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Statistics and politics in the 18th century[1]

I. Introduction

Statistics is not just collecting masses of information, at least not in the first place. It is not even so much about precision, although the argument of precision plays an important role in its history. Much more fundamentally, it is about collecting and processing a particular type of information: Statistics does not create *more* or *better* knowledge; it first and foremost creates an entirely new *kind* of knowledge – it transforms knowledge by means of systematic quantification and, by doing so, transforms the very way in which we perceive and judge the world. Statistics reduces a host of heterogeneous qualitative phenomena to quantitative figures, figures that are summed up and calculated and, as a result, create new entities such as 'population', 'production', or 'consumption' – entities that did not and do not exist outside statistics. As a French historian of statistics put it, statistics resembles the early modern art of alchemy by "converting the stale lead of a myriad of individual bits of information into the pure gold of general knowledge".[2]

Converting quality into quantity, this alchemy transforms the chaos of the world around us into measurable units. It reduces complex and unfathomable perceptions to a number of general objects and renders them as clear-cut figures, tables and graphs. Statistics leaves behind everything that is individual, local, and particular. It provides standardised packages of knowledge that can be compared with similar packages of knowledge about other places and periods. Statistics can be understood independently from regional or national contexts as well as across ideological and linguistic barriers, and is therefore an ideal instrument of communication. And for all these reasons, the alchemy of statistics, converting the "lead" of words into

[1] This article is based on the author's *Die Berechnung der Glückseligkeit. Statistik und Politik in Deutschland und Frankreich im späten Ancien Régime* (forthcoming). See also id. (2004). "Politische Zahlen". Statistik und die Rationalisierung der Herrschaft im späten Ancien Régime. *Zeitschrift für Historische Forschung*, 31, 551–577; id. (2006). Zahlen machen Räume: Landwirtschaftsstatistik und Raumwahrnehmung in der Grafschaft Lippe im späten 18. Jahrhundert. In id. (ed.). *Vermessen, Zählen, Berechnen. Die politische Ordnung des Raums im 18. Jahrhundert*, 95–130. Frankfurt: Campus; id. (2008). Agrarian statistics in late ancien régime France and Germany. In Nadine Vivier (ed.). *The state and rural societies. Policy and education in Europe 1750–2000*, 1–22. Turnhout: Brepols; id. (2011). "Des chiffres politiques": La statistique, dispositif politique et activité pratique au xviii^{e} siècle. In Pascale Laborier et al. (eds.). *Les sciences camérales. Activités pratiques et histoire des dispositifs publics*, 509–538. Paris: Presses Universitaires de France; … .

[2] "…". Desrosières, Alain (2005). Décrire l'état ou explorer la société: les deux sources de la statistique publique. *Genèses*, 58, 4–27, 18.

the "gold" of figures, has contributed to transforming the ways in which we perceive the world, talk about it, and act upon it.

By virtue of its specific epistemology – we may call it the bird's-eye perspective – statistics has been fundamental for shaping and legitimising economic, demographic, and indeed any comprehensive and long-term planning, and in this way has contributed strongly to creating the modern world, with its rational, functional, and egalitarian potentials on the one hand, and its dangers of homogenisation and totalitarianism on the other.[3] In this epistemological sense, too, statistics was invented at a particular time in history – namely, in the second half of the seventeenth century. In this sense, finally, statistics became relevant and powerful only at a somewhat later point in history – that is, in the last third of the eighteenth century. In the following pages, I will try to unfold this development in its most essential phases and features as well as in its underlying causes.

Before that, let me make two remarks about historiography to explain why the terms of the story have hitherto been blurred.

First, whereas general historians of statistics have written a great deal about the invention of statistics (or 'Political Arithmetic') in the late seventeenth century and about its subsequent theoretical development – especially in the form of demography – they largely skip the early history of its practical implementation by late eighteenth-century governments and administrators. Instead, they prefer to zoom in on the opening of specialised statistical bureaus at the beginning of the nineteenth century, portraying this as the turning point or even the birth of 'official' or 'state statistics' and discounting the decades before as 'proto-statistical' at best. One reason for this view is the confusing historical semantics of "statistics", a term that, during most of the eighteenth century, referred to qualitative descriptions of states rather than to numerical statistics.[4] The main reason, however, for this oversimplified chronology is the fact that only these bureaus started to produce *printed* material in larger quantities, thus making their work easily accessible for contemporaries as well as to later historians of statistics. In contrast, official statistics and statistical reasoning before that moment, during the last decades of the eighteenth century, were mostly documented in handwritten form and have since been covered by the dust of the archives. But once dug out, they show that economic and demographic factors became the object of quantification on various political and administrative levels already in the last decades of the Ancien Régime – a process that in turn triggered the general spread of statistical reasoning. These beginnings of official statistics yield important

[3] See the brilliant analysis by Scott, James C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.
[4] -> "Universitätsstatistik"

insights into late Ancien Régime politics as well as into the historically conditioned nature and logics of statistics as such.

To look beneath the printed surface of eighteenth-century demographers on the one hand, and of nineteenth-century institutional statistics on the other, and to explore the role of statistics in late Ancien Régime politics, is essentially taking an early modernist's approach. Early modernists, however – and this is the second remark – have for their part also overlooked the onset of systematic quantification and statistical reasoning during the last decades of the Ancien Régime: They tend to subsume any kind of administrative practice involving numbers under the heading 'statistics' and thus fail to notice the novelty of systematic quantification und statistical reasoning in the last third of the eighteenth century. Thus, for example, tax lists are called statistics, although they did not provide any general kind of quantitative knowledge – they were mere registers for local administrators to log individual households' tax loads. The same is true for military recruitment lists as well as for parish registers – they too were used for specific administrative purposes, in the latter case to monitor confessional parish membership, and were only considerably later discovered and used as quantifiable sources for aggregated demographic data.

To sum up, it is only by combining the early modernist's archival research and historical contextualisation, and the analytically refined perspective of historians of statistics and statistical knowledge, that one discovers the roots and beginnings of statistics properly speaking – that is, as a specific form of knowledge, decision-making and legitimation – and that can explore why, at that moment in time, figures, tables and calculations started to shape perceptions, arguments and actions.

In the following pages, I will first give a brief sketch of what might more appropriately be called 'proto-statistical' data gatherings – tax lists, cadastres and similar registers used as administrative tools in the early modern period. As will be argued, these instruments prepared the application of statistics in certain ways, but were not yet used as a means of producing generalised quantitative knowledge (II.). The decisive turning point, from these administrative data gatherings to statistics came – in theory – with the genesis of the concepts of 'Political Economy' in the second half of the seventeenth century, and – in practice – with its political implementation a century later (III.). This implementation took place, first and foremost, in France and the German principalities, where we can therefore find the first massive onset of systematic quantification and quantitative reasoning in political and administrative contexts (IV.). Just as it became an instrument of political decision-making and legitimation within states, statistics also became an instrument of comparison and competition among states (V.).

