearmament (Tooze, 2001, pp. 213–214).

The efforts to control the flow of raw materials was one of two main pillars of the Four-Year Plan (*Vierjahresplan)* of autumn 1936. The second pillar was the extended price controls implemented by the price commissioner (*Reichskommissar für die Preisbildung*) Josef Wagner (1899-1945). At first glance, Wagner's price controls seem to follow Wagemann's functionalist approach that emphasized interdependencies and rejected one-sided relationships. Wagner claimed to set prices based on an "organic procedure", guided by "an intimate familiarization [*innige Fühlungnahme*] with the interdependencies of economic life". Wagner understood his work as an overhaul of the insufficient regime of ceiling prices during the first years of the Third Reich, a regime that he considered to be one-sided, prone to distort price incentives and failing to embrace "the totality of the economy".[92]

To overcome the weaknesses of the old system of price controls, Wagner, with his team of 380 employees, registered every commodity in the production process and estimated their cost of production. On these estimates, he established a flexible and adaptable system of fixed prices instead

[92] See "*Aufgaben des Preisbildungskommissars*", in: *Kölnische Zeitung*, 580 (14. November, 1936), and "*Sinn und Zweck der neuen Preismaßnahmen. Reichskommissar Wagner erläutert*", in *Deutsche Bergwerks-Zeitung*, 282 (2. Dezember, 1936).

of rigid ceiling prices.[93] How Wagner's adaptive system of price control and price creation (*Preisbildung*) worked in detail is not well researched and it remains uncertain what Wagner exactly meant by switching his perspective from one-sided ceiling prices to the "totality of the economy". What is certain, however, is that by focusing on commodities, Wagner reduced Wagemann's system of interdependencies of branches and businesses to the cost of production. It is also likely that respecting "totality" was simply a euphemism for rearmament and *Gleichschaltung* by coercion. Wagner left open the possibility for businessmen to negotiate prices, but he was straightforward about what non-cooperation meant. If the ceiling prices agreed upon were exceeded, Wagner reserved the right to "severely punish" the infringers.[94]

In comparison to Leisse's and Wagner's program of controlling quantities and fixing prices, Wagemann's system seems like a liberal alternative for economic control in the 1930s—one of the "alternatives to the economic strategy pursued by Hitler's government" (Tooze, 2006, p. 33). Wagemann could not coerce businesses to adapt the barometer system. For Wagemann, the totality was the welfare of the German citizens reflected in a smooth and tamed business cycle. Wagemann's barometer system did not prioritize public over private benefits, but was in accord with business economists' hope that a leading authority could "achieve the effect that the public and private benefits always coincide" (Schmalenbach, 1925, p. 70).

[93] On Wagner's work, see the detailed contributions by André Steiner (2006a, 2006b). As Steiner (2006b) showed, the price regulation after 1933 under the economically liberal Carl Goerdeler (1884-1945) led to the distortion of prices, black markets, and hoarding. Wagner was not able to completely halt inflation, but in light of the disadvantages he had in trying to keep prices low (full employment, autarky, large investments in rearmament), a rate of inflation of 8% is remarkably low.

[94] Wagner claimed that the National Socialist did not strive to establish an "economic system" (*Wirtschaftssystem*), but rather an "economic concept" (*Wirtschaftsauffassung*) guided by a "national socialist spirit". In this economy, the state was equipped with the tools of "warning, urging, guiding and severely punishing". See "*Sinn und Ziel der neuen Preismaßnahmen. Reichskommissar Wagner erläutert*", in *Deutsche Bergwerks-Zeitung*, 282 (2. Dezember 1936). Along the same lines, Wagner later claimed that "personal freedom in economic activity" was only granted to those with the "highest discipline towards the whole". See "*Nationalsozialistische Wirtschaftspolitik. Preiskommissar Wagner auf einer Kundgebung in Hagen*", in *Bremer Nachrichten mit Weser-Zeitung*, 345 (16. Dezember 1937).

Business economists were quick to adjust their hopes and signed a vow of allegiance to Hitler.[95] German business economist Paul Deutsch (1901-1977), for example, maintained that the national economy consisted of "millions of single economic entities, [or] cells, called enterprises" that were filled with the "National Socialist spirit". These enterprises exercised "their functions in the organic whole out of innermost conviction" and adhered to the principle of "public interest before self-interest" (Deutsch, 1934, pp. 145–151).[96]

Wagemann did not take long either to adjust his terminology to the new political conditions. In his assessment of the new German order, Wagemann (1935c, p. VI) made sure to highlight that the German economy of the 1930s was founded on "property", "entrepreneurial responsibility" and "public interest before self-interest". Wagemann argued that in the new National Socialist economy, the businessman was "harnessed by the state", which allowed the state to "master and shape" the economy. Even more pronounced, in the first edition of *Europa-Kabel*, a journal established to promote the European economic area under the National Socialist lead, Wagemann (1941b, pp. 25–26) claimed that under the new German dominance, the state "mandates the economic objectives", but also "lifts the entrepreneur from the role of a private businessman to the level of a national economist". According to Wagemann, "entrepreneurship was by no means disenfranchised", but its tasks were transformed under the "new economic order".[97]

Taking Wagemann's remarks at face value seems to indicate that Wagemann not only prepared the soil for National Socialism, but that his vision of a technocratic entrepreneurial economy was turned into reality under authoritarian rule. It is appealing to think along the lines of historian Avraham Barkai (1921-2020) that Wagemann's long-held plans of economic control could finally be

[95] The vow of allegiance to Adolf Hitler (*Bekenntnis der Professoren an den Universitäten und Hochschulen zu Adolf Hitler und dem nationalsozialistischen Staat*) of November 1933 was signed by most of the business economists whom we have encountered in the previous section. It included Paul Deutsch, Erich Schäfer, Wilhelm Vershofen, Max Rudolf Lehmann, and Konrad Mellerowicz among others. See Mantel (2009) for a study on the relationship between business economics and National Socialism. Wagemann did not sign the document.

