

## The history of statistics as a genre: styles of writing and social uses\*

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In a book paradoxically entitled *The Social Construction of What?* (1999), Ian Hacking asks why the studies on the "social construction" of this or that object have proliferated since the 1980s. Hacking argues that these studies deal with what the general public clearly regards not as "social objects" but "natural objects." The studies aim to reveal the objects' social character by showing that "things could have turned out differently." Thus the studies contribute to the broad contemporary debate on science—recently marked by the spectacular "Sokal Affair," in reference to a hoax concocted by the American mathematical physicist Alan Sokal to ridicule the social sciences. In his book, Hacking dissects the rhetorical modes of the studies on the "social construction" of objects. In so doing, he surreptitiously but radically alters the terms of a "war of the sciences" (whose intensity is, by the way, different in North America and Europe). To what extent do the different forms of history of statistics belong to the literary genre analyzed by Hacking—that of "social constructions"? Do they have comparable social uses? What lessons can we draw from the recent debates on the history of science for the history of statistics, in particular that of national statistics?

It so happens that history has played a prominent role in the "denaturalization" and "deconstruction" enterprises that have flourished in the past twenty years under the name of "social construction." This represents a major shift in the social role of history. For a long time, history has been used in "foundation narratives," designed to forge and establish the identity of a human group or social practice by selecting and arranging the features capable of conveying the desired image of that group or practice. In this sense, the "national histories" of the nineteenth century—one of whose prototypes was Jules Michelet's history of France—played an important part in the "awakening of nationalities" of that period. History later sought to become "scientific" by rejecting the identity-building or hagiographic function. It claimed "objectivity," or at least "neutrality"—first with "positive" history of the kind exemplified by Charles Seignobos, then with "social" history as practiced by Marc Bloch and Lucien Febvre's *Annales*. Statistics was a key ingredient in this "scientization" of history, which sought to rely on "facts" and no longer on philosophical speculations of a basically teleological nature (of which the Marxists' "sense of history" was one embodiment). More generally, statistics was described as an essential tool for "rationalizing" the conduct of human affairs, by substituting the rational principles of measurement and calculation for the arbitrariness of passions and the dynamics of power struggles. Whether in the social sciences or the management of social issues, statistics was thus assigned a comparable role of "de-ideologization" and "objectivation." This enabled social facts to be treated "like things," in the words of Émile Durkheim, who draws a parallel between the natural scientist and the engineer imbued with the idea of progress and responsible for shaping nature to meet human purposes.

In the 1960s, the social sciences became "critical," in other words, they gradually shifted from the kind of role summed up in Durkheim's slogan to an unveiling function: their purpose now was to unmask and denounce the true social relationships that lay behind an

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\* Paper given at the conference on "Statistical internationalism, State practices, and national traditions: progress report and prospects in the history of statistics," University of Quebec, Montreal, Canada, September 22-23, 1999. It has been published in French in : J.P.Beaud et J.G.Prévoist (éds), *L'ère du chiffre. Systèmes statistiques et traditions nationales*, Presses de l'Université du Québec, Montréal, 2000, pp. 37-57

ideology. The critique of this ideology was of a different nature than the one practiced in the earlier "scientistic" and "progressive" period. History—particularly the history of science, then in an expansionary phase—became the underpinning of a new way of looking at the present, with the concepts of "archeology" and "genealogy" that were brilliantly orchestrated by Michel Foucault. In the history of science, this evolution took place in two stages: first, the transition from Karl Popper to Thomas Kuhn and Paul Feyerabend, who elaborated an internalist historicism that cared little for "social" facts; second, the shift from the latter to Barry Barnes, David Bloor, and Bruno Latour, who, albeit in different ways, reintroduced society, i.e., the world outside pure epistemology (Callon and Latour, 1991).

