

Connections and exchanges in European thematic cartography. The case of 19th century choropleth maps.

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Connections and exchanges in European thematic cartography. The case of 19th century choropleth maps

Connexions et échanges en cartographie thématique européenne. Les cartes choroplèthes du XIX^e siècle

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In the beginning of the 19th century, thematic cartography was enriched with subjects related to the human world. In particular, the enthusiasm for statistics

put on the foreground several topics drawn from what we would call today “social sciences”: demography, political economics, and moral statistics. In this context, most of the methods of quantitative mapping were invented within a short period, between 1826 and 1850. This article deals with the first and the most popular among these methods, the shaded map, which is credited to the Frenchman Charles Dupin. We explore the circumstances in which it was imagined, and its modes of diffusion in European cartography. Dupin’s shaded map became quickly famous and was imitated by scholars in the field of vital and moral statistics, then of medicine and anthropology. We suggest that these thematic maps were not neutral illustrations, but were primarily conceived as arguments in scientific or ideological debates, and that their sign system played a major role in their persuasive effect.

Au début du XIX^e siècle, la cartographie thématique s’enrichit de sujets relevant des études sur l’homme. L’enthousiasme pour la statistique place notamment au premier plan des données qui se rapportent à ce que nous désignerions aujourd’hui comme “sciences sociales”: la démographie, l’économie politique ou la statistique morale. Dans ce contexte, la plupart des méthodes de cartographie quantitative furent imaginées en un temps très court, entre 1826 et 1850. Cet article porte sur la première et la plus célèbre d’entre elles, la carte teintée, que l’on doit au français Charles Dupin. Nous présentons les circonstances de son élaboration, puis les modalités de sa diffusion dans la cartographie européenne. La méthode de Dupin devint rapidement célèbre et fut appliquée par des auteurs travaillant dans le champ de la statistique démographique et morale, puis en médecine et en anthropologie. Nous montrons que la plupart de ces cartes thématiques n’étaient pas des illustrations neutres, mais qu’elles jouaient le rôle d’arguments dans des débats scientifiques ou idéologiques, et que leur système de signes jouait un rôle important dans leur effet de persuasion.

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Introduction

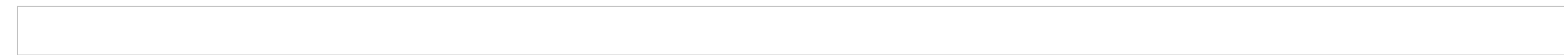
1The 19th century was a period of quick spread of thematic cartography in Europe. In the early stages, thematic maps were essentially related to natural sciences: geology, climate, geography of plants and animals. A first masterpiece was published in Germany in 1838-48: Heinrich Berghaus' *Physikalischer Atlas*. It was quickly imitated in Great Britain, with the publication of the *Physical Atlas*, edited in 1848 by the Scottish cartographer Alexander Keith Johnston.

2The first half of the century saw in parallel a development of quantitative mapping in the field of what we call today "human sciences". Most of the methods to map quantities were invented within a short period, between 1826 and 1850. This article focuses on one of these graphic innovations, immediately popular throughout Europe: the shaded, or choropleth map, as it is known today. The birth of this mapping method has been studied otherwise within its particular French context (Palsky, 1996). In this article, we draw the attention on the spreading of the method through Europe and on its gradual diffusion from political economy to other disciplines.

3The method was imagined in 1826 by Frenchman Charles Dupin. Dupin was a disciple of Gaspard Monge, expert in geometry and mechanics. He also had a long career in politics, becoming a distinguished member of different assemblies from the Restoration period to the Second Empire. An engraving dated around 1830 (figure 1) portrays him at about 45 years old, as a member of the French *Académie des sciences*. He wears the academician uniform, adorned with different symbols of his dignities: his *légion d'honneur* and his cross of the military and royal order of Saint-Louis. Behind his shoulder, an open window displays scenes of a working France: a forge, a factory, a ship under construction. Dupin always stood up for the rights of this productive France. On the table before him, three works represent his scientific production. First, a roll of paper, entitled *Enseignement des ouvriers*, Education for workers. Dupin was among the first, in France, to promote this type of education, whose model he had found during his travels in England.