On an analytical level, statistics can be seen as a factor and indicator of the logics and constraints of late Ancien Régime politics, or more specifically of what is termed "Enlightened Absolutism" (VI.). Finally, the historical conditions of its genesis can give clues to the epistemological nature of statistics (VII.)

II. Proto-statistics and cadastres

By the sixteenth century, and even earlier in the case of late medieval city states, European governments had begun to register their vital resources in the form of rent rolls, tax and customs lists, tariff registers, conscription records and the like. The ever-increasing generation of such information was abetted by the growing demand for fiscal and military resources in a highly competitive state system and the concomitant desire for a comprehensive and efficient system of taxation. However, such information gathering did not yet constitute statistics in today's sense of the word since the data collected in this way were not summed up and aggregated in order to create general insights for analysis or arguments for political measures. Rather, they were used for concrete administrational measures in their specific local and factual contexts. To illustrate the difference, it was the entries in the horizontal rows that interested the administrators – how many people live in the household of peasant x, how much land does he own, and how much does owe me this year? – rather than the vertical column, the sum of which might have indicated, for example, the overall number of people in the district or the total surface of acres under cultivation.

Two modifications have to be brought to bear on this general rule. First, there were instances of true statistics in the sense of numerical data gatherings with the purpose of gaining for a more abstract and general knowledge – such as, in particular, population counts, carried out in Italian city states since the fourteenth century, and later elsewhere, too. These occasional counts, however, in themselves served specific purposes and – in contrast to what we can observe in the late eighteenth century – did not lead to comparisons among different figures, let alone to a continuous and ever growing series of data gatherings. They almost always contained only one single parameter – such as, notably, the number of inhabitants in a given place – that was not correlated with other kinds of data in order to allow insights beyond the given purpose and thus also stimulate further data collections. The same can be said about what we may call financial statistics, i.e. calculations of income resulting from a specific kind of resource: They served to measure the fiscal profits to be expected, not as tools of further analy-

sis or planning. This becomes particularly clear in seventeenth century descriptions-of-state: They sometimes featured detailed enumerations and calculations of different sources of income, and possibly population figures, but did not make any further attempt at relating or comparing such figures amongst each other.

The second modification concerns the creation of cadastres, i.e. systematic registers of (especially) the distribution and quality of rural property created from the late seventeenth century onwards in order to standardise taxation levels. On the one hand, although cadastres potentially provided governments with an overview of territorial tax income, they too were designed primarily to serve as a practical administrative tool. On the other hand, and increasingly so towards the middle of the eighteenth century, cadastres and similar systematic and centralised forms of fiscal data collection were employed as analytical instruments to review the equity and functionality of the taxation system as a whole and to adjust it to changing property and productivity structures. In this sense, they were statistical tools creating a more general and abstract knowledge reaching beyond the individual taxpayers' obligations as well as beyond the prospective incomes from an established form of taxation. Having said this, it must be stressed that the kind of analysis and planning envisaged here was still restricted to the fiscal system. And it must also be stressed that hardly any of these schemes came to completion by the middle of the century, as cadastres proved to be extremely painstaking and expensive enterprises that were either reduced in scope or abandoned altogether, or else took many more decades to be completed.[5]

Either way, the creation of cadastres constituted an important springboard for the genesis of statistics: On a practical level, it trained state officials and local administrators in the complex routines of information gathering; on a conceptual level, it nourished the idea of a homogeneous, or at least potentially homogeneous, state territory whose resources could be monitored and counted. Eighteenth-century cadastral surveys sometimes even entailed ambitions at data collecting beyond the purely fiscal purpose by charting cartographic, infrastructural and agronomic information alongside the data on property distribution. Although these ambitions were rarely entirely satisfied and although the material gathered in this way was not designed for numerical compilation, they pointed in the direction of a more comprehensive quantification and tabulation of a territory's economic and demographic resources. Thus, by the middle of the eighteenth century, governments and administrators were able to gather comprehensive

[5] During the first half of the 18th century, few countries produced accurately charted tax cadastres: Starting with West Pomerania, the Swedish province on the German Baltic coast (1691-1709), then the seminal Milan cadastre (1719-1733, implemented around 1760), and later in Castile as well as in numerous German territories.

data: What they were still lacking was the *idea* that those resources could and should be analysed in a systematic quantitative way.

III. Political Economy and Political Arithmetic

The decisive leap from administrative data gatherings to statistics was only brought about by the desire for systematic and exhaustive knowledge of a state's economic and demographic resources. This desire, in turn, was the direct corollary of the concepts of 'Political Economy', that is, of the notion of a complex and dynamic territorial economy that could be – and should be – controlled and managed by the state. This idea was born in the second half of the seventeenth century, elaborating on and expanding the older idea of 'Mercantilism' – a concept that also conceived of a territorial economy, but in much more static terms and mainly in terms of its trade balance with other countries, not in terms of a domestic economy driven by the complex and dynamic interplay of all types of production and consumption and therefore capable of genuine growth.[6] Political economists also saw the population as a dynamic factor of the economy; they envisaged, one might say, not just an economic, but a *demo-economic* system. Massive economic and demographic data constituting such entities as 'population', 'production', or 'consumption' were required to understand their functioning and to manage and control the workings of the system as a whole.

It was therefore in immediate conjunction with the earliest models of Political Economy that 'Political Arithmetic' emerged – the idea of quantifying, aggregating and calculating economic and social particulars, in other words, the idea of applying mathematics to politics. Under the influence of the natural sciences of the seventeenth century that placed empiricism and methodology above received wisdom and traditions, it was first and foremost the Englishmen John Graunt and William Petty, but also Vauban, Leibniz and others on the continent, who started to quantify and calculate demographic and economic structures and developments in the second half of the seventeenth century.

It was in 1662 that the London merchant John Graunt extracted figures from the London *Bills of Mortality*, weekly lists of the deceased in each parish, in order to compare them along

[6] The term "Mercantilism" was coined only ex post (and derogatively) by Adam Smith, aiming precisely at its focus on the external trade balance. Evidently, there were many different strands of 'mercantilist' though and practice, some of which are closer in some respects to the new concepts of Political Economy than others.

various parameters such as district, time of year, and sex.[7] He was well aware of the novelty of what he was doing: Whereas his fellow Londoners only took the Bills "as a *Text* to talk upon in the next Company", he had discovered their "other, and greater uses" and "reduced into Tables […] so as to have a view of the whole together, in order to the more ready comparing of one *Year, Season, Parish,* or other *Division* of the City, with another." From this bird's-eye perspective, he was able "not only to examine the Conceits, Opinions, and Conjectures [based] upon view of a few scattered *Bills*" but also to find totally new insights and correlations "from my *Tables*" that had so far been hidden among the heterogeneous, un-aggregated information of the Bills. He was indeed, as it were, the self-conscious first statistical alchemist – "converting the stale lead of a myriad of individual bits of information into the pure gold of general knowledge".[8]

