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**CONDORCET'S SCIENCE OBSCURED:  
SHADOWS CAST BY THE ENLIGHTENMENT\***

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Ten years after the death of Condorcet (1743-1794), his *Œuvres complètes* appeared in the year XIII at the initiative of his widow, Sophie de Grouchy, assisted by Barbier, Cabanis, C.F. Cramer, and Garat. Approximately forty years later, Condorcet's daughter, Eliza O'Connor, published the *Œuvres de Condorcet* (1847-1849)<sup>1</sup> with the support of Arago, Génin, and Isambert. Richer than the earlier work, this second edition remains the most frequently cited edition of Condorcet's works even today. But, like the 1804 edition, it omitted most of Condorcet's extensive scientific work. This absence is particularly puzzling given that Condorcet was trained as a mathematician. He defended a *thèse d'analyse* in 1760 and actively continued with his work in pure mathematics until the beginning of the 1780s. He moved into applied mathematics at the end of the 1760s and continued to study it until the last years of his life. The bulk of his professional career took place within the Academy of Sciences, which he entered in 1769 as an *Adjoint mécanicien*, before being named in 1773 *Secrétaire adjoint* and, in 1776, *Secrétaire perpétuel*. By providing texts that were almost exclusively relevant to the political and moral sciences, as they were called at that time, the editions of 1804 and 1847-1849 distort the intellectual figure of Condorcet and give a highly biased idea of the full extent of his works.

I will first establish a detailed inventory of the omissions from the 1804 and 1847-1849 editions. An interpretation of these omissions will follow. The gaps in these editions appear to be due essentially to ignorance of Condorcet's scientific work or to the unfavorable assessments

from which it suffered at the time of his death as well as in the middle of the nineteenth century. In addition, the reputation of his scientific work was undermined by his philosophical and political reflection, which emphasized the image of the Enlightenment writer and Republican who died for the French Revolution.<sup>2</sup>

## **1. TWO INCOMPLETE EDITIONS**

Despite all appearances, the twenty-one volume edition of 1804 is less complete than that of 1847-1849, which only contains twelve volumes. Nonetheless, both editions exclude Condorcet's scientific works and most of the newly published texts in the second edition are philosophical or political. Before clarifying the selective process of these two editions, I should specify that I will consider these aspects essentially without taking into account Condorcet's original manuscripts. Faithful to the editorial policies commonly practiced in the nineteenth century, those responsible for the 1804 and 1847-1849 editions neglected this type of manuscript whatever its editorial stage (preparatory notes, plans, rough drafts) and whatever its purpose (scientific, philosophical, political, or economic). These omitted texts would have added at least another two-thirds to the size of the two editions. Thus, the exclusion of a certain number of Condorcet's autograph manuscripts does not specifically illustrate the discarding of his scientific work. In order to clarify the editorial decision to set aside Condorcet's scientific texts, I will focus on printed works or fair manuscript copies.

### **1. 1. The Edition of 1804**

As a manuscript note recorded by Wilhelm von Humboldt in December 1798 reveals, a section devoted to mathematics was initially to have been one of the components of the 1804 *Œuvres*.<sup>3</sup>

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The *Catalogue des ouvrages de Condorcet*, a 1797 text establishing the Condorcet corpus,<sup>4</sup> indicated the following divisions:

- a. Mathematics
- b. Eulogies from the Academy of Sciences
- c. Philosophical literature
- d. General and particular politics
- e. Political economy

In the first of these categories, one finds the following texts:<sup>5</sup>

- *Du calcul intégral* (1765)
- *Du problème des trois corps* (1767)
- *Lettre à d'Alembert sur le système du monde et sur le calcul intégral* (1768)
- Some texts which appeared in the *Mémoires de l'Académie Royale des Sciences* (1772-1774)
- *Traité du calcul intégral* (mid-1770s-early 1780)
- *Mémoire sur le canal de Picardie* (1780)
- *Essai sur l'application de l'analyse à la probabilité des décisions rendues à la pluralité des voix* (1785)
- *Moyens d'apprendre à compter sûrement et avec facilité* (1794)

Two other texts could have been placed in the “Mathematics” category. One, *Sur l'évaluation des droits éventuels* (1785), ended up in the category “Political economy.”<sup>6</sup>

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Basically it is a text on political arithmetic, comprising the “Third Part” (1785) of the *Mémoire sur le calcul des probabilités* (1784-1787). The second text is the *Tableau général de la science qui a pour objet l'application du calcul aux sciences politiques et morales* (1793). The *Journal d'instruction sociale*, in which this text appeared, is included in the division “Philosophical literature,”<sup>7</sup> but the text in question, as its title suggests, presents Condorcet's works in social mathematics.