This brief historical summary of selected steps in the social uses of history and, more recently, of the history of science, can be helpful for examining the different ways in which the history of statistics has been written and used. These approaches involve a full spectrum of styles and purposes: identity-building, hagiographic, commemorative, descriptive, scientistic, internalist or externalist, genealogical. The ultimate aim is to arrive at uses, consisting in the "social construction" of objects that are—depending on one's point of view—"measured" or "instituted" by statistics. The history of statistics is a particularly interesting arena for this exercise for the following reason: statistics is present in the sciences that describe themselves as "pure" sciences (in practice, this excludes the social sciences), because the formalism of mathematical statistics and probability is legitimate in those disciplines;<sup>1</sup> *at the same time*, it is present in what the French call the "human" sciences—such as economics, demography, sociology, history, and psychology. These are the sciences that the English-speaking world groups under the standardized label of "social and behavioral sciences" (which, by the way, is virtually untranslatable in French). Statistics—that space with a vast and ever-changing content—is thus a choice field for studying the history of the concept of "scientificity" and its migration from the natural sciences to the social sciences, which some would describe respectively as "hard" and "soft" sciences—using a metaphor whose history would be worth writing.

### ***The first period of national statistical histories (1800-1920)***

As we have seen, "national history" in the nineteenth century gave a powerful impetus to the emerging European "nationalities"—notably in the vast multinational Ottoman, Austro-Hungarian, and Russian empires. Similarly, "national statistics" was perceived, from the 1830s onward, as one of the vital attributes of the nation-States then under construction or seeking to assert themselves. The models here were the French State and its "Bureau de Statistique," established in 1800 and shut down in 1812 by Napoleon, then revived by King Louis-Philippe in 1833; the body was known as "Statistique Générale de France" (SGF) from 1840 to 1940. The other leading European States set up similar offices in the 1830s and 1840s, notably under the influence of that able propagandist for statistics, the Belgian astronomer Adolphe Quetelet (1796-1874). Quetelet created or fostered not only national statistics, but also statistical internationalism, by organizing "International Congresses of Statistics" at regular intervals from 1853 on.

Compared with what they have become since the 1940s, the statistical offices of the nineteenth and early twentieth centuries were often of modest size. Their "scientificity" consisted in relatively detailed compilations of administrative operations conducted for

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<sup>1</sup> As one can see, for example, in books and dictionaries on the "history and philosophy of science," which do not include the social sciences or even economics—despite its efforts to "cross the line"—but include entries on probability and statistics. The same observation can be made about the distinction in the Institut de France between the "Academy of Science" and the "Academy of Moral and Political Science."

non-statistical purposes. The major undertaking was the population census, sometimes supplemented by agricultural or industrial censuses. Sample surveys did not exist, since the actual method of random sampling—introduced by Laplace and the "political arithmeticians" in the eighteenth century—was strongly criticized for its insufficient rigor. Yet the political and institutional importance of these small institutions was, in a way, greater than their "scientific" importance—inasmuch as one can assess the latter from the scope, consistency, and uses of their output. This political weight is notably attested by the national "statistical societies," composed of eminent and influential personalities. These groups held sumptuous formal congresses that the highest authorities were invited to inaugurate. The regular censuses were regal acts. Their exhaustiveness and the rejection of all "approximate" assessments by means of sampling were not dictated by purely technical arguments. Just as national sovereignty is not complete without universal suffrage, compulsory education, and conscription, so national statistics requires a complete census.<sup>2</sup>

But the "foundational" role of statistics (in the sense in which Pierre Rosanvallon speaks of the "foundational" role of the State) is also attested by the recurrent production, at least until the 1930s, of texts on the history of national statistics—described either separately, or side by side (but with little summarizing) in works such as those by Jacques Bertillon (1895) and John Koren (1918). In a comprehensive study of statistical treatises published between 1800 and 1914, Michel Armatte (1991) has shown that, in an initial period, these works devoted large sections to the historical account of statistical activities in different countries. In the twentieth century, this share diminished and was replaced by expositions of the mathematical methods derived from the work of the British biometricians (Francis Galton, Karl Pearson and later his son Egon, Ronald Fisher, etc.). Once a thriving genre, "foundational" accounts are totally absent from the current statistical literature.