[96] The empty phrase "public interest before self-interest" appears in most National Socialist economic literature. German jurist Hans Merkel (1902-1993), for example, emphasized in his "scientific foundations" of the *National Socialist Economy* (1936) that only the acts that benefitted the "whole people" (*Volksganze*) had a right to exist. Mirroring Spann, Merkel (1936, pp. 3–12) promoted "living thoughts" instead of "dead formulas" and drew attention to the "function" of the individuals within the whole. On National Socialist economic theories, see Janssen (2012).

[97] Clearly, Wagemann's adherence to the new order, was not the "break with scientific traditions" that Vilk (1992, p. VII) highlighted in his analysis of German business cycle theories of the 1930s. As in the 1920s, Wagemann considered that businessmen were the carriers of the economy.

successfully implemented through coercive measures that would not have been possible during the Weimar Republic (Barkai, 1988, p. 177). However, when Wagemann felt less restricted in voicing his opinion, he assessed the economic order of the second half of the 1930s quite differently. In an interview with the Norwegian daily *Aftenposten* in early 1937, Wagemann pointed to the high price that was paid for economic growth of the 1930s. Praising the efforts by Hitler and Hjalmar Schacht (1877-1970), Wagemann emphasized that their economic plans could only be reached by "absolute force". Overall, argued Wagemann, "the German system has not raised people's standard of living, on the contrary."[98]

Even though Wagemann's incautious remarks were registered in Germany, his criticism of the German economic system did not have any consequences. As in the case of his infringement on the National Socialists' cause in 1943, Wagemann seemed too vital for the re-organization of the process of production under Göring's lead. As German-American political scientist Franz Neumann (1900-1954) emphasized, "[c]hanges in the process or production are not created by the touching of the flag or by the uttering of ceremonial words, but by work". Even under National Socialist rule, the "process of production is not magical, it is rational" (Neumann, 1942, p. 385). Wagemann stood at the beginning of the re-organization of the German industry with his aim to understand its functional dependencies and his efforts to provide barometers and booklets to the German entrepreneurs. His functional theory, the organic-biological principle, and his metabolism barometers were not ceremonial words, but the tools with which he tried to improve the process of production.

8.5 Conclusion: a variety in functional interconnection

When an intellectual of the 1920s like Wagemann opposes causal explanations and invokes the mental image of a "living organism", one is tempted to draw connections to the general "ideology of despair" (Lukács, 1962/1981, p. 82) and the "conversions to acausality" (Forman, 1971, p. 74) during the Weimar Republic. In one of the most widely read books of the 1920s, German philosopher Oswald Spengler (1880-1936) popularized the organism metaphor and discarded causal explanations as unworthy of intellectual endeavors. In his *The Decline of the West* (*Der Untergang des Abendlandes*), Spengler (1920, p. 179) argued, for example, that civilizations have to be understood as organisms with a morphology all of their own, and he rejected "mechanical causality" that he wished to replace with the physiognomy of nations, immediate cognition (*unmittelbares Erkennen*), and intuition. In

[98] See "*Moderne kredittteorier – Tysklands eksperiment*", in *Aftenposten*, 112, (3. Mars 1937), p. 10.

response to the popularity of *The Decline of the West*, Otto Neurath (1921/1981, p. 190) condemned Spengler's work as a "treasure trove for anyone who seeks excuses for unscientific behavior".[99]

In this chapter, we have seen that Wagemann did not reach into Spengler's treasure trove.[100] Instead, he turned to Hans Driesch's biology in order to solve a specific economic issue. Disillusioned about the usefulness of what seemed to him "mechanical" or monocausal barometers, Wagemann strengthened his belief that economic variables are functionally, rather than causally related. Hence, the economy could not be represented by a regular sequence of curves that predicted each other's movements. For Wagemann, the economy was a living organism that could never be understood by investigating one chart that compressed a variety of time series into two or three curves.

Wagemann specified that he followed an organic-biological principle by which he meant that all parts of the economy stood in functional relationships with each other. These relationships were altering over time and could not be expressed mathematically. Guided by this principle, the Statistical Office and the IfK started to collect hundreds of new time series that represented the different sectors of the German economy. Wagemann could then use these time series to build sets of up to 13 barometers to diagnose the state of the economy. However, we have seen that Wagemann could not live up to his organic-biological principle when he tried to forecast the course of the economy. Despite his assurance that he did not want to give priority to one economic variable, Wagemann had to select a leading indicator, or main cause that set the other economic variables in motion.

At this impasse, Wagemann resorted again to Driesch's biology to create a barometer system based on a new ordering principle. Driesch argued that in order to understand the workings of an organism, the functions of its smallest units, the cells, have to be investigated. Committing to Driesch's thought, Wagemann built a barometer system based on the function of businesses, which he located in their ability to transform commodities in the process of production. Wagemann claimed that businesses had a metabolism (*Stoffwechsel*): they took up raw materials, commodities, and money, turned them into products in their production process, and gave off the finished products to another branch or

[99] On Neurath's critique of Spengler, see also Cartwright et al. (1996, pp. 136–142).