The *Catalogue* omits many of Condorcet's other mathematical texts. Among printed works or fair manuscript copies, the following texts were left out:

- The reports which Condorcet drafted for the Academy of Sciences while Commissioner, from the beginning of the 1770s until the Revolutionary period
- The majority of the texts published from the beginning of the 1770s until the middle of the 1780s in the *Mémoires de l'Académie Royale des Sciences* or in the collections of foreign academies (Berlin, Bologna, St. Petersburg, Turin, and Utrecht)
- The “Prefaces” published between 1775 and 1784 in the *Mémoires de mathématiques et de physique présentés par divers Savans*
- The articles from the *Supplément à l'Encyclopédie* (1776-1777) and the *Encyclopédie Méthodique* (1786-1787)
- Four of the five parts of the *Mémoire sur le calcul des probabilités* (1784-1787)
- The *Elémens du calcul des probabilités* (1786-1787)

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Even more of Condorcet's mathematical works were soon to be dropped: a letter from Sophie de Grouchy addressed to Barbier on 26 December 1798 (6 nivôse year VII)<sup>8</sup> refers to only three divisions, which constituted the final plan for 1804 *Œuvres*'s twenty-one volumes:

- Miscellaneous works on literature and philosophy (volumes I-X)
- General and particular politics (volumes XI-XVIII)
- Political economy (volumes XIX-XXI)

The heading "Mathematics" has disappeared, while the second and third headings mentioned in the *Catalogue des ouvrages de Condorcet* have been combined under the heading "Miscellaneous works on literature and politics."

As a consequence, all of the texts inventoried in the initial list for "Mathematics" have been excluded except for the *Mémoire sur le canal de Picardie* (1780). Directly associated with the work of Condorcet under the Turgot ministry (1774-1776), this text includes little mathematics and compares the costs of different canal construction projects. In this sense it belongs as much to political economy as it does to mathematics and finds quite naturally a place in volume XIX of the 1804 *Œuvres* (pp. 49-98) beside Condorcet's principal economic texts from the mid 1770s. The *Tableau général de la science qui a pour objet l'application du calcul aux sciences politiques et morales* (1793) is also present in the 1804 *Œuvres*, in volume XXI (pp. 235-86), a placement which might take into account the connections which Condorcet develops there between Social Mathematic and political economy. The "Third Part" (1785) of the *Mémoire sur le calcul des probabilités* (1784-1787) is, on the other hand, omitted.

The 1804 *Œuvres* thus consciously neglect Condorcet's scientific works, while, by contrast, the absence of several texts relevant to the political or moral sciences was due in particular to the editors' difficulties in obtaining them.<sup>9</sup> The *Eulogies* delivered by Condorcet to the Academy of Sciences, which make up two of the ten volumes of the "Miscellaneous works in literature and philosophy," are the only reflection in this edition of the *Œuvres* of his activity within this institution. Equally excluded are, notably, the reports which Condorcet drafted from 1769 until the Revolution, the commentaries or summaries which he published in the "History" section of the *Mémoires de l'Académie Royale des Sciences* from his appointment as Secretary in the mid-1770s until the middle of the 1780s, and his "Prefaces" to the *Mémoires de mathématiques et de physique présentés par divers Savans*, drafted during the same period.

The 1847-1849 edition did not redress these various exclusions of Condorcet's scientific work from the collection published in 1804.

## **1. 2. The Collection of 1847-1849**

As a letter from M. G. T. Villenave addressed to Eliza O'Connor at the end of summer 1845 indicates, the editors of 1847-1849, like those of 1804, first envisaged publishing at least a part of Condorcet's mathematical works.<sup>10</sup> Despite this intent, the mathematical texts were again excluded. The simple statement of the rubrics of the edition of 1847-1849 is revealing:

- Correspondence and miscellaneous works (volume I)
- Eulogies (volumes II-III)
- Miscellaneous works in literature and philosophy (volumes IV-VI)
- Political Economics and Politics (volumes VII-X)

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- Politics (volumes XI-XII)

What are the differences between this edition and that of 1804? Four texts were cut out of the 1847-1849 edition because they were not by Condorcet or, in one case, were judged redundant.<sup>11</sup> Around forty other texts, as well as close to 200 letters, were added. These additions included works printed during Condorcet's life, previously unpublished writings that had appeared since 1804, and, finally, manuscripts that had never been published. Because of the editors' choice of subjects, this published material also slights Condorcet's scientific work. The following texts were added for the new edition:<sup>12</sup>