These national histories of statistics were presented in factual, chronological, and institutional form. They often reached far back in time, listing the establishment of offices, administrative ties, censuses, and other administrative compilations. The oldness of statistical activity was a sign of its greatness. Fernand Faure, professor of law, contributed a 113-page chapter on "statistics in France" to the collaborative volume published in the U.S. by John Koren in 1918 for the 75th anniversary of the American Statistical Association (celebrated in 1914). Faure devotes eight pages to "statistics in France from the eighth to the thirteenth centuries," and another fifteen pages to the fourteenth, fifteenth, and sixteenth centuries, i.e., to periods that are now dealt with not in "histories of statistics" but in historiographies of a totally different kind. The seventeenth and eighteenth centuries are covered in forty pages, the nineteenth century in twenty-two, and "present organization" (in 1914) in twenty-two as well. This page distribution shows how important it then seemed to establish a link with "statistics" in very remote periods, when the activities involving a certain degree of quantification (at least in Fernand Faure's judgment) had little in common with the corpus designated as "statistical" today (or indeed in 1914).

This is not to say that Faure was "mistaken," but that, at the very least, he constructed his object differently from us. The social role of this statistics-history genre recalls the emphasis on "our ancestors the Gauls" in French elementary school.<sup>3</sup> Faure's non-contextualized

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<sup>2</sup> The recent debate in the United States on the constitutionality of a sample-based "census"—rejected by the Supreme Court—shows the topicality of this issue, which is highly specific to official statistics: we are dealing here with the link between legal and metrological rationales ("metrological" as used in the natural sciences).

<sup>3</sup> In many histories of statistics, a ritual reference—which has the symbolic advantage of marking the initial year of the Christian era—plays the same role: the example of the census ordered by the Romans, which "explains" why Jesus was born in Bethlehem and not in Nazareth. It is hard to determine whether this "census" involved the compilation of a *list* for administrative purposes, or an *enumeration* aimed at producing numbers—which this mention in the histories of statistics implies.

mention of "detailed descriptions of church lands" ordered by Pepin the Short in 758 plays a similar role: antiquity is, in itself, a positive sign. Later, the rhetoric would be reversed in two other constructs: (1) Before, there was nothing—only obscurity, if not obscurantism; everything remained to be done (Alfred Sauvy in the 1930s). (2) Enormous progress has been made in recent years, after decades of indifference toward true scientific knowledge based on facts and not words (theme of the acceleration of progress, or of the "statistical revolution"; cf. Duncan and Shelton 1978).

The production of specific national statistics and the "ancientness" of this activity became arguments for the existence and substantiality of a nation. The case was made with occasionally surprising anachronisms. Silvana Patriarca (1996) has shown how the unification of Italy between 1820 and 1870 was supported by a proliferation of statistical undertakings that literally put the new nation on display. In this case, it is clear that statistics do not merely "reflect" national reality but also "establish" it, in the same way as the Constitution, national holidays, anthems, flags, school textbooks, and historical monuments. As regards statistics, the founding political act is not only the exhibition of a number (preferably a big one) such as the size of the population—or, later, the gross "national" product—but the *equivalence convention* that makes enumeration and addition possible. The link between democracy (one man, one vote) and statistics is attested by the fact that statistics was promoted in Risorgimento Italy by liberals hostile to the old monarchies. A nation is not only a politically unified space, but also a *common cognitive* space, observed and described through consistent interpretative frameworks. The negative demonstration of this is the long, costly, and often conflict-ridden effort by the European Union Member States to "harmonize" their statistical systems, i.e., to achieve a convergence between equivalence conventions that are dissimilar because of their often utterly different historical origins.

### ***The difficulties of statistical internationalism***

A famous episode of the history of statistical internationalism vividly illustrates the tension specific to "official"<sup>4</sup> statistical activity: it is the clash between an eminently political role (in the broad sense) such as the one cited above in Italy, and the goal of "objective and neutral" knowledge regularly championed by statisticians. We are not only referring to manipulations or pressures by politicians to conceal or "massage" a particular statistic: the relations between statistics and politics are often discussed exclusively in such terms. National statistics has multiple ties to the nation-State, through patterns and categories that are inseparably cognitive and political. In a much deeper sense, we can raise the issue of the relations between statistics and a "political" sphere ranging well beyond everyday government to embrace the various forces that "hold" a national community together.