[100] Wagemann knew both Spengler's work and had at least a basic understanding of the conversion to acausality in quantum mechanics. For Wagemann (1931, p. 13) Spengler's *The Decline of the West* was a "bold cultural-philosophical flight of thought". Wagemann's later work on statistical methods also shows that he was aware of the experiments and theories of Ludwig Boltzmann, Max Planck, and Werner Heisenberg. Wagemann argued that their research proved that in the "last decades […] a transformation has occurred that is probably the greatest spiritual revolution that has taken place in the West since the Renaissance". The physicists' challenge to causality seemed like a "wicked conspiracy against reason" (Wagemann, 1941a, p. 62,77).

market. Like cells in the biological body, businesses linked up with other cells and organs of the organism through their metabolism. By this analogy, Wagemann could gauge and weigh the interdependencies of different branches and establish a “functional theory”, or “network” of the economy.

Based on the insight that businesses possessed branch-specific metabolisms, Wagemann created a barometer system of 9 barometers that differed between sectors. With the barometers, Wagemann believed to be able to gauge the specific dependencies in each branch from the point of view of a business and decide whether there existed profit opportunities. If there were, Wagemann expected entrepreneurs to take action and create the conditions for an upswing in the economy. The new metabolism barometer system required businessmen to be well-informed about the conditions they faced on both their input and output sides. Hence, the IfK innovated new methods to make their publications user-friendly. The institute published *Weekly Reports* with up-to-date statistics and handed out small booklets for businessmen to carry around.

I have argued that these efforts only had little impact on the economy. On the one hand, businessmen needed specific knowledge to gauge profit opportunities, which they could not find in the IfK’s publications and booklets. On the other hand, the German economy came under stricter control of the National Socialist regime in 1936. During the Third Reich, the IfK lost its sway over the businessmen and associations and made room for the Economic Ministry’s steering of production towards rearmament. Individual decision-making on the basis of branch barometers lost its appeal.

CONCLUSION

In his *Three National Economies*, Sombart (1930, p. 112) expressed his hostility towards "analytical" (*ordnende*) economists who used the methods of the "exact natural sciences". Among these economists, he counted William Stanley Jevons, Carl Menger, Ernst Schuster (1893-1879), and, most importantly, Karl Marx. From what we have learned about Sombart in Chapters 4 and 5, his hostility does not surprise much. For Sombart, the natural sciences limited themselves to gaining knowledge "from outside" and focused on only "one characteristic of phenomena". Sombart thus maintained that:

> "By providing a measurement, or a number for properties of the phenomenon, natural science has put a formal, one-sided relation in the place of the manifold whole."[1]

As a historian of accounting, Sombart (1930, p. 126) was aware of the quantitative character of the "modern economy" (*moderne Verkehrswirthschaft*) that economists like Jevons and Schuster used to legitimate mathematical and quantitative methods. Hence, Sombart did not dispute that the economy dealt with numbers and quantities. Rather, he opposed mathematical economists because they wanted to "go behind the visual phenomena" and reduce them to the more "simple" and "elementary" facts. As a result, Sombart considered individualistic perspectives, the search for economic laws, and functional-mathematical expressions too reductionist for his economic research.

Sombart did not contend himself with attacking mathematical and reductionist economists but also lashed out against empirical and anti-theoretical economists like his teacher Gustav Schmoller. Already in his *Modern Capitalism*, Sombart (1902a, p. XI–XXIX) aspired to examine the variety of "living processes" in the economy but wanted to go beyond Schmoller's gathering of empirical-historical facts. Sombart sought to establish theoretical "constructions" and "social systems" with the empirical material at hand. Sombart believed that the economist's task was not only to collect variety but also to rework variety into theory. By 1930, Sombart contended that Schmoller did not even live up to his own assertion that the empirical material was not yet sufficiently large to derive theories from. Sombart (1930, pp. 151–153) accused Schmoller of extracting "laws" and "general regularities" from his empirical studies. Hence, Schmoller proceeded in the same way as the "analytical"

[1] "*Indem die Naturwissenschaft eine Messung, eine Zahl für Eigenschaften der Erscheinung ausgibt, hat sie eine formale, einseitige Beziehung an die Stelle des mannigfaltigen Ganze gesetzt*" (Sombart, 1930, p. 126).

economists when he claimed to “reduce the variety of phenomena to more simple ones” (Schmoller, 1888b, p. 38).

Instead of reducing variety to laws, regularities, and one-sided relations, Sombart sought to conserve the “manifold whole” in his theory. According to Sombart (1930, p. 184), the schema that we encountered in Chapter 5 was able to “meet these requirements” as it “combined the different features of the economy into a unity”. Framed by the two plant images that I introduced at the beginning of this thesis, one can argue that Sombart opposed economists who dealt with economic phenomena in the way Schleiden extracted the unity from the variety of plant forms. In his own work, Sombart wanted to create a variety in unity similar to Turpin’s plant.

In this thesis, we have encountered several times the issue that preoccupied Sombart in the above example. Next to Sombart, I have singled out Albert Schäffle and Ernst Wagemann as economists who encountered a great variety of economic phenomena but refused to reduce this variety to laws, typical forms, and simpler units. Instead, they wanted to conserve variety and attempted to combine it into a unity in the sense of Turpin’s plant or Humboldt’s *Tableau*. In Germany, there were many economists who took issue with the reductionism and mathematical methods of the “analytical” economists. I have argued that Schäffle, Sombart, and Wagemann stood out among their German contemporaries because they heavily relied on biological analogies in their economics.