- *Sur l'abolition des corvées* (1775)
- *Essai d'une histoire des correspondants de l'Académie* (1777)
- A large part of the *Correspondance*, notably *avec Turgot* (1770-1779) and *avec Voltaire* (1770-1778)
- *Observations sur le vingt-neuvième livre de l'Esprit des lois* (1780)
- *Fragments sur la liberté de la presse* (c. 1781)
- *Dialogue entre Diogène et Aristippe* (1783)
- Two *Discours à l'Académie française* (6 June 1782 and 26 February 1784) and a *Discours à l'Académie des sciences* (12 November 1783)
- Two addresses to the Lycée: *Discours sur les sciences mathématiques* (1786) and *Discours sur l'astronomie et le calcul des probabilités* (1787)



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- Around twenty political texts from the period 1790-1793, including *Sur l'admission des femmes au droit de cité* (1790), *Sur la nécessité d'établir en France une constitution nouvelle* (1793)
- Writings from Condorcet's time in hiding: *Fragment de justification* (1793), *Fragments 1, 2, and 3* of the *Tableau historique des progrès de l'esprit humain* (1793-1794), *Conseils de Condorcet à sa fille* (1794), *Testament de Condorcet* (1794)...
- J. de Lespinasse, *Portrait de Condorcet* (1774)

In the format of the 1847-1849 edition, these new texts fill almost 1,000 pages but only around 100 concern Condorcet's scientific works. Moreover, the scientific writings which this edition brought together – the *Essai d'une histoire des correspondants de l'Académie*, the *Discours à l'Académie des sciences*, and the *Discours sur les sciences mathématiques* and *sur l'astronomie et le calcul des probabilités* – were of a general, but not of a technical scope. In particular, they do not include any mathematical calculations.

Finally, another editorial choice illustrates this neglect of Condorcet's scientific thought. Among the manuscripts of the *Tableau historique des progrès de l'esprit* known to the editors,<sup>13</sup> the only two that were not published were precisely those relatively complex pieces that were the closest to Condorcet's scientific interests: "Fragment 4," on a universal language, and "Note 9," devoted to technical methods of classification.

Thus, if the 1847-1849 edition is more complete than that of 1804, it still neglects Condorcet's scientific works. This exclusion is sizeable; even if the editors had included only printed texts and manuscripts existing as fair copies, the inclusion of these scientific works would

have almost doubled the number of volumes in the 1804 and 1847-1849 editions; that is, they would have included approximately ten and twenty additional volumes, respectively. Why then did the editors choose to exclude so much of Condorcet's work?

## **2. WHY SUCH OMISSIONS?**

One could imagine that the editors' inadequate knowledge of Condorcet's scientific works contributed to their exclusion from the 1804 and 1847-1849 collections, but this was not the case. The bulk of Condorcet's scientific works were available and known to the editors. Both after Condorcet's death and in the middle of the nineteenth century, however, these writings were neglected or judged negatively, including by friends and intellectual followers. The focus on Condorcet as an Enlightenment philosopher as well as a politician of the Revolution obscured his role as a scientist. This probably accounts for the editing of his works in the two editions of his *Œuvres*, even if more prosaic reasons were also involved, such as financial exigencies and the additional work that the publication of scientific works would have required. Regarding the 1847-1849 edition, my arguments draw from a perspective that P. Crépel developed.<sup>14</sup>

### **2. 1. Consciously excluded texts**

Certainly the editors of 1804 and 1847-1849 did not know of the existence of dozens of manuscripts, beginning with those in the collections of the Bibliothèque Nationale de France.<sup>15</sup> In addition, certain academic works, notably those published in the "History" section of the *Mémoires de l'Académie Royale des Sciences*, were anonymous. Most of the BNF manuscripts are related to the *Tableau historique des progrès de l'esprit humain*;<sup>16</sup> they do not relate specifically to Condorcet's scientific thought and thus cannot help explain why his scientific

works were set aside. In the case of the anonymous works, the 1804 editors had at their disposal several autograph manuscripts by Condorcet (which would later become the key holdings of the Bibliothèque de l'Institut de France) that authenticated his authorship of certain unsigned academic writings.<sup>17</sup> Etienne Cardot, Condorcet's private secretary from 1787, was probably aware of Condorcet's authorship of several of them; he could have told Sophie de Grouchy. The editors of 1847-1849 certainly knew of this anonymous corpus because they had access to most of the same autograph manuscripts and because Arago could not have been unaware of this body of work. As he was also Perpetual Secretary of the Academy of Sciences (1830-1853), Arago could not have been better placed to know that this position involved the presentation, sometimes without attribution, of scientific papers published by that institution. Moreover, in his biographical note on Condorcet, Arago declared that he knew of the correspondence between Lagrange and d'Alembert,<sup>18</sup> two letters of which<sup>19</sup> attest to Condorcet's authorship of the "History" section in the *Mémoires de l'Académie Royal des Sciences* as early as 1773 when he was named Fouchy's assistant.