These points are illustrated by the crisis of the "statisticians' international," which developed in the 1870s, and its solution, reached in the 1880s. Since 1853, the tireless Quetelet had organized triennial International Congresses of Statistics modeled on the growing number of large international gatherings of scientists (Brian 1989). The first Congress, held in London in 1853, explicitly referred to a recent international meeting on *meteorology*: both events emphasized the value of coordinating and harmonizing local observations. The analogy with wind and anticyclones had the symbolic merit of drawing

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<sup>4</sup> "Official statistics" is the standard term in English-speaking countries or in those influenced by them. The French prefer the expression "public statistics," which is consistent with their specific concept of "public service" but is less familiar in English.

statistics toward nature and pulling it away from political forces. This reorientation justified the establishment of a community of specialists not beholden to kings and emperors.

The Congresses were attended by the heads of the national statistical offices and prominent reformers, physicians, public-health advocates, jurists, actuaries, and members of the national statistical societies. All these participants were, in a way, lobbyists for the development of statistical institutions—offices, education programs, censuses, etc. For twenty years, the official goal of "furthering knowledge" as in meteorology made it possible to shield statisticians—particularly those of the national offices, who were civil servants—from the concerns that might be voiced by the authorities. The newborn German Empire set up the Statistisches Reichsam to supervise the national statistical offices of Prussia, Bavaria, Saxony, and the other kingdoms forming the Empire. In 1875, the Germans said they did not want any decisions or even any policy orientations involving imperial statistics to be influenced by a gathering of experts in which the French would play an important role. The imperial German government accordingly decided that the statistical offices under its authority would no longer participate in the International Congresses. The German decision effectively took the steam out of the Congresses, which stopped meeting. Negotiations in the 1880s led to a compromise solution: the founding of the International Statistical Institute in 1885. Conceived as a purely learned body, the ISI has survived to this day (Nixon, 1960). Government statisticians participate *as individuals* with presumably legitimate academic credentials, and their discussions in no way reflect their countries' official views. Yet the kinds of harmonization discussed at the ISI—for example regarding censuses, occupational nomenclatures, and causes-of-death classifications—have unquestionably had a practical influence. Thus the relationships between science, technology, and policies—concentrated in the boundary-object called "expertise"—are far more complex than one might assume from the somewhat naive but efficient compromise that led to the creation of the ISI.

After the 1920s, this division of labor was substantially modified by two unrelated factors. The first was the foundation of international institutions that were openly political and not purely learned as before, such as the League of Nations and the International Labor Office (ILO). The second was the rise of "mathematical statistics." The harmonization of statistical recording was discussed in the new international institutions (later in the United Nations, the European Union with its "Eurostat" Office, etc...). The ISI, meanwhile, essentially became a forum for the most technical aspects of statistical methodologies, which incorporated the latest tools of mathematical statistics and probability theory. These tools were used, for example, to legitimate the large-scale use of sample surveys—formerly condemned. Sample surveys were often discussed at the ISI, first between 1895 and 1903 in connection with the experiments by the Norwegian A.N. Kiaer, then in 1925. That year, a "motion"—an ambiguous term, somewhere in between science and politics—was passed on the respective merits of two sampling methods: "random" sampling defended by the Englishman Arthur Bowley, and the "purposive selection" method proposed by the Italian Corrado Gini.

These transformations of "statistical internationalism" coincided with the near-disappearance of the literary genre of "national histories of statistics" in the 1920s. The large multi-author volume edited by Koren written in 1914 and published in 1918, with the chapter on France by Fernand Faure, is one of the last examples of the genre, typical of the nineteenth century. Other forms of history of statistics—belonging to several different genres—emerged.

Since the 1940s, several factors have reshaped the landscape of statistics, as well as the kinds of histories written about it: the dissemination of mathematical statistics, the changes in the functions and size of statistical offices, and the quantification and mathematization of the social sciences—not to mention the new issues and methods in the history and sociology of science. Even as the traditional genre of national-statistics histories practically vanished, three other genres developed: (1) histories of the mathematization of statistics, often initiated by the protagonists of that process; (2) internal histories of statistical offices, often (but not always) written to celebrate anniversaries; (3) academic, interdisciplinary histories increasingly influenced by the modern sociology of science.