John Graunt called his tables and conclusions *Natural and Political Observations Made upon the Bills of Mortality* as he distinguished between the interest in mere demographics, on the one hand, and the interest in their political dimensions, on the other. This "political" interest, moreover, involved not only the number of people, but also relevant economic factors, such as the quantities of harvests and of cattle and their respective ratio to the size of the population. Graunt conceived of the territorial economy as a complex system, and – just like other political economists – he conceived of it as a system capable of growth. And he also conceived of politics as a task, among others to be sure, to coordinate the economy in a way so as to make that growth possible.[9]

Graunt referred not only to Bacon but also to "the Mathematicks of my Shop-Arithmetick" as the base of his calculations.[10] Here, as elsewhere, commercial accounting techniques were an important ingredient next to modern science and mathematics. Another feature common to

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[7] The following quotations are from Graunt, John (3rd edn. 1665). *Natural and Political Observations mentioned in a following Index, and made upon the Bills of Mortality*. London: John Martyn & James Allestry, 1 ff. (italics in the original).

[8] Desrosières (2005), Décrire l'état, 18.

[9] „Whereas the Art of Governing, and the true *Politicks*, is how to preserve the Subject in *Peace* and *Plenty*; […] men study only that part of it which teacheth how to supplant and over-reach one another, and how […] by tripping up each other's heels, to win the Prize. Now, the Foundation or Elements of this honest harmless *Policy* is to understand the Land, and the hands of the Territory, to be governed according to all their intrinsick and accidental differences: As for example; It were good to know the *Geometrical* Content, Figure, and Situation of all the Lands of a *Kingdom* […]. It were good to know how much Hay an Acre of every sort of Meadow will bear; how many Cattel the same weight of each sort of Hay will feed and fatten; what quantity of Grain and other Commodities the same Acre will bear in one, three, or seven years, *communibus Annis*; unto what use each soil is most proper. It is no less necessary to know how many People there be of each Sex, State, Age, Religion, Trade, Rank, or Degree, *&c.* by the knowledge whereof , Trade and Government may be made more certain and Regular; for, if men knew the People, as aforesaid, they might know the consumption they would make […] I conclude, That a clear knowledge of all these particulars, and many more, […] is necessary, in order to good, certain, and easie Government." Graunt, Natural and political observations, S. 146-151 (italics in the original).

[10] Graunt (1665), *Natural and Political Observations*, Epistle dedicatory to the Royal Society (5.2.1662, n. p.).

Graunt and other statisticians was the use of older, non-statistical registers and lists (tax lists, parish registers) originally created for specific administrative purposes, and to process them with their new aggregative and arithmetic methods. Before the beginning of large-scale state data collection for statistic purposes in the second half of the eighteenth century, statisticians had to rely on this material, although it was unsatisfactory in many ways and although they kept asking for more specific data.

A second important figure was William Petty who, about ten years, later coined the term "Political Arithmetic". Similar to Graunt, Petty wanted "intellectual arguments" replaced by sheer "termes of Number, Weight, or Measure".[11] And just like Graunt, he advocated that the government should collect and process systematic data on the population and economy so as to comprehend the workings of the demo-economic system and to steer and optimise it by means of systematic intervention.

This plea, however, fell on deaf ears. The title of Graunt's work of 1662, *Natural and Political Observations*, helps to understand the twofold reception of the method devised by him: On the one hand, the "Natural Observations", that is, the more abstract demographic calculations carried out by Graunt, were soon picked up and developed further by British, Dutch, German, and, later, Swedish and French scholars, and applied, among others, in the fields of medical and insurances statistics, as has been studied intensively by historians of statistics.[12] On the other hand, the "Political Observations", i.e. the political use of quantitative demographic and economic data and calculations as advocated by Graunt, Petty, and others, were largely ignored by governments on both sides of the Channel. Although, to take an example, Charles II had personally promoted John Graunt to the Royal Society, he and his successors showed no interest whatsoever in his statistical methods as a potential device of decision-making, planning and legitimation. For some hundred years after its invention, Political Arithmetic was a private and academic venture that as yet failed to convince rulers and their governments. As a result, it continued to rely on rudimentary and incomplete data. Although Petty no less than Leibniz or Vauban, all of them high-ranking officials, had access to existing information and were in a position to create additional sets of data, they all complained that without systematic, state-sponsored data gathering the possibilities for quantitative reasoning and comparisons were very limited.

[11] Petty, William (1690). *Political Arithmetick, or a Discourse concerning the Extent and Value of Lands, People, Buildings; Husbandry, Manufacture, Commerce, Fishery […]*. London: Robert Clavel, Preface (n. p.).
[12] In particular (and with ample further references) Rusnock, Andrea A. (2002). *Vital accounts. Quantifying health and population in eighteenth-century England and France*. Cambridge: Cambridge University Press; Martin, Thierry (ed.). (2003). *Arithmétique politique dans la France du xviiie* siècle. Paris: Ined.

Apart from a few sporadic, inchoate, and isolated attempts at such centralised data gathering for statistical purposes towards the middle of the century, notably in Prussia and Sweden, it was not until the 1760s that governments became seriously interested in Political Arithmetic and began to put it into practice on a broad, lasting, and ever growing scale. The reason for this timing was the fact that Political Economy – the concept, that is, of economic systems capable of state-induced, long-term growth – became massively popular with governments and administrators at that time.

IV. The German and French cases

The first and sudden interest in the concepts of Political Economy that triggered the implementation of statistical methods since the 1760s was, it seems, particular to France and the territories of the Holy Roman Empire, with other states following suit over the next decades.[13] In those states, a long-standing interventionist tradition in the economy – hitherto in a largely mercantilist mould – as a consequence, among other things, of authoritarian forms of governments, discourses of economic backwardness, and intermittent involvement in highly (cost-)intensive warfare, coincided with a growing bulk of publications, especially around the mid-century, on Political Economy in its classic, state-centered form, and often with a particular stress on agronomy and state-sponsored agrarian innovation as the necessary centrepiece of economic revival and competitivity.[14] Another common feature, the catalyst for the ultimate take-off of economic and statistical thinking was to be the Seven Years War (1756-1763): A war that plunged state budgets, economies, and popular subsistence into yet more severe disarray on both sides of the Rhine,[15] and thus pushed rulers and governments to search for new models of generating economic stability and growth – models assiduously offered by the exponents of Political Economy and particularly of its more recent guises, namely Cameralism in Germany and Physiocracy in France.[16]