Thus, no part of Condorcet's scientific work was omitted from the two collections of his *Œuvres* because the editors were unaware of it. Its absence resulted, rather, from a deliberate choice.

## **2. 2. The scientist eclipsed by the man of the Enlightenment and of the Revolution**

It is true that the 1804 editors had initially planned a section devoted to mathematics in their publication. But, as I have mentioned, this rubric was initially incomplete, and it was quickly eliminated. I have not found any explicit documentation about this decision.

Regarding Condorcet's works on pure mathematics, one can nevertheless suppose that Halma, in particular, was critical of the manuscript of the *Traité du calcul intégral*.<sup>20</sup> Even during his lifetime, Condorcet was criticized, including by his friends, for the lack of clarity and precision in his work.<sup>21</sup> More generally, Condorcet's writings on pure mathematics were not particularly well thought of. It is also significant that Condorcet's name does not appear in the entry "Integral and Differential Calculus" or in the alphabetical classification in the index of volumes three and four (1802) of Montucla's *Histoire des mathématiques*,<sup>22</sup> dedicated to the seventeenth and eighteenth centuries.<sup>23</sup>

Although better known, Condorcet's work on "mixed" mathematics – what we would call today "applied" – did not rouse much enthusiasm in the aftermath of the Revolution. Leaving aside the hostile opinions of Condorcet's declared enemies,<sup>24</sup> or even those of supposedly more neutral authors,<sup>25</sup> it is truly remarkable that among his supporters Diannyère appears quite isolated in his praise for Condorcet's work;<sup>26</sup> the majority of authors either ignored or criticized more or less openly Condorcet's Social Mathematic. This was the case for Cabanis, one of the co-editors of the 1804 edition, who paid homage to his friend but was dubious about the use of mathematics in other fields of knowledge.<sup>27</sup> More generally, the Ideologues, who genuinely admired Condorcet, nonetheless neglected his Social Mathematic; among them, Degérando<sup>28</sup> and Destutt de Tracy<sup>29</sup> were later openly critical on essentially methodological grounds. Some authors close to the Ideologues condemned Condorcet's Social Mathematic more or less explicitly; J.B. Say, for instance, in his discussion of the difficulties involved in applying mathematics to political economy.<sup>30</sup>

These varying assessments, some from Condorcet's intimate friends, very likely contributed to the exclusion of his scientific works from the 1804 edition. The figure of the

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Enlightenment philosopher and politician defending the ideals of 1789, and victim of the Terror also cast a long shadow that obscured the scientist. One need only consider the reception of the *Esquisse d'un tableau historique des progrès de l'esprit humain* to appreciate the omnipresence of this interpretation. Composed by Condorcet shortly before his death, this work was extensively reviewed in the press;<sup>31</sup> the Convention ordered 3,000 copies,<sup>32</sup> and it was published at least sixteen times in various languages between 1795 and 1804.<sup>33</sup> A “philosophical manifesto of post-Thermidorian reconstruction,” in the words of K. M. Baker,<sup>34</sup> this book seemed to be the legacy of an intellectual who died for the Revolution that he had served so well. His so-called *Œuvres Complètes* of 1804 can be seen in the same light. J. Sgard’s analysis of the emergence of the idea of “complete works” is useful here. Noting a multiplication of such collections beginning in France in the last quarter of the eighteenth century, Sgard insists especially on the testamentary nature of “complete works”: “The author dies with his pen in his hand . . . his work is entrusted to the nation. . . . The next step . . . is the consecration of the writer, giving him his due with funeral rites of inhumation, celebration, and immortalization.”<sup>35</sup> Condorcet’s 1804 editors clearly shared this perspective: “The only consolation left to his family and friends is to have guided a complete edition of his works; it is the only compensation for his loss that they can offer his *patrie* and the republic of letters.”<sup>36</sup> The truncation of the 1804 edition and its near-exclusive focus on Condorcet’s works in the moral and political sciences were part of the rehabilitation of the republican philosopher in the aftermath of 9 Thermidor,<sup>37</sup> while his scientific works were overlooked.