Schäffle took over the concept of tissues (*Gewebe*) from Rudolf Virchow’s biology to claim that society consisted of five layers of tissues in which different types of commodities circulated. From psychologists and neurologists like Gustav Theodor Fechner, Schäffle learned about the nerve cells, fibers, ganglia, and thresholds of consciousness, and adapted them to what he called “social psychophysics”. Sombart borrowed the principle of differentiation and integration from Ernst Haeckel and applied it in his theory of industrial development. Making use of Haeckel’s graphic device, the phylogenetic trees, Sombart claimed that firms unfolded into a great variety. Wagemann adapted the image of the human blood circuit to his ideas about economic circuits and claimed that the different markets of the economy were functionally related through the stream of capital. From his reading of Hans Driesch, Wagemann convinced himself that the economy was a living organism that could best be understood by a close analysis of the metabolism (*Stoffwechsel*) of businesses in different branches.

My main claim was that Schäffle, Sombart, and Wagemann used these biological analogies as tools to conserve variety. By conserving variety, the economists aspired to what Mannheim has termed a “conservative style of thought”: they emphasized the parts of a whole and their interconnections—a variety in unity. This style was diametrically opposed to the “natural-law style”, which sought to find the "typical" laws or reduce variety to the smallest units—a unity in variety. With biological concepts, images, theories, and principles the three economists could give form and more substance to the variety that they encountered in the economy. Hence, I argued that biological analogies had an epistemological value and were not ontological commitments to the view that society and natural organisms are governed by the same laws. Nevertheless, as we have seen most strikingly in the cases of Schäffle and Sombart, the use of biological analogies had ontological consequences. Schäffle could not overcome the negative feature that the social body is not held together by the same substance as human bodies. By contrast, Sombart managed to clarify that integration within social organizations was essentially planning by a central authority—a feature that did not exist in Haeckel's definition of integration.

In my thesis, I could also confirm Mannheim's (1936, p. 111, 1986, p. 45) assertion that the conservative style of thought was not merely an expression of political convictions. Rather, the conservative style "bound up" with an ideologically and politically colored "worldview" (*Weltanschauung*). By investigating in detail how the three main actors of my thesis selected and adapted biological analogies, I was able to show that political convictions only played a subordinate role in their style of thought. We have seen that Schäffle used biological analogies in support of socialism, but also shaped them into anti-socialist claims. Sombart began using biological analogies at the height of his Marxist convictions but deviated from embracing Marx's theory of industrial development due to the insights he gained from using Haeckel's principle. Likewise, Wagemann's adoption of Driesch's biology can only be partly explained by his faith in the self-governance of the industry. Still, his political convictions took effect on his economics as one of the 'ingredients' in his circuit model.

With such findings, I challenged the widespread notion among historians of economics that biological analogies had no scientific value in economics. For most historians, the economists' borrowings from biology indicated that they had abandoned scientific rationality and had replaced it with a mystic appeal to nature. Schäffle, Sombart, and Wagemann must have either lost their minds for placing their bets on biological analogies or they must have used them as political and ideological catchwords. In any case, historians maintained that biological analogies were a failed attempt to learn something from biology about economics. Taking a closer look at biological analogies was therefore a needless task.

As I have indicated in the Introduction, when I tried to confirm the historians' views by gathering more evidence for their validity, I came across three clues that let me doubt their dismissive judgments. I hope that in the course of this thesis, I have been able to corroborate these clues into evidence that overturns the historians' verdicts. First, my economists did not just hand waive to biological analogies but were committed to their substance; they scanned through the works of biologists, borrowed explicit concepts, images, and theories, and adapted them to their economics over several years. Second, even when they were criticized by their contemporaries for borrowing from biology, they continued to use biological analogies and only discarded them when they no longer seemed useful. Third, Schäffle, Sombart, and Wagemann were capable economists who stood at the forefront of economic research and were able to deal with the existing theories of their time. Yet, instead of deepening their knowledge of existing theories, they expanded their knowledge by exploring economic phenomena through biological analogies.

Since I have claimed that biological analogies were not simply catchwords, or ornaments in the three economists' work, I felt compelled to explain when and why Schäffle, Sombart, and Wagemann introduced them. To support my claim that biological analogies were the tools of the economists' style of thought, I also worked out *what* the economists built with them. Based on five cases, I argued that the three economists introduced biological analogies when they stood at theoretical and methodological impasses. At these impasses, the economists claimed to have encountered a great variety of economic phenomena but were unable to fit this variety into the existing theoretical framework. I have suggested that biological analogies helped them to overcome the impasses, because biological concepts, images, principles, and theories equipped the economists with the tools to conserve variety.

We have seen that Albert Schäffle introduced the tissue (*Gewebe*) analogy in 1875, at a time when he could not fit the variety of "symbolic goods" (letters, telegrams, ledgers, storage vouchers, books, and patents) into Hermann's classification of economic commodities (Chapter 2). With the tissue analogy, Schäffle could classify symbolic goods as parts of the "social nervous tissue" and assign them the functions of communication and storage of knowledge. Schäffle further argued that the social body could be "dissected" into five tissues. Thinking about the social body as an assembly of five tissues gave Schäffle pictorial representation and clarity and purported the notion that social pathologies could arise when the tissues were misaligned. Criminality and alcoholism could easily arise, for example, if the housing tissue (bone tissue) grew at a slower pace than the tissue of the labor force (muscle tissue).