[13] The principalities of Northern Italy were the first ones to do so, but more detailed research will be necessary to establish this (see, for the moment, Federico D'Onofrio, … , upcoming?).
[14] Britain as the motherland of both Political Economy and Political Arithmetic had seen a Census Bill rejected by the House of Lords in 1753 and introduced officially government-sponsored statistics only at the beginning of the nineteenth century, but there was a similar upsurge in semi-official and notably parliament-sponsored statistical enquiries also since the 1760s: Julian Hoppit (1996). … ; Joanna Innes (20…). … .
[15] And threatened the political legitimacy of those regimes that had to concede defeat, such as was case in France which, in spite of the utmost efforts to the contrary, lost most of its colonies to Britain as a result of the war.
[16] On Cameralism, Garner, Guillaume (2005). *État, économie, territoire en Allemagne: l'espace dans le cameralisme et l'économie politique 1740–1820*. Paris: Ehess; Simon, Thomas (2004). *"Gute Policey". Ordnungsleitbilder und Zielvorstellungen politischen Handelns in der Frühen Neuzeit*. Frankfurt: Klostermann, 440 ff.;

Common to both concepts, once again, was a clear departure from the dominant theories and practices of Mercantilism: Instead of focusing on the external trade balance and the flow of precious metal into and out of a state, Physiocracy and Cameralism concentrated on the economic mechanisms *within* it. They conceived of the economy as a complex and dynamic arrangement of agricultural, industrial, and other commercial activities; they focused on production rather than trade; and, as a consequence, they considered economic growth possible independently of the trade balance. For Physiocrats and Cameralists alike, economic growth hinged essentially on agricultural output as the ultimate basis for both industrial and commercial activities and for a prosperous population. Last but not least, *both* systems stressed the importance of state action in order to promote economic growth – and to this end, they also entailed the desire to collect systematic, quantitative knowledge of states' economies. As a result, when governments and administrators in France and in the German states seized upon these ideas since the early 1760s, they also started to systematically count and calculate the human and material resources of their territories in order to know their specific potentials and to discern the best ways to stimulate and sustain economic (and demographic) growth. In short, Political Arithmetic was now seized upon as a tool of knowledge-generation, planning, decision-making and legitimation.

Yet, there were major differences in the way that state intervention in the economy and, consequently, information policies were conceived by the German and the French version of Political Economy.[17] The German version, Cameralism, was more conventional: it continued the tradition of "good policing" ("Gute Policey") in that it favoured direct and, if necessary, detailed intervention in conformity with the particular circumstances of time and place; and accordingly, it urged governments and administrators to count and measure the economic and demographic resources of their territories.

Therefore, when more and more German territories, from the 1760s onwards, turned to Cameralism as a promise of a new master plan to save their budgets and economies, they carried out comprehensive censuses – counting and sorting the population by such functional categories as age, sex, and profession, as well as collecting data on their territories' agrarian and commercial economies. Based partly on such censuses and partly on older forms of ad-

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Sandl, Marcus (1999). *Ökonomie des Raumes. Der kameralwissenschaftliche Entwurf der Staatswirtschaft im 18. Jahrhundert*. Köln: Böhlau. On Physiocracy, the most relevant title is still Weulersse, Georges (1910). *Le mouvement physiocratique en France (de 1756 à 1770)*. 2 vols., Paris: Mouton; on Political Economy in eighteenth-century France generally: Perrot, Jean-Claude (1992). *Une histoire intellectuelle de l'économie politique (xvii^{e}-xviii^{e} siècle)*. Paris: Ehess.

[17] See Behrisch, Lars (2008). Agrarian statistics in late ancien régime France and Germany. In Nadine Vivier (ed.). *The state and rural societies. Policy and education in Europe 1750–2000*, 1–22. Turnhout: Brepols.

ministrative data collection – tax rolls, cadastres or parish registers – which were now used for the *new* goal of gaining comprehensive statistical knowledge, governments and administrations then proceeded to aggregate, compare, and calculate the figures obtained in order to analyse their state's economic and demographic situation and to base any further planning and decision-making on such quantitative data.

What is astonishing in the German context – and particularly in the smaller states with shallow hierarchies as well as a lack of military ambitions, and therefore little emphasis on secrecy – is the active involvement of regional administrators in this rush to produce, aggregate and interpret numerical data. In the northwest-German county of Lippe, for example, after two decades of increasingly intensive statistical data collection and tabulation on the central level, a regional administrator set out to compare the growth of the population with that of the number of looms employed by rural linen weavers in the various districts of his region. To this end, the administrator (or *Amtmann*) extracted data, among other sources, from two consecutive censuses carried out in 1776 and 1788, as well as from the recently completed territorial cadastre (see Illustration).[18] Although a far cry from the sophisticated calculations that we associate with statistics today, this numerical overview was indeed statistical in nature: It made systematic use of quantification for the purpose of gaining a new kind of general knowledge and, through it, a basis for planning and intervention. The Amtmann argued that the marked increase in population *(= A. Volcksmenge*) in one of the districts of his region, namely the bailiwick *(= Vogthei*) of Lage – starting from an already high level – corresponded to the equally high and increasing number of looms *(= B. Web[er]stühle*) in use in the same district. This correlation he considered as undisputable proof of the validity of his general claim that the government ought to encourage and subsidise the purchase of looms in rural households. Such a policy would not only lead to population growth but also to growing levels of prosperity, as the Amtmann further showed by adding, at the bottom of the page, the numbers of horses and cattle in the district of Lage, both of which had also considerably increased during the period under scrutiny.

This seemingly simple numerical operation and its representation were the fruit of a long and difficult learning process on behalf of the administrator who, just as many others in this period, first had to understand himself how figures could be used and juxtaposed in order to distil new knowledge and coherent arguments out of them. Thus, in earlier attempts to prove the same point, the Amtmann had also adduced various figures, but as yet without a similarly

[18] Landesarchiv Nordrhein-Westfalen, Staats- und Personenstandsarchiv Detmold, L 92 A Tit. 61 Nr. 15, 126.

straightforward purpose or result.[19] Clearly, it was not simply the existence of ever more data that prompted the administrator to make use of quantitative arguments, but also his increasing involvement in the new trend of statistical reasoning: a trend that he and his colleagues picked up from Cameralist writings and periodicals, as well as by gathering, interpreting, and discussing data on behalf of the government. By taking an active and often critical part in those activities, these administrators in turn helped advance and implement the statistical discourse in the county.[20] In fact, the Amtmann himself coined the term "Political Figures" ("Politische Zahlen"[21]) to denote the product of his reflections, which might betray his own acquaintance with the concept of Political Arithmetic.

The administrator had created his table as part of a report on the economic development of his region that he had to dress every year. However, he preferred to insert the table on a separate sheet, so that the count, an avid reader of administrative reports, might take it out and, as the Amtmann stated, could then "at one glance" judge for himself. He was convinced that "it will be the most vivid joy [for the Count] to learn from these figures the annual progress of his subjects' prosperity with certainty".[22] The Count of Lippe was indeed keen to be presented with statistics: By the 1780s at the very latest, he and other leading political and administrative figures in the county had come to consider statistics to be the most reliable kind of information and communication. In this process, figures and tables corroborated the perception of a territorial economy constituted by such parameters as the number of looms, the number of linen producers, and the number of cattle. This new perception in turn both demanded and legitimised political action aimed at such factors: And the government did indeed, in this case, grant the subsidies for the purchase of looms that the administrator had suggested in order to enhance the rural linen production.