The first decades of the nineteenth century did little to modify this image. With regard to pure mathematics, Condorcet’s disciple, Lacroix, expressed a series of increasingly severe judgments against his master’s analyses between 1810 and 1820.<sup>38</sup> Lacroix ultimately declared

the *Traité du calcul intégral* obsolete, a conclusion that led its exclusion at a time when the degree of an old work's utility to contemporary research could alone determine whether or not it would be published. Little by little, Condorcet's works were forgotten. Although more frequently commented upon, his research on applied mathematics enjoyed no greater esteem than before. Only Duvillard, in his declarations as well as in his works, paid homage to Condorcet's Social Mathematic.<sup>39</sup> Elsewhere, Condorcet's work was ignored or disparaged, as it had been in the aftermath of the Revolution. Paradoxically, Fayolle's 1805 edition of the *Elémens du calcul des probabilités* (1786-1787) further damaged Condorcet's reputation. It was hastily put together, full of omissions, and it artificially includes a very poor version of the *Tableau général de la science qui a pour objet l'application du calcul aux sciences politiques et morales* (1793).<sup>40</sup> Parisot's assessment, published in his *Traité du calcul conjectural* (1810), was unequivocal: "It is impossible to write more incoherently or obscurely."<sup>41</sup> Other mathematicians contributed little to restoring Condorcet's image. In the second edition of his *Traité élémentaire du calcul des probabilités* (1822), Lacroix underrated the originality of Condorcet's views by considering them as concepts borrowed from Hume and Laplace, while Laplace never quoted Condorcet and Cournot did so on only a few occasions.<sup>42</sup> Comte treated Condorcet with some deference, but he considered Condorcet's Social Mathematic as "entirely chimerical."<sup>43</sup>

We have seen that the editors of 1847-1849, like those of 1804, initially intended to maintain a place for Condorcet's scientific work in their collection. This plan's failure to materialize was possibly due in part to the bad reputation of those writings. Lacroix's final and most damning assessment, expressed in a letter to Eliza O'Connor herself, rejected the publication of the *Traité du calcul intégral*, which he judged obsolete.<sup>44</sup> Isambert, one of the co-editors of the *Œuvres de Condorcet*, invoked Arago's authority as he harshly confirmed

Lacroix's judgment: "his [Condorcet's] mathematical works can only be properly appreciated in the context of his era and in light of the judgment of his most competent peer, Arago, one of his successors as Perpetual Secretary of the Academy of Sciences."<sup>45</sup> One of the few nuances in the eulogy that Arago delivered to the Academy of Sciences in December 1841, was his assertion, with regard to Condorcet's work on comets, that calculations were not his strong point,<sup>46</sup> and Arago added more generally that Condorcet's "mathematical works . . . lack the elegant clarity that so clearly distinguishes the papers of Euler and Lagrange."<sup>47</sup> However, Arago, who was an advocate of applying mathematics to the social sciences, was relatively benevolent in his judgment of Condorcet's works. In another speech to the Academy in 1850, he placed his predecessor at the same rank as Laplace and Poisson.<sup>48</sup> Arago knew, however, of the torrent of criticism endured by Poisson following his presentation to the Academy in 1835 of his *Recherches sur la probabilité des jugements en matière criminelle et en matière civile*, an event which, indirectly, impeded any restoration of Condorcet's work to contemporary scientific favor. Arago admitted as much in his 1841 biography of Condorcet when he indicated that "the struggle continues" over the use of mathematical probability "in the field of jurisprudence and the moral or political sciences."<sup>49</sup> Two elements may have motivated Arago's decision not to include Condorcet's Social Mathematic in the 1847-1849 *Œuvres*: the overly-polemical nature of Condorcet's work on this question and Arago's own risk of entering into conflict with many of his colleagues in the Academy. Finally, Arago probably excluded Condorcet's *comptes rendus* and other academic syntheses because he judged them minor, not particularly creative, or composed simply in response to professional obligations. This hypothesis seems to be confirmed by the fact that Arago chose not to include works of the same kind in his own *Œuvres complètes* (1854-1862), which he planned during his lifetime.

Clearly, Arago intended to promote the figure of the republican man of politics rather than the man of science. Although Arago declared in his biography that it was necessary to proceed with Condorcet's "rehabilitation"<sup>50</sup> as a man of science, as well as a moralist and a politician, only a fifth of the text concerns scientific issues, while the account of Condorcet's activity during the Revolution alone takes a good third. Arago had sat since 1830 on the left of the Chamber of Deputies and, as J. P. Schandeler has explained it, he found in Condorcet a legitimation of his own republican aspirations.<sup>51</sup> Arago delivered similar speeches on Bailly, Carnot, and Monge, and Libri explicitly reproached him for their emphasis on politics: "M Arago should make no mistake, the public does not come to the open meetings of the Academy to attend a political rally, but rather to learn the history of science, and to hear about sublime discoveries explained in ordinary language."<sup>52</sup> A lively polemic between Arago and Libri followed, which I will not review here.<sup>53</sup> The key point is that Arago's biography, printed in the opening pages of the 1847-1849 edition of Condorcet's *Œuvres*, perfectly reflected the *Œuvres*'s truncated contents.