The great mathematicians of the early nineteenth century (Gauss, Laplace, Legendre, and Poisson) formalized the probability calculus and its use in astronomy, without ever referring to "statistics." The founding fathers of mathematical statistics were the British biometricians Karl Pearson, his son Egon, Ronald Fisher, William Sealy Gosset (better known by his pseudonym of Student), and Udny Yule—as well as the Pole Jerzy Neyman. Often these protagonists wrote the history of their own research and of their antecedents. The first was Karl Pearson (1920; 1978), followed by Egon Pearson, who wrote a biography of his father (1938) and edited collections of historical articles with M. G. Kendall (1970); Kendall later edited another volume of studies with R. L. Plackett (1977). While this historiography has tended toward an ever greater internalism (i.e., a history of formalisms), it has also displayed a broader purpose thanks to Karl Pearson, author of an influential work on the philosophy of science, *The Grammar of Science* (1911). This larger ambition is conveyed by the title of his collected lectures, 1921-33, published by his son Egon in 1978: *The History of Statistics in the 17th and 18th Centuries, against the Changing Background of Intellectual, Scientific and Religious Thought*. In this sense, Karl Pearson was still a nineteenth-century figure: he anchored his work in a historical and philosophical framework of far wider scope than his mathematical technology *per se*—and used that commitment to justify his endeavors.

Later, this way of writing and using the history of statistics was taken up by a French statistician, Jean-Paul Benzécri, who sought to establish a non-probabilistic mathematical descriptive statistics. This approach—which he calls *data analysis*—differs from the dominant, Anglo-American variety. Benzécri's method has been influential in the French-speaking community since the 1970s, but has not had a wide audience in the English-speaking world. A philosopher and theoretician of science as well, Benzécri, like Pearson, has felt the need to write a history. The ambition of his book, *Histoire et préhistoire de l'analyse des données* (1982), is not only to offer a scholarly historiography. Both Pearson and Benzécri write a history that is at the same time their personal history and the history of their reflections on their predecessors and forerunners (Benzécri talks admiringly and at length of Pearson). This is a way for them to put their work into perspective and to connect with a long tradition, which they accept even while radically transforming it. Theirs is not a nostalgic exercise undertaken in retirement, nor a pompous address by the chairman of some learned society. This historical and philosophical awareness—and this effort to define oneself in a long and extensively re-examined history—is somewhat lacking in later works by highly specialized authors. To them, history is a Markov chain, where all past events are presumed to be summarized in the next-but-last state of science, and in the step they have taken to reach the final state.

The genre of an internalist history of probability and mathematical statistics has been taken up in studies by statisticians including Stigler (1986), Hald (1990; 1998), Fienberg and Tanur (1996), Bru (1988), Sheynin (numerous articles since 1966), and many others. These

studies are usually circulated in specialized journals and congresses (such as those of the ISI); they have few connections with the more externalist and interdisciplinary currents in the history of science; in the history of statistics, these currents have been very active since the early 1980s, notably with the work of the Bielefeld Group described below. This is a more recent example of the classic opposition between an internalist history of a science written by specialists of that science, and another, more externalist history, encompassing social and institutional issues, and written by historians or sociologists. One of the challenges of the new sociology of science is precisely to transcend and erase the old separation between these two approaches—the internalist and externalist—as well as the division between "content" and "context." But this new approach to historical research cannot refute the frequent charge of "relativism" (leveled against it particularly by Sokal and his supporters) except by taking totally seriously the "internalist" works mentioned here, which are irreplaceable. This supposes a convergence of competencies, talents, and sensitivities rarely assembled in the same individuals.