French Physiocracy was more abstract, more original, and more ambitious than Cameralism. Other than the heavily pragmatic German version of Political Economy, it was full of French *esprit*. But also unlike Cameralism, it was arrogant and elitist: convinced that they had analysed the economy once and for all, Physiocrats instructed the government exactly what to do. Unlike Cameralism, Physiocracy broke with the tradition of "good policing" ("Bonne police") in that it despised the activity of local administrators. To stimulate agricultural produc-

[19] See Behrisch, Lars (2004). "Politische Zahlen". Statistik und die Rationalisierung der Herrschaft im späten Ancien Régime. *Zeitschrift für Historische Forschung*, 31, 551–577.
[20] See Behrisch, Lars (2006). Zahlen machen Räume: Landwirtschaftsstatistik und Raumwahrnehmung in der Grafschaft Lippe im späten 18. Jahrhundert. In id. (ed.). *Vermessen, Zählen, Berechnen. Die politische Ordnung des Raums im 18. Jahrhundert*, 95–130. Frankfurt: Campus.
[21] Landesarchiv Nordrhein-Westfalen, Staats- und Personenstandsarchiv Detmold, L 92 A Tit. 61 Nr. 15, 124.
[22] Ibid. ("[…] die lebhafteste Freude sey, aus solchen Zahlen das jährl[iche] [Vor]rücken des Wohlstandes der Untertanen mit Gewisheit zu erfahren").

tion, Physiocrats propagated a radical liberalisation of commerce, especially of the commerce in grain, and a recasting of the taxation system in the form of a single tax on the net revenue of landowners. And yet, in order to assure the primacy of agriculture, Physiocrats were ready to harness other branches of industry, check demographic mobility, and employ taxation as a means of indirect regulation: Thus, rather than abandoning intervention altogether, they wanted it to be more consistent and freed from the diversity of localities, from the arbitrariness of administrators, and from the back and forth of changing governments. And to the contrary of what is regularly alleged by historians of economic theory trying to spot the roots of present-day market liberalism (*some* of which may very well be traced back to Physiocracy), its ultimate goal was not free trade or a laisser-faire economy, but the strengthening of the monarchy's fiscal and military power.[23]

But, as argued, if Physiocracy was not a laisser-faire approach, it was surely more systematic than Cameralism by setting a schedule for one-time government action rather than for the flexible day-to-day activities by provincial or even local administrators proposed by the latter. This difference in the level of abstraction and, consequently, in the level of uniformity of political or administrative action, also led to a more abstract use of figures and calculations: Instead of urging administrators to quantify the objects of their respective actions, Physiocrats created and propagated calculations showing, among other things, the relative backwardness of French agriculture in order to prove the necessity to re-launch it, or – rather paradoxically, one might say – the surplus of national grain production over consumption, in order to bolster their call for free trade in grain. Physiocrats used figures and calculations based on methods of extrapolation and calculation to ground and defend their theory, rather than to assess a particular situation as did the Cameralists.

The same spirit of generalisation, it should be added, obtained in the field of demographic data collection and calculation: They too were mainly driven, at least in the first stages, by the abstract but none the less fervent and eminently political debate over the alleged depopulation of France that Rousseau proclaimed to prove the political decay of the monarchy.[24] This more abstract approach to economic and demographic questions was, or so it seems, to some extent a reflection of the sheer size and heterogeneity of France, a fact that by itself made nationwide data collections of any kind all but impossible: No truly comprehensive data collection on the population or the economy could be undertaken during the last decades of the Ancien Régime, just as it proved impossible to establish a nationwide cadastre, in spite of the arduous wish to

[23] Apart from Weulersse (1910), *Le mouvement physiocratique*, … vols., see also the brilliant Kaplan, Steven L. (1976). *Bread, politics and political economy in the reign of Louis XV*. 2 vols., The Hague: Nijhoff.

[24] …

do so.[25] And yet, gradually, the debates over Physiocratic doctrine and related discussions, as well as demographic questions, made for a permanent increase of grass-roots data collection – a process that has often been overlooked because, again, it left its traces mostly in the archives. Thus, the efforts to create reliable accounts of national grain production and consumption – driven, in particular, by the heated debate around the Physiocratic doctrine of free grain trade – resulted, among others, in ever more comprehensive and detailed regional harvest reports from the 1760s onwards.[26]

The Physiocratic promise of a sustained economic and fiscal national renewal had the enticing appeal of scientific analysis and mathematical precision. François Quesnay, the founder of Physiocracy, relates a discussion with Finance Minister Henri Bertin in 1761 that illustrates the impact of his mathematical reasoning and of his analogies to science. Bertin challenged the Physiocratic view that the luxury industry was detrimental to the economy: "Expenses for luxury", the minister asserted, "are said to be nothing but a continuous exchange from the left pocket to the right and vice versa". Quesnay retorted that "there is no doubt about the exchange, but [there is doubt] about the scale; and [therefore] it is not by reasoning that we can decide this question, but by counting." When Bertin wondered if calculation was not hazardous, Quesnay replied: "This kind of hazard is very much relied upon for the prediction of eclipses" – a reply that "cut deep".[27]

The same minister Bertin opened a department of agriculture within his ministry, inaugurated agricultural societies across the country, and adopted a central demand of Physiocratic doctrine by beginning to liberalise the grain trade in 1763. Thus, already by the early 1760s, the abstract and figure-based promise of national renewal presented by the Physiocrats coincided with the urgent desire for fiscal and economic reform – a desire boosted by military defeat, notably against Britain, by war-induced bankruptcy and by the ensuing trauma of national decline. Physiocrats were not the only ones advocating major economic reforms, especially in the agricultural sector; but with their clear-cut analyses and solutions, they spearheaded a general movement for state-induced economic growth.[28] At the same time, precisely

[25] See Rusnock (2002), *Vital accounts*; and Brian, Eric (1994). *La mesure de l'État. Administrateurs et géomètres au xviii^e siècle*. Paris: A. Michel.

[26] For details see Behrisch (forthcoming), *Berechnung der Glückseligkeit*. On the ‚Enquête Terray', a demographic survey based on the birth rates from a number of selected parishes, carried out in 1770-72 (and disproving the depopulation thesis), see … Esmonin, … . On industrial statistics, see Minard, Philippe (2000). Volonté de savoir et emprise d'État. Aux origines de la statistique industrielle dans la France d'Ancien Régime. *Actes de la recherche en sciences sociales*, 133, 63–72.