Schäffle also used detailed neurological analogies to investigate how symbolic goods traveled between individual "cells" and the "social ganglia" like businesses, cooperatives, and other collectives (Chapter 3). Images of the nervous system and the concepts of "thresholds" and "stimuli" enabled Schäffle to explain how collectives tried to take effect on the subjective values of consumer goods. Businesses, for example, tried to surpass individuals' sensory thresholds by disseminating advertisements through the "social fibers" of the news network. Other "authoritative circles" like groups of economic or technical experts determined the values of ideal goods (education, patents) and tried to modify society through social reform. The existence of social thresholds also suggested that new ideas did not diffuse all over the social body but remained local in enclosed circles.

Sombart stood at a different impasse in 1896. He observed that a great variety of firms unfolded in the economy but could not fit this observation into Marx's theory of industrial development (Chapter 4). Sombart asserted that the industry did not develop linearly from small handicraft firms to large, mechanized factories as Marx had claimed. Instead, Sombart argued that firms 'branched out' as in Ernst Haeckel's ideas about the development of organisms visualized in his graphic device of the phylogenetic tree. With Haeckel's principle of differentiation and integration, Sombart explained that firms unfolded into eight different types of firms with varying degrees of division of labor (differentiation) and organization (integration). We have seen that Sombart believed that non-mechanized and small undifferentiated firms could survive in modern capitalism. He explained the presence of these firms by the fact that by sound organization productivity could be increased even without machinery. In addition, Sombart suggested that a "capitalist spirit" spread to small firms, which enabled them to survive in a modern capitalist economy.

I further explored how Sombart created a "schema" (*Schema*) from these insights by suggesting that the economy consisted of the three "basic components" (*Grundbestandteile*) of spirit, order, and technology (Chapter 5). By these components, Sombart claimed to be able to pin down the character of an "economic system". Sombart maintained that the components and their 12 sub-components could influence each other, which allowed him to show how an economic system developed over time. By the late 1920s, Sombart concluded that the capitalist economy had come to an end and slowly transformed into a rigid socialist economy. Yet, this transition did not imply that the great variety of firms had disappeared. Quite to the contrary, Sombart believed that the industry had become so diverse that Haeckel's principle of differentiation and integration could no longer explain the different types of organizations.

In the last part of the thesis, we encountered yet another set of biological analogies. I showed how Ernst Wagemann became critical of the dominant economic theories and empirical methods of the 1920s (Chapter 7). Wagemann took issue with the quantity theory of money because Fisher used the theory to claim a unidirectional causality from the amount of money to the price level. Wagemann suggested a new monetary theory based on the balance sheet analogy, in which causality could run both ways between the two sides of assets and liabilities. Wagemann went on to expand his monetary theory by depicting the monetary circuit as the double circuit of the human body. I claimed that Wagemann could use this double circuit model not only to form new ideas about inflation but also to re-interpret the ABC barometer by the Harvard Committee. Based on his circuit model, Wagemann claimed that markets in the economy are functionally connected. Yet, I argued that when forecasting the economy based on the barometer, Wagemann could not evade causal explanations that he promised to avoid.

Wagemann had higher ambitions than re-interpreting existing barometers that he considered too reductionistic to begin with. His aim was to build a functional theory of the economy based on what he defined as the organic-biological principle (Chapter 8). Wagemann started from the premise that the economy was a living organism, a great variety of functionally related parts, that could never be understood by limiting an economic investigation to a single point of analysis. Consequently, Wagemann collected large numbers of branch statistics to take into account the variety in the economy and build sets of up to 13 barometers. I pointed out that building large sets of barometers did not suffice Wagemann to live up to his organic-biological principle, because he could not avoid defining leading indicators.

In consequence, Wagemann altered his barometer system by rearranging his large collection of time series. Consulting again Driesch's work, Wagemann found that the idea of metabolism (*Stoffwechsel*) was a fitting ordering principle to narrow down the range of possible combinations of his times series and build new barometers. His new barometer system was built on the idea that businesses possessed a branch-specific metabolism that depended on different economic variables on the input and the output side. By assessing the conditions on both sides of the metabolism, Wagemann could forecast the course of the economy without having to define a main cause or leading indicator.

A main insight from these five case studies is that it does not suffice to explain why the three economists resorted to biological analogies by embedding the three economists in an "organismic school" (Pribram, 1983), or "organic paradigm" (Hutter, 1994). It is telling that Schäffle, Sombart, and Wagemann used completely different sets of biological analogies to make specific claims about the economy. They were more explicit than economists who compared the economy to an organism, and, as we have seen, had pragmatic reasons to borrow concepts, images, and principles from biologists. Based on Hesse's (1966) framework, I have claimed that the economists resorted to biology because they recognized variety as the main positive feature between the natural and the social world. Yet, in the five cases, we have seen that the economists recognized several additional positive features depending on what specific economic issue they wanted to flesh out.