The book open on the table is a famous treatise in which he developed his theories in political economy, *Forces productives et commerciales de la France* (*France's Productive and Commercial Strength*, Dupin, 1827). At last, a map of France, of which we see only the lower part, is set before him. Why choose a map to symbolize the work of a person who wasn't a geographer or an officer? I will try to answer this question, to point out the originality of this map and explain its importance in the history of contemporary cartography. I will also consider the quick diffusion of the method imagined by Dupin in European statistical studies, and its progressive application to diverse topics. This paper aims to contribute to a history of the graphical language. However, the question is not purely of graphical technique: early statistical cartography cannot be considered apart from a scientific discourse. I will attempt to put maps back in the context of social and medical reflection in the first half of the 19th century.

Figure 1. Portrait of Charles Dupin, ca 1830. French national Library, all rights reserved.



[Agrandir Original \(jpeg, 1.0M\)](#)

[The invention of a seminal method](#)

4Dupin had nothing to do with the traditional circle of geographers or map-makers. Born in 1784, he had received a scientific and technical education, being trained as an engineer at the *École polytechnique*. He worked as a naval engineer between 1803 and 1818, and at the same time he carried out researches in geometry, under the influence of Monge. In the 1820s, a new topic held his attention: “statistics, an entirely new science, had never been usefully applied”, says one of his biographers, “...Mr Charles Dupin resolved to make it serve to observe our country's progress in the path of moral and material interests” (Hoefler, 1858, 320). Dupin then developed new researches in economic and social statistics. He presented some of his results in 1825 and 1826 through special lessons, taught at the *Conservatoire National des Arts et Métiers*, where he had founded his course for workers. On 30 November 1826 he presented his *Carte figurative de l'instruction populaire*, as part of a paper about the “effects of popular education on France's prosperity”. The map was reproduced one year later in his major work: *Forces productives et commerciales de la France* (Dupin, 1827). This was the starting point of a graphical revolution, the consequences of which can still be felt in contemporary mapping.

- 1 Dupin asserted that he exploited “the last official account from the royal university” (Dupin, 1827 [\(...\)](#))

5Dupin illustrated the theme of primary education, per *département*. Instruction

was chosen as an indicator of the economic development in the different parts of the kingdom, as Dupin was convinced that there were intimate relationships between people's education and prosperity. The data were quite uncertain at that time, for the regular account of primary education was not yet published (numbers were gathered by the chief education officers from 1829, and first available in 1831). Dupin used probably the figures displayed in the *Almanach de l'Université de France*¹.

- 2 *Journal des débats*, 21 juillet 1823, pp. 3-4. See also Chartier, 1978.

The map (figure 2) illustrated a basic opposition between northern and southern France. The idea was not new. It had been suggested as soon as 1823 by geographer Conrad Malte-Brun, who had pointed out the extreme disparity of education across the provinces of Europe and discovered in France “the most surprising contrast” between north and south².

Figure 2. C. Dupin, *Carte figurative de l'instruction populaire de la France*, 1826. Paris. French national Library, all rights reserved.

[Agrandir Original \(jpeg, 1,9M\)](#)

What about the graphic method? “To make visible”, Dupin wrote, “the main difference, I had the idea to give to the various *départements* shades all the more dark since they sent less pupils to schools” (Dupin, 1827, 249). This *carte teintée* (shaded map), as Dupin puts it, has no known antecedent. However, it is plausible to put forward a few hypotheses about its conception. Dupin asked himself: how many inhabitants are necessary to find one educated person? Thus the higher the values, the lower the proportion of educated people, and the most intense visual effect, with dark shades, was assigned to ignorance: “in our map, the blackness of shades corresponds with the magnitude of numbers written under the name of every *département*. This shade and this number indicate how many people are necessary to provide a male pupil to schools. The most enlightened departments are consequently the ones which possess the most widespread primary education” (Dupin, 1826, legend of the map). We can reasonably think that the gradual shadings of the map were directly inspired by a metaphoric conception of knowledge. The shading gave the impression of a light thrown on the map, comparable to the light of knowledge. Moreover, Dupin often used the expression “dark” and “enlightened France”, when he commented on his map:

“The Treasury Department collects 6,820,000 fr. in land taxes from enlightened France, and 3,599,700 from dark France” (Dupin, 1826, p. 28).