After World War II, the statistical agencies (or *bureaux* as they were known in French) underwent a transformation in size and character. They often became "institutes" or "offices": these name changes suggest a gain in autonomy vis-à-vis the public administration in the strict sense (the old "bureaucracy"), and a move toward a more "scientific" status (the "institute"), or, at any rate, a more specific and autonomous status (the "office").<sup>5</sup> Duncan and Shelton (1978), describing the changes in official statistics in the U.S. between 1926 and 1976, identify the four most important components of this "statistical revolution": the sampling method, national accounting, statistical coordination, and information technology. This list contains two very different "technical" factors (sampling, computers), one factor that appears to be of a purely "institutional" sort (coordination), and a synthetic construct informed by Keynesian macroeconomics and the policies inspired by the latter (national accounting). To show how these seemingly heterogeneous components are closely interlinked in specific cognitive and political configurations is to apply the research program outlined above—which, so far, has been only very partially explored.<sup>6</sup> One of the main difficulties is that few studies explicitly address the issue of the relations between (1) technologies with a scientific and therefore—in principle—*universal* purpose, and (2) their *national* applications and reinterpretations. In other words, the technical and social configurations can differ widely from one country to another,<sup>7</sup> despite the efforts to create common languages in the statistical and political "international." The problem is that the qualifications needed to analyze those two components are scattered among very different researchers—statisticians or econometricians for the first component; political scientists, sociologists or historians for the second.

### ***The new wave of national-statistics history (since 1975)***

Yet a relatively new kind of history has developed in the past two decades, which—in a certain manner but in very different forms—resurrects the nineteenth-century histories of

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<sup>5</sup> Far more recently—and, no doubt, under the influence of the communication strategies promoted by business firms—the statistical offices are shedding this type of name to become Statistics Canada, Statistics Norway, Eurostat, etc.

<sup>6</sup> In very different genres and with very different approaches; see, for example: Porter (1986), Hacking (1990), Fourquet (1980), Nelson (1987), Anderson (1988), Desrosières (1993), Armatte (1995), and van den Bogaard (1998). Although they deal with a variety of subjects, these works—among many others—have a common feature: they suggest links between the cognitive and political dimensions of the tools described.

<sup>7</sup> See, for example, Desrosières (1999) for a comparison of macroeconomic planning tools in France and the Netherlands.

national statistics. The statistical institutes themselves have compiled or commissioned their own histories, for example to celebrate their anniversaries. The works consist of chronological narratives or surveys by topic. The narratives are generally produced for commemorative occasions. They tend to be "deluxe" productions, lavishly illustrated with portraits of statisticians, old tables, charts, and maps, issued in attractive bindings, and printed on high-quality paper. These volumes are a showcase for the image that the institutes want to convey. They are often unsigned, and written by multiple authors. We will list five, covering four countries:

- 1) France: *Cinquante ans d'INSEE... ou la conquête du chiffre* (1996).
- 2) Canada: *75 ans à compter: l'histoire de Statistique Canada* (1993, French and English).
- 3) Britain:
  - a) *Keeping Score: The First Fifty Years of the Central Statistical Office*, Reg Ward and Ted Doggett, 1991.
  - b) *People Count: A History of the General Register Office*, Muriel Nissel, 1987 (150th anniversary, published by the Office of Population Censuses and Surveys [OPCS]).
- 4) Russia-USSR: *Russia's State Statistics, 1802-1996*. Goskomstat (1996, Russian and English).

Despite their official and commemorative character, these books contain a wealth of information, both explicit and implicit. The chapter divisions often correspond to the succession of directors. Chiefly destined for institute staff, the works focus on in-house activities, organization charts, institutional ties, the major operations, working conditions, buildings, and technological change. The more general history of the country itself is discussed sporadically through two kinds of events. The first are wars, which have often led to large-scale reorganizations of statistical services. The second are economic crises, whose role is contradictory, because they increase the demand for new information and new statistical tools, but often entail drastic cuts in spending on statistics. Country-specific features are highlighted: in Canada, heavy investment in statistical *methodology* and strong *centralization*; in Britain, coordination problems and the role of *public health*; in France, the crucial stimulus provided by national accounting and *economic studies*; in Russia-USSR, the Revolution and the purges of the 1930s are almost ignored. By contrast, there is no description of the links between (1) statistical programs and operations and (2) their specific uses in each national setting. The broad terms of reference are often described in a normative and generic fashion, especially as one moves closer to the present. Yet some points are stressed, such as the recent focus, in some countries, on the marketing and sale of statistical products to offset budget cuts.