Already prior to his borrowings from biology, Schäffle divided society into a private and a public "tissue" that ran "parallel" to each other, which made the idea of tissue layers much more suggestive. Schäffle had long held the idea that collectives had a retroactive effect on individuals, which facilitated the idea of "social ganglia" and "stimuli" in his *Structure and Life*. Sombart knew from

Marx about the importance of the division of labor and of organization within a firm, which made it easier for Haeckel's principle of differentiation and integration to gain a foothold in his economics. At the time when Wagemann introduced the double blood circuit analogy, many economists reflected on monetary circuits and the perpetual motion of money within them. Likewise, Wagemann knew from business economists that entrepreneurs were occupied with analyzing the input and output of their undertakings, which facilitated the idea that businesses were like cells that took up and gave off materials in their metabolisms.

What can also be learned from my five cases of biological analogies is that inquiring into "organism as a metaphor" (Hutter, 1994) in economics is too broad to determine whether biological analogies were used constructively by economists. With "organism" as a common denominator, the efforts by Schäffle, Sombart, and Wagemann to tease out specific characteristics from organisms are blurred with the works by the Austrians (Menger, Wieser, Mises, Hayek), or the corporatists (Spann, Heinrich, Walther) who used quite different characteristics of organisms in their claims about the economy.[2] Schäffle's social tissues and social psychophysics, Sombart's theory of industrial development and his schema, Wagemann's monetary circuit, his metabolism barometers, and his branch network would fall under the category of "organism as a metaphor", notwithstanding that they were purposely shaped tools to address specific economic issues.

The theories, systems, schemas and networks that my economists created were less reductionist than the theories and models that they campaigned against. Menger's subjective theory of value reduced the complexity of economic life to individual decision-making. Marx's theory of industrial development reduced the unfolding of a variety of firms to a linear path. Fisher's quantity theory isolated the money stock as the main cause of price fluctuations, and the ABC barometer extracted a typical sequence from a wide range of disparate movements of time series. Schäffle, Sombart, and Wagemann did not give up on reductionism, but simply believed that three abovementioned economists drove reductionism too far. They opposed two types of reductionism by their contemporary economists: those economists who tried to explain economic phenomena from the

[2] The Austrians Carl Menger, Friedrich von Wieser, Ludwig von Mises, Friedrich von Hayek, who occasionally compared the economy to an organism, did not detail the metaphor, because the economy was too complex and the economist's knowledge too limited to gain much insight. As Erwin Dekker (2016, pp. 109–130) clarified, the Austrians' "therapeutic nihilism" taught them to accept the forces of nature and only marvel at the workings of the market. In stark contrast, corporatist economists and sociologists like Othmar Spann, Walter Heinrich, and Andreas Walther used the organism metaphor to form ideas about hierarchical structures like the corporatist state (*Ständeordnung*).

smallest equal units (usually referred to as atomism), and those who strove to isolate universal laws represented by single equations (*Einheitsformeln*) or laws of development.

Instead, my protagonists aimed to reduce the infinite variety of economic phenomena that they encountered in empirical studies to a variety in unity. Sombart's assertions are again representative of the three economists' approaches. Sombart (1902a, p. XVIII–XXII) claimed that his method was a "compromise" (*Kompromiss*) by abstracting "the essence" (*das Wesentliche*) of a certain time, instead of permanently "isolating the essential from the unessential". Sombart admitted that his abstraction exhibited a "certain brutality" compared to Schmoller's method, but asked himself "which 'theory' would not be brutal in light of the great variety of life"?

It is tempting to view the three economists' rejection of reductionism as a sign of their methodological holism (or collectivism). My economists emphasized the importance of institutions (Schäffle), economic order (Sombart), economic sectors and used macro-level statistics (Wagemann). Yet, they also claimed that the behavior of individuals had to be taken into account. In various forms, they considered consumers, authorities, and businessmen to stand in a mutual relationship with institutions, collectives, or the overall economy. What is more, with their aim to conserve variety, Schäffle, Sombart, and Wagemann also opposed economists like Quetelet, Marx, and Fisher who cannot usually be seen as methodological individualists.

Besides, I do not think that much can be gained from classifying the three economists into one school or locating them between two approaches. [3] My economists do never fit adequately in the opposing categories proposed by several economists, be it "atomistic" vs. "organic" (Menger, 1883), "individualistic-atomistic" vs. "socialist-organic" (Brentano, 1893), "perception of the economy as the result of individual action" vs. "perception of the economy as an organism" (Schumpeter, 1908, pp. 92–93), "individualism" vs. "universalism" (Spann, 1920, pp. 29–33), or *Gefügetheorie* vs. *Gebildetheorie* (Harms, 1927, p. 3).

Instead, I have emphasized that the economists *chose* a style of thought that they compared to the working methods of biologists or botanists. Confronted with variety in their specific field of interest, Schäffle, Sombart, and Wagemann collected, classified, and ordered their empirical observations. Yet, instead of reducing this variety to the common, or typical, or trying to isolate laws and regularities from it, they conserved variety with their analogical tools. Only by conserving variety,

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[3] See, for example, Hodgson (2003), who claimed that Veblen can be located between the two opposites of methodological individualism and collectivism.

the three economists could venture the next steps of analyzing interconnections of the parts they collected and of creating systems that gave form to variety in unity.

The question remains whether my economists' style of thought was unique or limited to German economic thought. Mannheim (1986, p. 54) suggested that "Germany can be said to have played a complementary role [to the abstract thinking by the French], since she turned conservative organic and historical thought into a spiritual weapon". What speaks for Mannheim's claim is that Schäffle, Sombart, and Wagemann understood their work as complementing what reductionist economists left out. Nevertheless, I hesitate to take my economists' aim to conserve variety by means of biological analogies as sufficient grounds to characterize their style of thought as a German *Sonderweg* in economics.