[27] Quotations taken from Weulersse (1910), *Le mouvement physiocratique*, vol. 1, 82.

[28] There existed a vast bulk of literature on fiscal, economic, and agrarian reform that was not identical with and often hostile to Physiocracy. See Perrot (1992), *Une histoire intellectuelle*; Bourde, André J. (1967). *Agronomie et agronomes en France au xviii^e siècle*. 3 vols., Paris: Sevpen.

because their analyses and solutions were so suspiciously clear-cut, because the Physiocrats were so arrogant, and because the policies they recommended failed to bear fruit – the liberalisation of the grain trade finally had to be revoked in 1769 due to massive shortages, price rises and popular resistance – they also aroused a lot of antagonism. Yet, their opponents resorted to figures and calculations, too: There was a growing sense that arguments were convincing only to the extent that they rested on statistical evidence.[29] Both in the political arena and in the public debate, numerical arguments, either theoretical or based on actual data, became increasingly important and triggered comprehensive data collections across the country – even if, like many other efforts and ambitions of the late Ancien Régime, they were fully accomplished only after the Revolution.

To sum up, inversely to the German movement – from counting to calculating – one could say that the French proceeded from calculating to counting. But in both countries alike, we witness a gradual shift towards the quantification of facts and arguments – a shift fuelled by the new interest of governments and administrators in systematic planning aiming at long-term economic expansion and growth.

And in both the German and the French contexts, the production and publication of ever more quantitative data nourished and stimulated discussions around them and moved them into the centre also of public attention as an increasingly relevant criterion of political action, success and legitimacy. As Political Arithmetic became implemented in political and administrative practice, so did the idea and, indeed, the imperative of demo-economic quantification impose itself within and beyond politics.

V. Statistics and international comparison

Just as it became an instrument of political decision-making and legitimation within states, statistics also became an instrument of comparison and competition among states, a factor that further contributed to the ever-growing importance of numerical arguments. Just as the opponents of the Physiocrats felt compelled to use figures to prove their own point, so too was it impossible not to respond in kind to quantitative comparisons: After all, figures were the most suitable, because they were the least particularistic and qualitative, measuring unit among any number of different political entities.

[29] See, for example, the protocols of the later governmental Agricultural Committee with Physiocratic outlook: Pigeonneau, Henri, and Alfred de Foville (eds.) (1882). *Procès-verbaux de l'administration de l'agriculture au contrôle général des finances, 1785–1787*. Paris: Guillaumin.

The comparative dimension and potential of statistics was, again, already seen and used by the earliest exponents of Political Arithmetic. John Graunts disciples, such as William Petty, Charles D'Avenant or Gregory King, set about not only relating various demographic and economic dimensions and objects of rule within the British Isles, but also started to compare Britain with its enemies and rivals, notably Holland and France. They compared, among other things, surface and population figures, trade and production volumes, as well as various relations among those entities such as the density of population per square mile or per capita-ratios of the yearly shipping tonnage.

The same applies to their continental colleagues who related and compared not only elements of their own economies but tried to find out about their relative strengths and weaknesses by comparing them to data from abroad. This comparative impetus lead to a considerable degree of integration and exchange among the various loci of early statistics by the end of the seventeenth century, with the Academies in London, Paris and Berlin serving as initial hubs of contact and exchange of statistical data, methods and interpretations. One of the manifold issues animating the international debate was a heated controversy about the relative size of Paris and London. Indicative of the international character of such debates, the question was finally, in the middle of the eighteenth century, settled by the Prussian demographer Johann Peter Süßmilch who rather solomonically deduced from the various figures that at the beginning of the debate, i.e. in the late seventeenth century, Paris had been bigger, whereas since then London had taken the lead.

Not surprisingly, the intensity of and, a fortiori, the political and public interest in comparative statistics increased after the massive onset of statistical reasoning and data-collection in the 1760s. The comparative potential of statistics was especially vividly seized upon in the German case, prompted by the close proximity and relative similarity of the German principalities, especially those of small or middling size. The comparison of, among other things, the density of population, agrarian output per square mile, or the number of looms per capita was driven both by a genuine, as it were 'enlightened' concern to measure and find the best solutions to economic problems, and, at the same time, by the zeal to prove one's own territority's superiority over the neighbours. These comparisons took place on many levels – governments, administrators, scholars, public media – with secrecy and censorship paling against the new desire to show off one's own state's efforts and successes in increasing the material well-being of its territory and its subjects in the guise of figures. Due to their formal precision and their non-particularistic, non-qualitative nature they were seen to be, the longer the more, as an ideal tool for comparison between political entities, as well as between their economic

policies. With specific reference to the density of population as supposedly unambiguous indicator of economic success and 'good governance', and in a global perspective, statistician and geographer August Friedrich Wilhelm Crome proclaimed them to be the "only true measure of the civilisation of any nation".[30]

In France, the notion of a general and growing backwardness in comparison to its British rival, especially in the field of agricultural production, as well as of absolute decline compared to earlier periods of history, notably the supposed golden age under Henri IV and his minister Sully in the early seventeenth century, were cast in figures by proponents of the depopulation thesis as well as by the Physiocrats for whom, at the same time, they served as a stimulus and guideline for future national economic revival and growth. The numerical assertions of depopulationists and Physiocrats alike were, in turn, put into question by competing statistical evidence and more recent data material and, in the case of the depopulation thesis, in fact disproven with the help of an ambitious demographic survey of the actual size and development of the population of France.[31]

Thus statistical comparisons, and the international debates and exchanges they brought with them, did not only fuel and sustain the political, scholarly and public interest in statistics, but also helped, and indeed forced, to refine and standardise the data sources and methods employed. The 'entangled' early history of statistics is further reflected by the terminology: Just as "Political Arithmetic" had been taken over, among others, in French as "Arithmétique politique", the German "Statistik", originally referring to various kinds of descriptions of states, took on the more specific meaning of numerical descriptions around the mid-1780s – and was taken over, at the same time, in both England and France, where it soon started to replace the term "Political Arithmetic".

Thus, the anonymous author of a *Political Geography*, published in 1789, that compared different states with the help of figures, added the subtitle *Statistical Tables of the principal […] states in Europe*. Just like his German colleague Crome a few years earlier, the author prefaced his comparative work with an enthusiastic statement on the superiority of figures over all other criteria: With them the comparison of, among others, colonial empires no longer stemmed "from an imaginary picture traced by the pencil of fancy in all the glare of false col-

[30] „Der einzig wahre Maaßstab der Cultur aller Nationen", *August Friedrich Wilhelm Crome*, Über die Größe und Bevölkerung der sämtlichen europäischen Staaten. Ein Beytrag zur Kenntnis der Staatenverhältnisse, und zur Erklärung der neuen Größen-Karte von Europa, Leipzig 1785, Vorrede (unpaginiert); *Lars Behrisch / Christian Fieseler*, Les cartes chiffrées: l'argument de la superficie à la fin de l'Ancien Régime en Allemagne, in: Genèses 68/3 (2007), 4-24.