### **2. 3. Material Reasons**

Earlier I mentioned the fact that the publication of Condorcet's scientific work – even restricted to the printed works and manuscripts in fair copies – would have almost doubled the number of volumes finally published in either 1804 or in 1847-1849. The additional costs would have been prohibitive, especially for the 1804 editors. Already luxurious because of its typography, which did not economize on space, that edition would have approached forty volumes, as exceptional a number at that time as it would be today.<sup>54</sup> In the years preceding the



appearance of the 1804 edition, Sophie de Grouchy's correspondence with Barbier raised financial questions, although in a somewhat hazy fashion.<sup>55</sup> A letter from Isambert to Eliza O'Connor in the summer of 1844 makes it clear that financial considerations also influenced the 1847-1849 edition: Isambert refers to a loan which Condorcet's daughter had contracted and to the savings realized during the correction of proofs because they were "printing from an already-published edition,"<sup>56</sup> that of 1804. If the 1847-1849 edition had been more voluminous and had included especially Condorcet's scientific manuscripts existing in fair copies, beginning with the *Traité du calcul intégral*,<sup>57</sup> the financial demands would have been even heavier.

The publication of Condorcet's scientific work would have required rereading and correcting many of his calculations. Shortly after his death, several people would certainly have been able to do it: his pupils, Duvillard and Lacroix, or certain mathematicians who were acquainted with the *Traité du calcul intégral*,<sup>58</sup> that is, Arbogast, Halma, and Lalande. But the corrections would have required much more work than for a literary text and would have been slow and laborious. By the middle of the 1840s, this undertaking would doubtless have proven still more arduous. Arago, notably, was competent for the task, but it is difficult to see how he would have had the time given his numerous social and political activities since the 1830s.

## **Conclusion**

Studies devoted to Condorcet from the mid-nineteenth to the mid-twentieth century<sup>59</sup> remained focused on the image of an Enlightenment philosopher and a revolutionary, an image which continued to overshadow Condorcet the scientist.<sup>60</sup> Some modification of this perspective appeared with K. Pearson who examined Condorcet's theory of the "motive for believing" as it is

presented in the *Elémens du calcul des probabilités*.<sup>61</sup> The rest of the story is better known: public choice theorists exhumed the *Essai sur l'application de l'analyse*,<sup>62</sup> while interest in Condorcet's work in social mathematics has also grown, with two monographs dedicated to it.<sup>63</sup> In the 1980s and 1990s finally, Condorcet was eventually recognized as the founder of mathematical expectancy theory and of the rule of statistical estimates, which he discovered before Laplace and independently from Bayes.<sup>64</sup> Condorcet is also seen as the precursor of the general model of Markov chains<sup>65</sup> and, in the field of pure mathematics, as the creator of the theory of integration in finite terms.<sup>66</sup> We may still ask, however, why this rehabilitation was so delayed. With regard to applied mathematics, the development of statistics and interest in the application of mathematics to social sciences since the Second World War have certainly been determining factors in the recognition of the value of Condorcet's research, often previously rejected because of a simplistic epistemological credo. With regard to pure mathematics, Condorcet's generalizing approach, which did not conform to the methodological canons of his time, contributed to his neglect.<sup>67</sup> In general, however, it seems that Condorcet's scientific works have suffered from simple cumulative neglect: because his scientific writing was little esteemed and was obscured by his work on moral and political sciences, it was set aside in his *Œuvres* of 1804 and 1847-1849. Because of its absence in these volumes, the scientific work has been little commented on and thus again neglected, falling into an editorial vicious circle. In the domain of applied mathematics, several publications, one of which returns to the original manuscripts,<sup>68</sup> have appeared during the last twenty years coinciding with the bicentennial of the Revolution and the death of Condorcet. This interest has certainly contributed to a wider reading of Condorcet, but editorial fervor has not spread to the rest of his scientific work. At this time, the majority of Condorcet's academic works are only available in their original printed editions or as

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fair manuscript copies deposited in the archives of the Academy of Sciences. Almost none of the texts on pure mathematics have been published.<sup>69</sup> The *Traité du calcul intégral*, to which Condorcet devoted several years of his life and which was, in size, the most important of his mathematical works, is today completely unavailable. On the eve of his death, Condorcet implicitly asked that this work be published.<sup>70</sup> We hope that his desire will soon be fulfilled.

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\* I thank Carol Harrison for her translation.

<sup>1</sup> Even though her name was not mentioned on the title page, Eliza O'Connor selected and edited most of the texts in that edition. On this point, see J. N. Rieucan, "Eliza O'Connor propose, François Arago dispose: l'écriture de la *Biographie de Condorcet* (1841, 1849) et l'édition de ses *Œuvres* (1847-1849)," in *Arago et son temps* (Paris: Estagel, forthcoming, 2005).