We have seen that Schäffle found much acclaim among French sociologists with his borrowings from biology and that he took inspiration from U.S. economist Charles Carey to compare organic with social variety. Only recently, historians have pointed to the different sets of biological analogies that U.S. social reformers applied to the study of society (Leonard, 2016). As historian of science Etienne Benson (2020, pp. 78–105) revealed there are more applications of biological analogies to be found among social reformers who analyzed the development of housing districts in comparison to social organisms. We have also seen that Sombart's insights from adapting biological analogies to industrial development were taken up by U.S. historical economists and they resonated with the New Institutional economists' view on the economy. There exists also an undeniable resemblance between Wagemann and Mitchell in their rejection of business cycle theories and in their insatiable desire to collect more statistics to gain an all-encompassing image of economic fluctuations.

When we turn to modern economic thought, Schäffle, Sombart, and Wagemann only appear foreign from Mannheim's "natural-law" perspective. Having in mind the neoclassical "mechanics of economic development" (Lucas, 1988) or the representative agent models in macroeconomics, the aim by Sombart and Wagemann to conserve the variety of firms and branches seems superfluous.[4] Yet, when we turn to other economic research like New Institutional economics, we can observe that economists work with different "levels" that contain "values" (institutions, customs, traditions), rules (judiciary, bureaucracy), and other characteristics that are reminiscent of the components of Sombart's "schema" or Schäffle's tissue analogy (Williamson, 2000, pp. 596–597).

Sombart might have been satisfied to know that recent research by antitrust authorities on economic concentration builds on a vast set of indicators that pay attention to cross-holding

[4] On the reductionism of representative agent models in macroeconomics, see Hoover (2015).

(*Kapitalverflechtung*) and personal ties between large companies and do not limit themselves to the Herfindahl-Hirschman Index.[5] Wagemann's forecasting based on a variety of different branch indices and his close cooperation with businessmen does not differ fundamentally from modern forecasting institutes that use several real-time indicators and business surveys.[6] In modern economics, the choice of the style of thought remains relevant and boils down to the question of whether an economist seeks to single out unity or conserve variety.

[5] The German monopoly commission (*Monopolkommission*), for example, uses the Herfindahl-Hirschman Index only as a baseline and complements it with various additional indicators (Wambach & Weche, 2018).

[6] The *German Council of Economic Experts* (*Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung*), for example, uses large collection of indices, and puts together sentiment indicators (*Stimmungsindikatoren*) through interviews with companies and consumers (https://www.sachverstaendigenrat-wirtschaft.de/publikationen/konjunkturprognosen.html, (5.4.2023)).