“Inhabitants from Haute-Loire, or Cantal, or Corrèze, these parts still

so dark on the map of primary ignorance of the Kingdom” (Dupin, 1826, p. 37).

“In our southern provinces, so much ignorance still darkens the countryside, the hamlets and the secondary towns” (Dupin, 1827, p. II).

8Afterwards, the map was commonly referred to as “Map of Dark and Enlightened France”.

9Maps with increasing shadings rest on the division of a statistical series in a few class intervals, each of which are expressed by a particular shade. The methods for class intervals calculation and for shading a map are grimly discussed among statisticians, in the last quarter of the 19th century, in the framework of their international congresses. Dupin did not provide any detail about his method, or any key on the map. He just restored the original data, by writing down the numbers under each department. Problems of method seemed to be left aside, and Dupin’s comments focused on the visual effect of his map. His map emphasized a major geographical break: “It is the activity and spirit of the inhabitants that produce the enormous difference that catches the eye when it casts over the map. Notice a clear-cut and blackish line going from Geneva to Saint-Malo, which separates the North and the South of France.” (Dupin, 1827, pp. 250-251) This pattern of the “two France” and the Saint-Malo-Geneva line became through the 19th century a common place of territorial analysis (Chartier, 1978 and 1986).

10Thematic cartography certainly opened up the way to generalization, as opposed to topographic cartography, which described the particularity of places, their uniqueness. Through shadings, territories could be compared and visually classified. Moreover, with Dupin’s map, the comparison went beyond the limits of the French kingdom. The French territory was tensed between two poles: United Kingdom, clear on the map, and Spain, which appeared entirely black. This map has to be replaced in the context of Dupin’s theories in political economy. The image was a clear argument in favour of the English model of civilization, based on liberalism and industry. Educated France was the France of “moral energy”, active, productive and *positive*. So the act of foundation of statistical cartography was clearly associated with a certain vision of progress that prevailed, or was in process to prevail in 19th century Europe. And so was it for most of the pioneer thematic maps, notably those that were drawn by railway engineers, in the 1840s (Palsky, 1996). However, the prevailing discourse was not the only one. We will see below that several authors expressed their opposition to Dupin’s ideas by producing maps presenting a reversed image of France.

11With the 1826 map Dupin gained an immediate popularity. This is testified by several biographical notices. In the *Larousse great encyclopaedia* for example, the article about Dupin stressed “the just fame that his map of obscure France and

enlightened France brought to him”. We also read in Hoefer’s dictionary of biography that “one can still remember the vogue success obtained by this ingenious map of enlightened France and obscure France, in which more or less dark tones gave a striking expression of the situation of public education in the departments” (Hoefer, 1858, p. 320). This success was indeed echoed in several works, as Dupin and his statistics were in fashion in Parisian salons (cf. Barbéris, 1966). Stendhal was among the attendance of the 1826 conference. At that time, he wrote chronicles about the French actuality for English reviews. In a text published in the *New Monthly Magazine*, he described the map at length: a “curious map” which “aroused great interest in the audience”, and called it a “much talked about map” (Stendhal, 1935). Several years later, Balzac testified to the long-lasting celebrity of the map, as he wrote in a short story, about its character, Chodoreille: “A young man has forsaken his natal city in the depths of one of the departments, more or less dark on M. Charles Dupin’s map.” (Balzac, 1845)

12The work of Dupin was also well received in the European learned circles. We know for instance that Goethe borrowed *Forces Productives* (...) in the Weimar library and was much impressed by the map. He mentioned it with laudatory terms in a conversation with Eckermann, dated from October 1828. Dupin’s treatise was not translated, but it had an edition in Belgium in 1828.