<sup>2</sup> Remember Condorcet's tragic destiny. At the beginning of summer 1793, he went into hiding because of his criticism of the proposed Montagnard constitution. He was finally arrested 27 March 1794 and found dead in his cell one or two days later. The reasons for his death remain mysterious. Was it due to a poison that Cabanis might have given to him? Or was it the result of Condorcet's exhaustion? He was, after all, already an old man, and he had wandered in the countryside for several days. See E. & R. Badinter, *Condorcet – Un intellectuel en politique* (Paris: Fayard, 1988), 631-33.

<sup>3</sup> "Manuscrits Condorcet. Relevé des manuscrits qui m'ont été communiqués par Mme Condorcet" (19 frimaire year VII (9 Dec. 1798)), Bibliothèque de l'Observatoire de Paris, Z 19, f. 2v. For the text of this document, see my "Quatorze lettres inédites de Sophie de Grouchy et des éditeurs des *Œuvres dites Complètes de Condorcet*," *Recherches sur Diderot et sur l'Encyclopédie* (forthcoming, 2005, n°39).

<sup>4</sup> Written around 1797, this document is preserved in the Bibliothèque de l'Institut de France [hereafter BIF] as MS 849, f. 194r-198v, 205r.

<sup>5</sup> I exclude certain eulogies which, evidently, were erroneously attached to division "a," and not to "b." See BIF MS 849 f. 194v, 197r.

<sup>6</sup> BIF MS 849 f. 194v.

<sup>7</sup> BIF MS 849 f. 205r.

<sup>8</sup> For the text of this letter see "Quatorze lettres inédites de Sophie de Grouchy."

<sup>9</sup> Barbier explicitly referred to this difficulty with regard to the *Adresse à ses commettants* (31 May 1793); see *Note de Barbier au sujet d'un discours de Condorcet* (n.d.), BIF MS 2475, pièce 59<sup>bis</sup>.

<sup>10</sup> Villenave effectively alluded to a "mathematical part of the edition," *Lettre de M. G. T. Villenave à Eliza O'Connor* (29 August 1845), BIF MS 854, f. 422.

<sup>11</sup> In *Condorcet – Ecrits qui sont imprimés dans l'édition de 1804 omis dans l'édition actuelle et motifs de ces omissions* (1847?, BIF MS 848, f. 216r-217r), Eliza O'Connor explained that the "Avertissement" of the *Essai sur les assemblées provinciales* (1788), 13: i-iv was withdrawn because it was by Diannyère, not Condorcet. Similarly Eliza O'Connor attributed the "Avertissement" of the *Recueil sur l'état des protestants en France* (1778-1781), 21: 283-86 to Diannyère, although it is actually by Barbier, as the latter indicates in his *Dictionnaire des anonymes* (1806-1808, vol. 4; reprint, 1984), 80. Eliza O'Connor added that Condorcet was not the author of one of the *Adresses à l'Assemblée Nationale* (4 Sept. 1792), 17: 382-83, so this text was also removed. Finally, given that the *Adresse à l'Assemblée nationale sur les conditions d'éligibilité* (June 1790), 16: 167-84 was a "more extensive, more correct" (f. 216r) version of the *Lettre sur le marc d'argent* (August 1791), 20: 69-88 – although they are in fact two different texts – she eliminated the latter.

<sup>12</sup> Regarding volumes 2-12, I follow the summary furnished by Eliza O'Connor: *Condorcet – Ecrits qui ne sont point dans l'édition de 1804* (1847?), BIF MS 848, f. 214r-215v.

<sup>13</sup> They were unaware of the volume now in the Bibliothèque Nationale de France [hereafter BNF], n. a. fr. 4586. Although deposited in 1812 according to an introductory page, this volume does not seem to have been made available to readers until 1891, as per a second page and the back of its binding.

<sup>14</sup> “Ce qu’Arago a fait et n’a pas fait de l’œuvre de Condorcet” *Arago et son temps*.

<sup>15</sup> For a general inventory of the holdings, see “Les manuscrits de Condorcet,” *Chantiers révolutionnaires – Manuscrits de la Révolution II* (Saint-Denis: Presses Universitaires de Vincennes, 1992), 1<sup>st</sup> part.

<sup>16</sup> BNF, n. a. fr. 4586.

<sup>17</sup> These texts are scattered through the volumes BIF MS 873 and MS 875.

<sup>18</sup> “Biographie de Jean-Antoine-Nicolas Caritat de Condorcet,” *Œuvres de Condorcet* (1849), 1: iv, xv. I am citing the corrected and expanded version of Arago’s initial speech in the Academy of Sciences, 28 Dec. 1841, which was published in *Le National* (Jan. 1842).

<sup>19</sup> “Lettres de d’Alembert à Lagrange” (25 April, 1 July 1774), *Œuvres de Lagrange*, ed. M. J. A. Serret (Paris: Gauthier-Villars et fils, 1892), 13: 282, 288.