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APPENDIX 1

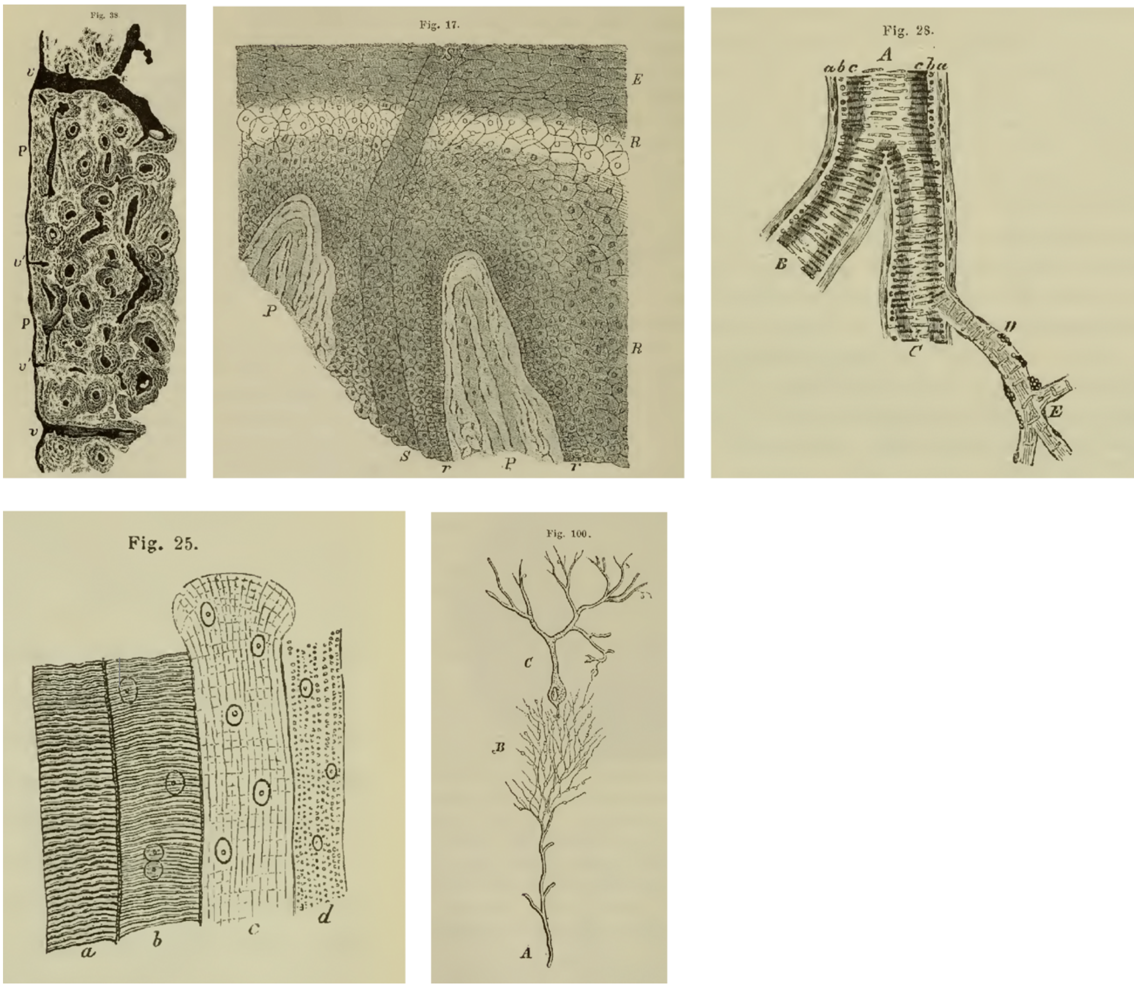

Figure 31: The five tissues in their original (non-warped) shape, reproduced from Virchow's *Cellular Pathology* (1871).Top row, from left to right: bone tissue (p. 110), skin tissue (p. 32), vascular tissue (p. 59). Bottom row, from left to right: muscle tissue (p. 51), nervous system (p. 312).

APPENDIX 2

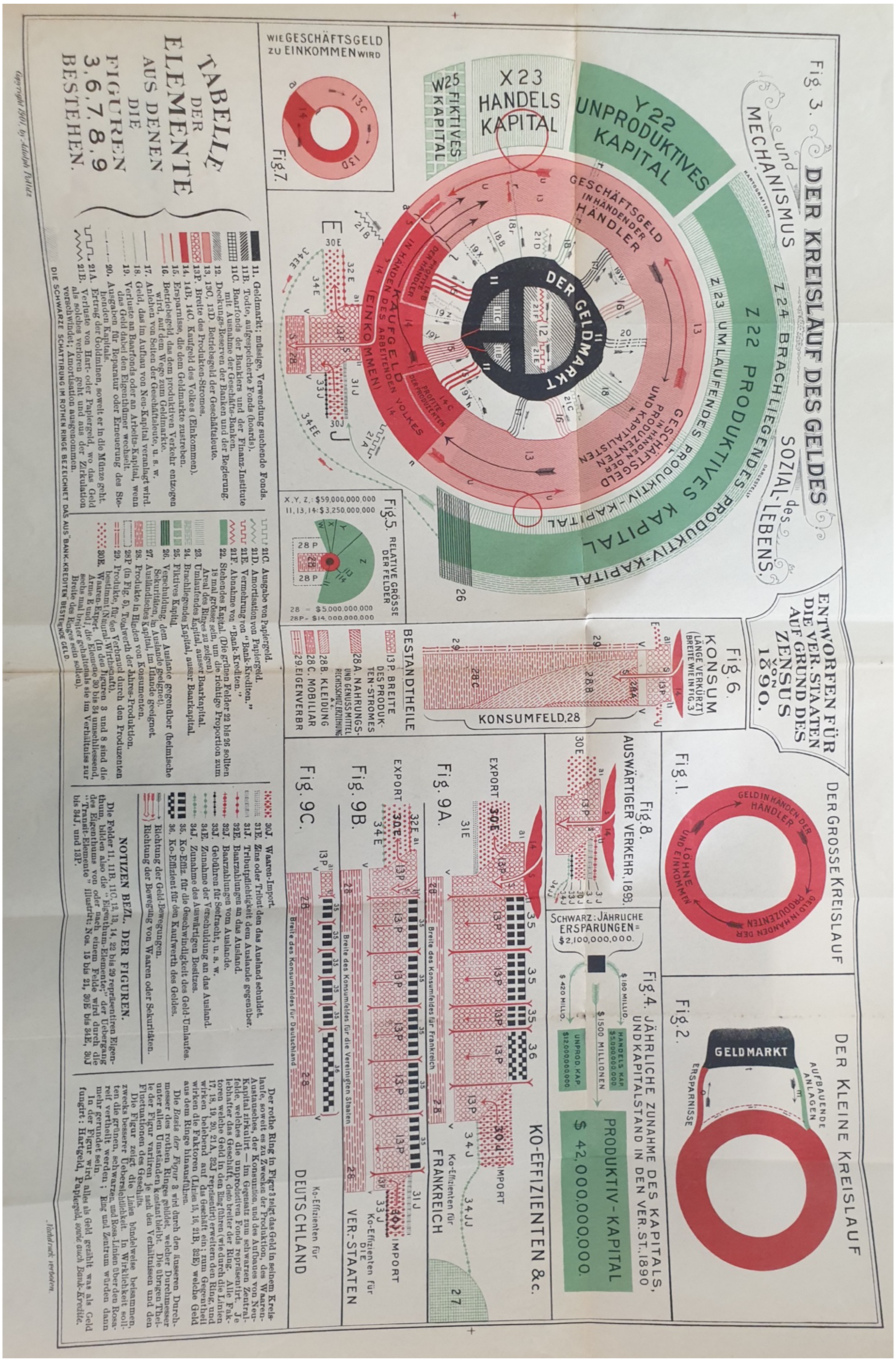

Figure 32: Lahn’s “Circuit of Money” (*Der Kreislauf des Geldes*). Source: Lahn (1903).

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