13To conclude, we can notice that in the second part of the century, many statisticians still referred to the graduated shadings as “Dupin’s method” or “Dupin’s system”. However, the rapid spread of the method is without doubt the most convincing demonstration of its popularity.

[First applications in the field of moral statistics](#)

14The immediate posterity of the map is indeed remarkable. After Dupin, many authors valued this way of “speaking to the eye”, to use an expression by William Playfair, the Scottish pioneer in the graphic representation of data (Playfair, 1802, p. XX). It was rapidly admitted that with shaded or coloured maps, results were more striking, and information was conveyed much easier than with lists of numbers. Maps were promoted as important tools of descriptive statistics, to summarize data, to demonstrate, persuade, and even discover new facts.

15Dupin’s method was first adapted to a map of the population density of Prussia, a plate of an atlas prepared by order of Frederic William, Prince of Prussia and published in 1828: the *Administrativ-statistischer Atlas vom Preussischen Staate* (Döring, 1828). Nevertheless, shaded maps were rather rare, till the 1860s, for vital or economic data. Their main field of development was social or moral statistics. One key of the success was certainly the possibility, despite the use of

an abstract language, of a *natural reading* of the shades. Black or white did not mean exclusively high or low statistics, but positions on a scale of moral values. As for ignorance, blackness took on a metaphorical sense: evil deeds, poverty or suicide. The authors used frequent sentences with double meaning when they described their maps. For instance, the Ireland census commissioners presented in 1843 a map of education in Ireland “by which it will be seen that in a large portion of the island, there is still considerable darkness” (Robinson, 1982).

16The first follower of Dupin in this field was probably the Belgian of German origin Hirsch Sommerhausen. His map, dated around 1829, illustrated for the Low Countries the same topic as Dupin’s, education. It bore almost the same title in French (*Carte figurative de l’instruction populaire des Pays-Bas*), and the same paragraph of explanation. Hirsch Zvi Sommerhausen was an intellectual of the Jewish community of Brussels, a polygraph who published several educational booklets and plates. He had a good knowledge of the developments of statistics, as we can infer from the data he used, which came from an official report on education, dated 1827. He also mentioned Quételet’s statistical study about the Low Countries on his map (Quételet, 1829). Lastly, he had designed two years before a chart inspired by the work of the German statisticians Johann Georg Hassel and August Crome, using proportional squares and circles to compare the surface and population of the different provinces of the Low Countries (Sommerhausen, 1827).

17Between 1829 and 1835 the mapping method was extended to criminality by the French lawyer André-Michel Guerry, partly in collaboration with the Venetian geographer Adriano Balbi, and by the Belgian statistician Adolphe Quételet. The expansion of public statistics gave an opportunity to explore new topics. Thus, Guerry and Balbi’s first work, entitled *Statistique comparée de l’état de l’instruction et du nombre des crimes (...)*, was a plate of three shaded maps (figure 3), showing crimes against persons, crimes against properties and education in France (Guerry & Balbi, 1829). To draw it, the authors used the first account of the administration of criminal justice, set up in 1825 by Guerry de Champneuf, director at the Ministry of Justice. Later Guerry prepared a statistical essay, illustrated with 6 maps (Guerry, 1833). It included a new map of education (figure 4), for which he had compiled three years of results of an exam established for the conscripts by the Ministry of War. As for Quételet, Guerry had a passion for criminal data, which he had discovered in 1827, when he was committed by the Ministry of Justice to work on the Parisian criminality. He foresaw the possibility to find out regularities and to identify the laws that might govern them. In his 1833 presentation, he showed that rates of crime and suicide, grouped according to departments and categories of age, sex or season of the year, remained remarkably stable from year to year, and varied systematically across the geographic space. Guerry was particularly interested in studying the link *between* variables in order to progress towards a scientific explanation of crime. He could only rely on visual comparisons of maps or diagrams, as methods of inferential statistics, such as estimation, correlation or regression, had not been invented

yet. In his 1829 maps for example, he aimed to check the widespread opinion that a connection existed between criminality and ignorance. Considering his maps, he concluded that there was no link between crime and education: the less educated part of France was not the most criminal. Later, he carried on his research, studying with the same method other variables, such as suicide, property, illegitimate births, and so forth. Guerry's maps cannot be considered as pure illustrations. They were used as tools of spatial experimentation and scientific arguments. They "tested common beliefs and trivial truths" (Chartier, 1978, 402). Through the relation of one map with another, the eye could catch new information. Cartography stood as a medium between different types of data. It allowed comparisons, more easily than if the reader had to handle with numeric tables.