These documents contain valuable material, but cannot be regarded as histories of statistical offices. There is a second category of works that fits this description. Occasionally, the statistical institutes commission members of their own staff to write more detailed and technical histories, some of which are highly informative. Examples include:

- 1) France: *Pour une histoire de la statistique*, INSEE (vol. 1: 1977; vol. 2: 1987).
- 2) Canada: D. A. Worton, *Le Bureau fédéral de la statistique. Une histoire de l'Office central de statistique du Canada et de ses antécédents*, Montreal: McGill University Press, 1998.
- 3) United States: J. W. Duncan and W. C. Shelton, *Revolution in United States Government Statistics, 1926-1976*, Washington: U.S. Department of Commerce, 1978.
- 4) Italy: *ISTAT: Cinquanta anni di attività, 1926-1976*. Rome, 1978.
- 5) Netherlands: J. van Maarseven and M. Gircour (eds.), *A Century of Statistics: Counting, Accounting and Recounting in the Netherlands, 1899-1999*. Statistics Netherlands, 1999.
- 6) Spain: *Historia del Instituto Nacional de Estadística, 1945-1981*, INE, 1981.

Most of these works are authored by current or former members of the statistical office staff. They are arranged by field, type of survey or source, processing technology, method,

etc. While going into greater technical detail than the previous category, they are very "internalist" in their approach to the institutions. The references to the social uses of statistics are not there much more abundant than in the commemorative volumes. There is little mention of technical or political controversies, failures, or internal divisions. Yet they provide vital source materials for a comparative history of official statistics (still to be written), because they contain more first-hand technical information.

A third category of histories of statistical offices is produced by academics who do not belong to them. The authors are often, but not exclusively, historians. Some of these studies (which are not all recent) are the by-product of investigations initially undertaken to gather *sources* of statistical data for historical research—and only by extension to reconstruct their institutional context (for France: Gille 1964; Le Mée 1975; for Germany: Stockmann and Willms-Herget 1985). Other, more recent works are *mainly* devoted to the historical and sociological study of statistical offices as such. The historical coverage and the approaches vary, but, as a rule, the links with national contexts are analyzed far more fully than in the first two categories of history. The following are worthy of mention, with no claim to exhaustiveness:

- 1) France: Brian (1994) on the eighteenth century; Bourguet (1988) on the Napoleonic period; Schweber (1997) on demography in the nineteenth century; Touchelay (1993) on the early days of INSEE (1946-61); Fourquet (1980) on national accounting (1945-75); Volle (1982) on industrial statistics (1940-75); Bardet (2000) on the INSEE regional offices (1940-72).
- 2) Canada: Beaud and Prévost (1993) on the establishment of the Federal Statistical Office (1912-21), and many other articles by the same authors.
- 3) Britain: Davidson (1985) on labor statistics (1880-1910); Szreter (1996) on demography (1860-1940).
- 4) United States: Anderson (1988) on two centuries of censuses; Alonso and Starr (1987) on U.S. statistics in general; Didier (2000) on sample surveys (1920-45).
- 5) Russia-USSR: Blum (1994) on demography under Stalin; Stanziani (1998) on the relations between statistics and economics (1870-1930); Mespoulet (1999) on regional statistics (1880-1930).
- 6) Italy: Patriarca (1996) on Italian unification (1820-70).
- 7) Switzerland: Jost (1995) on statistics and politics in Switzerland (eighteenth to twentieth centuries).

As a rule, these histories are less detailed in their examination of statistical recording and tabulation methods; but they provide detailed analysis of the role of official statistics, their institutional and political contexts, and the networks of their social uses. They offer many examples confirming the assumption that national statistics help to "establish" reality before reflecting it. Indeed, this difference in viewpoint lies at the heart of the differences in writing styles between the works in the first two categories and the works in the third. The first two categories are implicitly grounded in a realistic epistemology, inspired by the metrology of natural science: the assumption here is that reality exists independently of the procedure used to observe it. Reality is measured with the greatest possible precision, as one would measure the distance between the Earth and the Moon. This epistemology is, of course, a response to a deep-seated social demand, which focuses on action rather than knowledge as such. In this pragmatic context, "reality" pre-exists in order to be transformed. It is the foundation and object of action: the aim is to rely on things that hold together, i.e., on "reliable statistics," on "good-quality" statistics, to use the terminology of "total quality" that spread so quickly in statistical institutes in the 1990s.