[31] On the ‚Enquête Terray', a demographic survey based on the birth rates from a number of selected parishes, carried out in 1770-72, see … Esmonin, … .

ouring, but [is] exhibited in the sober garb of exact statement, backed with the irresistible force of arithmetical demonstration"[32].

VI. Statistics and Enlightened Absolutism

Statistics was in many ways congenial to the specific political culture of the late Ancien Régime that has been termed "Enlightened Absolutism": a potentially contradictory combination of authoritarian regimes on the one hand with an 'enlightened', that is, secular and utilitarian rationality, on the other. A further element of the enlightened agenda was a methodical, if possible mathematical, approach to both nature and human society.[33] Statistics incorporated both: a focus on the material, i.e. the secular und utilitarian aspects of polity and society, and a methodical approach that was based on quantification and arithmetic operations. To be sure, the mathematics of eighteenth-century official statistics was hardly sophisticated, it mostly relied on simple correlations: the number of births compared to the number of deaths in a territory, the number of inhabitants compared to the amount of grain produced in a year, and so forth. And yet these operations, in all their apparent simplicity, helped propagate a new perception of the objects and goals of politics.

Quantification, tabulation, and calculation aimed at and indeed produced a new kind of generalised knowledge about hitherto abstract entities, such as 'population' and 'demographic growth' or 'agrarian production' and 'consumption'. By making these entities palpable, visible and therefore real, statistics encouraged state action directed towards them; by comparing demographic figures as well as economic outputs, they pointed towards dynamics and growth. As censuses recorded categories of age, sex, and profession, and thus the reproductive and productive values of the individual rather than traditional categories such as social estate, confession, and property, they strengthened a functional rather than a hierarchical perspective on territories and states. By highlighting what could be counted, measured, and compared over space and time, and by leaving aside everything that could not, statistics placed the homogeneous above the heterogeneous; placed dynamics above conservation; emphasised productivi-

[32] … .

[33] Diderot in his entry ‚Arithmétique politique' for the Encyclopédie "didn't doubt that we will be able to convince ourselves that the world of politics, just as the world of physics, can be regulated in so many ways through weight, number, and measure" ("je ne doute point qu'on ne parvînt à se convaincre que le monde politique, aussi bien que le monde physique, peut se régler à beaucoup d'égards par poids, nombre et mesure", Diderot, ‚Arithmétique politique', *in: Encyclopédie … , p. …*). The last words echo William Petty ("[Political Arithmetic] reduc[es] many termes of matter to termes of number, weight, and measure", Petty, Political Arithmetick, Preface, n. p.).

ty, efficiency, and growth; and suggested the possibility, or indeed necessity, of human (i.e. state) action directed at these goals.

In this way, statistics both reflected and helped intensify an inherent contradiction within Enlightened Absolutism: a contradiction between a claim to apply methodical rationality to all objects of politics, and the legitimation of monarchical authority. The inherent contradiction did not rest, a some narratives of Enlightened Absolutism suggest, on the incongruity of authoritarian rule and enlightened concepts: quite the contrary is true, as most enlightened thinkers, from Voltaire to Kant, propagated the implementation of the rule of reason through an authoritarian ruler – indeed they propagated, without any intended irony, what they called "enlightened despotism". In fact, the inherent contradiction rested on the *lack* of authority of eighteenth-century monarchs and their embeddedness in traditions and traditional power structures: They *could* not – short of causing revolution – thwart noble prerogatives, eliminate local privileges and override corporate rights, because their *own* dynastic legitimacy was a function of the same set of traditions, traditional values and traditional privileges and might very well be swept away with them – as indeed happened in France. The outcome, in short: Napoleon, was a proper enlightened despot, soon successfully imitated by neighbouring monarchs who *now* could, thanks to the French example and its acutely threatening military efficiency, override many of the traditional obstacles to a more 'enlightened' rule, without endangering monarchical authority.

Overriding such traditional obstacles had been a constant effort of 'enlightened' monarchs – most famously of Joseph II of Austria who not only, by his own admission, fell far short of his ambitions in this direction, but whose efforts were largely scrapped after his death. As Joseph and other monarchs noted over and over again in frustration, rationalisation in the 'enlightened', i.e. material and utilitarian sense, required the abolition of traditional obstacles to the homogeneisation of the economic, fiscal, juridical space, in order to allow both the free operation of market forces and central steering and control – in varying combinations according to the specific approach. Put in other words, the homogenising and equalising logic and functional imperative of statistics pointed at and demanded the abolition of any status, regional or corporate distinctions and differentiations that by definition had a traditional, not a functional, logic to them. But the same logic and imperative, applied to politics, resulted in the abbé Sieyès' arithmetic argument that the Third Estate ought to outweigh the First and Second Estates in politics as a logical result of its numerical demographic superiority – an argument, once again, that *could* be interpreted in a participatory, i.e. democratic spirit, but could also,

and did in fact, lead to plebiscitarian dictatorship – legitimised not by tradition, but by the claim of utilitarian rationality.

By making economic and utilitarian rationality – and what was also termed "public happiness" ("Glückseligkeit", "félicité publique") – the new, 'enlightened' rationale and legitimation of their policies and indeed of their rule, 'enlightened' monarchs undermined the very basis of their dynastic legitimacy and paved the way for true 'enlightened despotism', or else indeed – in the long run – for more participatory forms of government. They could not live up to their utilitarian and rationalist goals that would have required doing away with the whole structure of the society of orders and privileges on which their own dynastic legitimacy rested. Because they could not fulfil the utilitarian goals they themselves had proclaimed and that were expressed in statistics – as in Lippe whose count was to "calculate […] the yearly rise and fall of his subjects' happiness"[34] – they became the target of public criticism; and because at the same time, they *did* try, to some limited extent, to do away with status and privilege, they also risked losing the loyalty of the (noble) elites: The result of this double loss of legitimacy was to be the fate of Louis XVI.