Figure 3. A.-M. Guerry & A Balbi, *Statistique comparée de l'état de l'instruction et du nombre des crimes*, 1829. French national Library, all rights reserved.

[Agrandir Original \(jpeg, 784k\)](#)

Figure 4. A.-M. Guerry, "Instruction", plate III, in: *Essai sur la statistique morale de la France*, 1833. Private collection, all rights reserved.

[Agrandir Original \(jpeg, 407k\)](#)

18From the continent, shaded maps diffused into Great Britain, among social observers and statisticians. We know that Dupin paid a visit to the British Association for the Advancement of Science in 1836 and probably displayed a shaded map on this occasion. Besides, the works of Guerry and Quételet immediately attracted the attention of scholars all over Europe. In England, Guerry's essay was extensively presented in the *Westminster Review* ([Anonymous], 1833). In 1835, William Greg, a member of the Manchester Statistical Society, published 5 maps "coloured after Mr Guerry's example" in his essay on the "Social Statistics of the Netherlands" (Greg, 1835). Guerry's work was also mentioned in November 1835 at the Statistical Society of London, a society which elected him as a foreign member in 1837 (cf. Rosenbaum, 2001).

19Later, important examples of shaded maps can be pointed out in Great Britain. In 1841, the results of the Census of Ireland were illustrated with a map of education and two maps about the living conditions. By the middle of the century, we find statistical maps in several social studies: Joseph Fletcher's *Moral and Educational Statistics of England and Wales* (1849) and Henry Mayhew's *London labour and the London Poor* (1851) included respectively 20 and 15 social maps, on a wide range of topics. Both of them were influenced by Quételet and Guerry, and frequent references to their publications are found in their works.

20Let's go back to the continent. In France, Guerry had initiated "the revenge of deprived and illiterate France" (Chartier, 1978, p. 402). Other authors turned Dupin's own weapons on him and produced reversed images of France, where they denounced "the bitter fruits of modern material civilization" (*ibid.*, p. 403). The viscount Villeneuve-Bargemont published for example four maps of pauperism and begging in France and Europe (Villeneuve, 1834). Villeneuve-Bargemont (1784-1850), royalist and legitimist, had been a prefect during the Restoration, till the July 1830 Revolution. He then became deputy, and devoted himself to statistical studies. His theories met those of other Christian and agrarian thinkers, like Bigot de Morogues, who questioned the English model of civilization and economy favoured by Dupin. According to Bigot de Morogues, the South of France was not a backward territory but the moral part of France with respect to poverty ("pauperism"), criminality, or begging (Bigot de Morogues, 1832). Villeneuve-Bargemont took up these appreciations in 1834. He directly replied to Dupin, with statistic tables and his shaded maps, entitled *Paupérisme en Europe, Paupérisme en France, Mendicité en Europe, Mendicité en France*. His data were unlikely, and he did not define his sources very clearly (boards of charity?). Concerning France, he found one poor out of 9 inhabitants in the North, and one out of 22 in the South. His map of poverty in France was not the exact negative of Dupin's picture, and Villeneuve-Bargemont even sketched a division into three France ("suffering", "medium" and "favoured"). However, he clearly reversed the North/South pattern. His results, even incomplete, proved that pauperism, that "[marched] everywhere on the grounds of capitalist, urban and industrial concentration, [was] more frequent in manufacturing, protestant, northern countries than in agricultural countries, catholic States, southern provinces" (Villeneuve, 1834, p. 1).

[The extension to medicine and anthropology](#)

21In the 1830s, the shaded map passed on from social to medical observations. There was indeed a long tradition of cartography in medical studies, as medical topographies (*topographies médicales*) were illustrated for long with maps whose purpose was to present the "theatre of disease". Besides, medicine resorted early to statistical sources and methods.