In contrast, the works in the third category—written by academics—typically adopt a different epistemological perspective, informed by the reflexivity requirement characteristic of the latest trends in the social sciences (reflexivity being the interdependence between the observer and what is seen). These studies often rest—in a wide variety of ways, of course—on the notion of a co-construction of social representations, of policy forms, and of the national statistical systems that justify, guide, and assess those policies. Can this approach be described as less "realistic"? Does it seek to "denaturalize," to "undo social constructions," as Hacking asks (1999)? Or, instead, is it trying to examine "reality" in a broader perspective, by paying *simultaneous* attention to measurement procedures and the social networks of the uses of these measures? The reading of these different categories of studies might suggest an epistemological divorce, reflected in the expression "war of the sciences," used in North America today. We propose that these issues should be addressed not through a confrontation between irreconcilable philosophical principles—"reality" versus "construction"—but in an empirical and historical manner, through surveys on the uses of statistical argumentation, as well as on the uses of realistic and constructivist epistemologies. This was the type of survey undertaken by a group of researchers from different backgrounds who worked together for a year (1982-83) at the University of Bielefeld in Germany.

### ***The Bielefeld Group and the "probabilistic revolution"***

The Bielefeld Group has radically transformed the style of statistical historiography, previously subdivided into the history of national statistics and the history of mathematical statistics. This enterprise, launched by the physicist and philosopher Lorenz Kruger, took up the issues raised by Thomas Kuhn on "scientific revolutions" and their "paradigm shifts." Did the nineteenth century witness the dissemination of a "probabilistic paradigm" in both the natural and social sciences? Bringing together specialists of these two types of science was a pathbreaking initiative that proved to be fruitful, notably by showing that the circulation and exchange of cognitive patterns was a *two-way* process rather than a one-way flow from the natural sciences to the social sciences, as is often stated. The exemplar here was the concept of *average*, which traveled from astronomy to the "science of man," then back to physics via Quetelet, Herschel, and Maxwell. The Bielefeld Group's core assumption is the historical shift from one model of science to another: the first was the eighteenth-century "deterministic" model, in which probability—known as "epistemic"—was predicated by an insufficient knowledge of the states of the world; the second was the "probabilistic" model, in which randomness is inherent in these states of the world.

In principle, the questions explored by the Bielefeld Group are internal to the epistemology of science, and somewhat remote from the statistical issues examined here. Yet, through the multiplicity of historical approaches to very different sciences, this seemingly theoretical discussion has evolved into a sociology of science in which the contents of scientific statements circulate as naturally as their formulators—the best way to abolish the opposition between internalism and externalism.<sup>8</sup> Despite the minimal presence of the history of national statistics, due to the "universalist" scientific approach to the issue, the specificities of certain national profiles (in particular that of Germany) have been visible. The histories of the analysis of economic time series (Klein 1997) and the history of econometrics (Morgan 1990; Armatte 1995) have been introduced into this panorama,

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<sup>8</sup> The books and articles generated by this collective effort are too numerous to be listed here. For a good overview, see one of the volumes, written by six authors (Gigerenzer et. al.1989).

paving the way for research on the social and national forms of economic-policy modeling, and on the role of official statistics in the latter. But the new literature's main contribution has been to show the possibility of an empirical and historical interdisciplinary investigation bearing no resemblance to the purely epistemological clashes and "dialogues of the deaf" so often observed, for example between economists and sociologists. This episode may indeed be described as the invention of a new style of writing about science and its role in society.

The "Bielefeld" approach could be fruitfully applied to the analysis of the national specificities of the statistical systems in different countries, their interpretation, and the consequences of these specificities on the debates that instrumentalize statistics divorced from their social recording networks. There is a better alternative than drawing a line between hurried users who do not want to waste time reopening black boxes, and their critics, who—resurrecting nominalism—challenge the equivalence conventions on which statistical work is based. It is preferable to analyze the political foundations (understood as the general treatment of a community) and economic foundations (i.e., action and cognitive work) of such conventions. One of the effects of the new social sciences is to make naive realism less credible. Should we throw out the baby with the bathwater? The baby itself is conceived by a man and a woman. It then becomes a very real entity, living its life in a society that can no longer do without it.

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