VII. The epistemology of statistics

Statistics has been the object of much research and debate as to its relevance for modern society. Historians and sociologists of statistics such as the late Alain Desrosières, Eric Brian, Theodore Porter, Norton Wise, or James Scott, all emphasize the performative aspect of statistics – its potential, in other words, to transform human perceptions, human actions and ultimately the world around us. James Scott, in particular, has sketched a bewildering scenario of a world increasingly shaped in accordance with its statistical assessment: From the geometrically laid out, mono-species forest through rectangular and systematically planned cities to agricultural monocultures, humans have tried, over the last two hundred years, to shape living as well as natural spaces according to the categories, standardisations and output expectations dictated by statistics – an effort that can and did boost productivity, but that at the same time destroys ecological and cultural diversity and thus in the long run endangers both nature and

[34] Landesarchiv Nordrhein-Westfalen, Staats- und Personenstandsarchiv Detmold, L 92 A Tit. 61 Nr. 15, 173r. (1791) ("*die Summe von Glück und Zufriedenheit jährlich gleichsam zu berechnen*").

civilisation. This process has been most obvious in totalitarian states, but is no less an underlying feature inherent in global capitalism.[35]

Scott may very well have overstated the case, but he points out a fundamental trait of statistics, independently from its concrete application and its concrete users: It necessarily focuses our perceptions on the material world and puts it in a functional and dynamic perspective; in so doing, it strengthens an economic worldview, suggesting not only the possibility but the necessity of ever growing material efficiency and productivity, output and growth. In a less apocalyptic vein (for once) than Scott, the same potential of statistics has been described by Michel Foucault for the period under scrutiny in this article, i.e. the eighteenth century, albeit in the form of a more general narrative.[36]

In spite of those and many more brilliant analyses of the effects of statistics that have, of course, also influenced the perspective taken in this article, none of the sociologists or historians of statistics named above, including Foucault, have tried to take a stance in view of the trickiest of all questions, i.e. that of the epistemological nature of statistics: Does statistics portray 'reality' as it is, and much more accurately and 'objectively' than any other form of perception and medium of communication? Or is it a mere construction, a pure figment of imagination? Such would be the two most extreme existing interpretations that can be labelled a 'positivist' versus a 'constructivist' view.

It is obvious that this question touches upon much more fundamental debates in sociology, the history of science, and ultimately philosophy, that cannot be taken on board in this context. It is also clear that, for those same reasons, it is beyond the expertise and capacity of a historian to try and answer them. And yet, it seems appropriate for someone examining the history of statistics to take a stance in view of those overarching questions; and it also seems as though the early history of statistics – or what we might even call the genesis of statistics – contains certain clues that allow one to make some qualified statements about the epistemological nature of statistics, in other words, about the presumptive relationship between statistics and other forms of human cognition.

Two statements in particular can be made from the historical perspective presented in this article, and they point to a middle way between the positivist and the constructivist views.[37] To start with, it seems clear that the first uses of statistics opened up a new world to those

[35] Scott, James C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.
[36] Foucault, *Governmentality*; Foucault uses exclusively theoretical texts and thus lacks chronological precision as far as the actual implementation of statistical practices and statistical reasoning is concerned.
[37] See, in much more argumentative detail, Behrisch (forthcoming), *Die Berechnung der Glückseligkeit. Statistik und Politik in Deutschland und Frankreich im späten Ancien Régime*, part V.

who applied it, as they sometimes stated quite explicitly themselves.[38] New realities came into being – new entities (such as 'population', 'production', 'consumption'), and various relationships among them, that could not be conceived before and outside the quantitative and aggregative methods of statistics. And that is because statistics radically transforms the perceived nature of things by extracting only what they have in common – as a 1, to be subsumed under the category denoting what they have in common – and leaves aside everything they do not, everything that makes them individual and particular: Thus, all human beings are counted as '1', no matter what distinguishes them.

The epistemic "alchemy" of statistics lies in the process of construing equal units that can be counted and added up to new entities, equal units stripped bare of all their individual qualities and reduced to a simple '1'. In this way, essentially incommensurable perceptions, such as human beings, are made commensurable. The epistemic clue of statistics lies in the construction of quantifiable unities and quantitative entities; once created, these entities then become plausible and evident through the formal precision of their mathematical treatment, in the form of correlations and comparisons. Simple sums, e.g. a figure of production, are of little interest until they are related to other sums, such as a figure of 'consumption'. And such first-degree relations become even more interesting when they are compared to other relations of the same kind: The production-consumption ratio in *this* state compared to that of another, or the ratio of this year compared to that of last year, etc. In this way, once its elements are construed, the arithmetic pliability and, at the same time, methodical accuracy of statistics makes it seem ever more objective, and thus ever more 'truthful', than any other form of reality description. At the same time, by singling out a common quantitative denominator and abstracting from any individual qualities, and then aggregating them to larger entities that are compared in space and time, statistics necessarily creates a perception focussed on the material world and its functional correlations.

So far, so constructivist: At a given moment in time, and more precisely at a fairly recent moment in history, this new form of perception came into being, at first theoretically, and then, at an even later point in time, also practically. Both moments were determined by the (first theoretical, then practical) emergence of the idea of a Political Economy, i.e. of systemic and dynamic territorial economies that could and should be controlled and engineered. This idea and the construction of material and functional entities through statistics went hand in hand, in fact conditioned each other.

[38] Take, for example, the statements made by John Graunt (see above, III.).

The co-genesis of Political Economy and Political Arithmetic was taken up by the historian of science Mary Poovey in her *History of the Modern Fact*.[39] She argues that the new economic entities that were construed as a function of the systemic and dynamic concept of the economy that emerged in the second half of the seventeenth century, entities such as 'production' and 'consumption', 'producers' and 'consumers', implied the construction of their elementary units such as 'producer' or 'consumer'. In other words, these units – or "facts" – could not and did not exist outside the quantitative entities they constituted and were mere functions of the new systemic concept of the economy. In other words, the system made the facts, and the facts made the system.

While this account appears compatible in principle with the statements above, Poovey goes further by tracing the invention of statistics back to a very specific context, namely that of late seventeenth-century Britain: According to her, it was, in particular, William Petty who construed those entities and their units, with others following suit. Not untypical for historians of science, Poovey thus construes a somewhat fortuitous moment of construction that could or could not have occurred, and that occurred under very particular circumstances, in a very particular setting, and in the mind of a very particular person. And at this point, the historical evidence concerning not only the theoretical genesis but also the later application of statistical methods and quantitative reasoning allows a second evaluation of the epistemological nature of statistics: For the fact that statistical methods were not only co-invented together with the concept of Political Economy *independently* in different contexts, as it seems to be the case at least with Vauban in France, but that they were also re-invented in different ways and contexts a hundred later, with the reception and implementation of the ideas of Political Economy – these facts point quite clearly to statistics being something more than just a fortuitous discovery at the intersection at a number of constellations, not entirely fabricated, as it were, but an epistemology that imposed itself once the territorial economy as a complex and dynamic system became the focus of attention.

Thus, the study of the multiple and successive geneses of statistics suggests that it was and is neither completely fabricated, as a radically constructivist approach would have it, nor just simply 'true' and 'objective'. Statistics is a specific epistemology that was and is congenial with a materialistic, functionalist, economic worldview. It has imposed itself as a mode of perception wherever such a worldview became relevant; and it has, in turn, contributed to making such a worldview overriding and dominant – and that, ultimately, on a global scale.

[39] Poovey, Mary (1998). *A history of the modern fact: Problems of knowledge in the sciences of wealth and society*. Chicago, IL: University of Chicago Press, esp. 120 ff.