22The first thematic maps of diseases took the form of qualitative maps, showing the distribution of cases or deceases, with marks or spots. The choropleth method was used for the first time in 1834, in a study about the epidemic of cholera which had broken out in Paris in 1832. An official commission presented in 1834 a report about illness, which included a general shaded map, which offered "at the same time the respective degrees of intensity of the loss that has caused the cholera" ([Cholera Commission], 1834). It was built upon 5 or 6 shadings to express the

number of deceases out of 1,000 inhabitants.

23Afterwards, only a few shaded maps about epidemics are known. One of them was drawn by a German physician, Rothenburg, about cholera in Hamburg (Rothenburg, 1836). Two other cholera maps were prepared by German geographer Augustus Petermann and published in England in 1852 (Petermann, 1852a). He drew a general map of the epidemic in the British Isles, using the technique of “qualitative shading”, but also a little statistical plan of the proportion of decease in London, with six shades of red. Drawing these maps, Petermann intended “to obtain a view of the geographical extent of the ravages of this disease and to discover the local conditions that might influence its progress and its degree of fatality” (Petermann, 1852b). Yet the use of shaded maps as a tool for medical geography seems rare. Physicians favoured dot or spot maps in their researches about the influence of local factors on epidemics, perhaps for lack of statistics.

- 3 “Mon ami M. Guerry” (Parent-Duchâtelet, 1836, 1st vol., 32), Parent-Duchâtelet even asked Guerry, i ([...](#))

24Through which channel did the choropleth method reach medicine? In France, we can observe a direct link between social and medical mapping. Among the cholera commissioners appeared the name of Alexandre Parent-Duchâtelet. This physician was a firm supporter of the statistical method in medicine. He was also close to social statisticians, and he probably made use of the shaded map under the influence of Guerry, who was a friend of his³. In the end, Parent-Duchâtelet is the only member of the commission who later re-used the method for two statistical maps he drew for his book about prostitution in Paris, posthumously published in 1836. The map *Distribution des prostituées dans chacun des 48 quartiers de la ville de Paris*, is indeed very similar, in scale, dimensions and graphics, to the one drawn for the report of the cholera commission.

25Anyway, moral and medical statistics were not unconnected domains. Social statisticians had made contributions to medicine, and conversely, hygienists were concerned with social matters. Mapping disease meant for physicians a new significance of environmental conditions. This was characteristic of the neo-hippocratic trend, which established a connection between disease and environment. This trend weakened in the course of the century, with the new focus on internal conditions, biological analysis. Yet medical cartography stood well alive in France: military physicians published numerous maps of the distribution of endemic diseases, disabilities, and even anthropological characteristics, such as human height, colour of the eyes, and so forth. One of the first maps to illustrate an endemic disease was sketched by Malgaigne, a military surgeon, who figured by shades the frequency of hernia in France (Malgaigne, 1840). He superimposed three bounds on his map, in order to investigate the possible causes of hernia. He drew for instance the “northern limit of olive tree”, because some physicians had voiced the hypothesis that olive oil consumption

could favour hernia. Malgaigne ranked among the partisans of the numerical method in medicine, and it has been said that he re-invented by himself the shaded map (Jarcho, 1974). In fact, he clearly mentioned a source: Count d'Angeville, who had published an essay with no less than 16 statistical maps, on diverse social topics (Angeville, 1836). Malgaigne explicitly compared his own map with one constructed by d'Angeville from the numbers of exemptions for height defect. It is to be noticed that once again, this new development emerged from a model found in social statistics. Malgaigne had no immediate followers, but he found numerous disciples in the 1850s-1860s, such as Doctors Jean-Christian Boudin and Paul Broca, founders of a school of anthropological cartography (Palsky, 1995).

- 4 Cf. the title of a book by William Booth, *In darkest England and the way out* (London, 1890), inspir [\(...\)](#)

26With most of the medical maps, it is interesting to notice a change of scale: cholera maps were often prepared at an urban scale, whereas moral maps were essentially drawn on a national scale, even if cities were a main preoccupation for social observers. Mayhew's work for instance dealt with poverty in London, yet it was entirely illustrated with shaded maps of England by *counties*. This can be explained by the lack of data on a local scale. Urban social data did not result from public periodical surveys, but were gathered on occasion, by private persons or special commissions. However, those maps became more common at the end of the century. Famous examples can be found in Charles Booth's monumental survey into the living and working conditions of Londoners (Booth, 1889-1891). Booth illustrated it with several maps which used either shadings or colours. But his code of colours was far from being neutral. Rich classes were expressed with warm tones (rose, red, orange) and lower classes with cold or dark tones: pale blue ("poor"), dark blue ("very poor, casual workers, chronic want"), and finally black ("Lowest class. Vicious, semi-criminal"). Darkness referred to misery and crime, but also probably to an unknown social territory which had to be described to propose a diagnosis and to define an urban policy. Thus, Booth's inquiry is indeed a travel "in darkest England"⁴.

27From Dupin's *Carte figurative* to the maps of the second half of the century, two methods of analysis were usually drawn. The authors compared either different territories for the same variable or different variables for the same territory.

28The first method led them to observe regularities or discontinuities and to express precursory forms of spatial reasoning. From the second one, they observed correlations and sought explanations. Yet the effectiveness of the map as a scientific tool was doubtful. The data were often rough, and its collection within large administrative divisions, such as departments or counties, prevented any detailed geographical analysis. Guerry for instance drew departmental limits on his maps, but recorded his information within the bounds of justice or school districts, made of one to four departments. Graphically speaking, shaded maps

were often oversimplified, for theoretical reflection about their making was not especially developed before 1860. Villeneuve-Bargemont made crude representations, with no distinguishable shades, but a continuous graduation. Mayhew merely interpreted the data in black and white, with black representing counties with averages above the mean, and white those with averages under the mean. Besides, the process of comparison between maps suffered from a serious theoretical flaw, later described as “the ecological fallacy” (Robinson W., 1950; Boudon, 1963). From correlation between collective units, Dupin, Guerry or later d’Angeville inferred correlation between individualities. Actually, the relation (or absence of relation) between crime and education, noticed at an aggregate level, would have to be checked at an individual level. This mistake was frequently repeated afterwards, when shaded maps spread in medicine and anthropology.

29We observe strong scientific connections between European precursors of statistical studies. Scholars from different countries were aware of each other’s work, and often belonged to other country’s societies. Dupin and Guerry were both members of the Statistical Society of London. The connections were reinforced in the second part of the century, with the foundation of the international congresses. The first statistical congress was held in Brussels in 1853. The questions related to maps and to the graphical method in statistics were debated on further sessions, such as La Haye (1869) or St. Petersburg (1872). Graphical statistics was in favour in the second part of the century. Shaded maps diffused into other branches of knowledge, such as geography. Maps and diagrams spread in official publications, atlases, text-books, newspapers, geographic dictionaries. Some were displayed at parliamentary debates (on mortality, alcoholism), or at the time of universal exhibitions, to catch the attention of the public. Among several mapping methods, the shaded map remained the more successful, “more than a speech, better than a binding, it is a numerical image within the reach of every intelligence”, Manier wrote in 1865. A shade, he added, bluntly conferred to each territory “a compliment or a blame”.

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Notes

¹ Dupin asserted that he exploited “the last official account from the royal university” (Dupin, 1827, p. 272).

² *Journal des débats*, 21 juillet 1823, pp. 3-4. See also Chartier, 1978.

³ “Mon ami M. Guerry” (Parent-Duchâtelet, 1836, 1st vol., 32), Parent-Duchâtelet even asked Guerry, in 1834, to bring him back some information about the London prostitutes, from his travel to England.

⁴ Cf. the title of a book by William Booth, *In darkest England and the way out* (London, 1890), inspired by Stanley's *In darkest Africa*.

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Titre Figure 2. C. Dupin, Carte figurative de l'instruction populaire de la France, 1826. Paris. French national Library, all rights reserved.

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