<sup>20</sup> Through the intermediary of W. Humboldt and C. F. Cramer, Sophie de Grouchy entrusted him with this manuscript. On this point, see “Quatorze lettres inédites de Sophie de Grouchy.”

<sup>21</sup> See “Lettre de Lagrange à d’Alembert” (6 July 1765) and “Lettre de d’Alembert à Lagrange” (25 March 1772), *Œuvres de Lagrange*, 13: 42, 232; “Lettre de Keralio à Frisi” (10 March 1768), quoted by P. Crépel “Quelques voyages d’Italiens réussis ou six encyclopédistes réunis par leurs correspondances,” in *Sciences, musiques, Lumières – Mélanges offerts à Anne-Marie Chouillet*, eds U. Kölvig and I. Passeron (Ferney-Voltaire: Centre International d’Etude du XVIII<sup>e</sup> Siècle, 2002), 142; “Lettre de Lexell à Euler fils” (7 Jan. 1781), *Revue d’histoire des sciences et de leurs applications* (Paris: Presses Universitaire de France, 1957), X: 156.

<sup>22</sup> J. F. (= J. E.) Montucla, *Histoire des mathématiques* (Paris: Agasse, year X (May 1802)), 4: 674-75.

<sup>23</sup> In a passage in his “Notice sur la vie et les ouvrages de Condorcet,” *Mercure français* 21 (30 nivôse year IV (20 Jan. 1796)), 144-45 Lalande inserted his judgment of Condorcet’s research in the 1760s – too general and too careless of potential applications – between otherwise laudatory statements. Lalande completed and published Montucla’s work.

<sup>24</sup> Such as De Bonald, *Théorie du pouvoir politique et religieux dans la société civile* (n.p., 1796), 2: 492, 496-500, 506 and, a little later, La Harpe, *Lycée ou Cours de littérature ancienne et moderne* (Paris: Agasse, 1799; reprinted, year XIII (1804-1805)), 15: 6-7.

<sup>25</sup> I am thinking principally of L. S. Mercier, “Discours au Conseil des Cinq Cents” (18 floréal year IV (7 May 1796)), *Moniteur universel* 235 (25 floréal year IV (14 May 1796)), 936 and of T. R. Malthus, *Essai sur le principe de population* (1798; Paris: INED, 1980), 75-76.

<sup>26</sup> *Notice sur la vie et les ouvrages de Condorcet* (2nd ed., 1799; Paris: Le livre d’histoire, 2000), 29-32, 36-37. See also Diannyère, *Essais d’arithmétique politique* (Paris: Goujon: year VIII (1799-1800)), where he prominently cites Condorcet.

<sup>27</sup> On this point, see M. S. Staum, *Cabanis – Enlightenment and Medical Philosophy in the French Revolution* (Princeton: Princeton University Press, 1980), 104-5, 159, 210.

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<sup>28</sup> See J. M. Degérando, the philosophical section of M. Dacier, *Rapport historique sur les progrès de l'histoire et de la littérature ancienne depuis 1789 et sur leur état actuel (présenté à l'Empereur le 20 février 1808)* (Paris: Imprimerie Royale, 1810), 330.

<sup>29</sup> A. L. C. Comte de Destutt de Tracy, "Supplément à la première section des Elémens d'idéologie," in *Elémens d'idéologie - IV<sup>e</sup> et V<sup>e</sup> partie* (1815, 2<sup>nd</sup> ed., Paris: Courcier, 1818), 33-35.

<sup>30</sup> "Discours préliminaire," *Traité d'économie politique* (Paris: Deterville, year IX (1803)), vi-vii, xxxix.

<sup>31</sup> See my assessment of the periodical press of year III in Condorcet, *Tableau historique des progrès de l'esprit humain (1772-1794)* (Paris: INED, 2004), 1133-134. See also the *Magasin encyclopédique* 1 (Spring 1795), 86-108, 136 omitted in that assessment.

<sup>32</sup> I published the text of this order is in Condorcet, *Tableau historique*, 1125-130.

<sup>33</sup> See the bibliography prepared by J. P. Schandeler in Condorcet, *Tableau historique*, 1246-247, 1254-255.

<sup>34</sup> K. M. Baker, *Condorcet. From Natural Philosophy to Social Mathematics* (Chicago: University of Chicago Press, 1975), 343.

<sup>35</sup> J. Sgard, "Des collections aux œuvres complètes, 1756-1798", *La Notion d'œuvres complètes*, eds. J. Sgard and C. Volpilliac-Auger (Oxford: Voltaire foundation (SVEC), 1999), 1-12.

<sup>36</sup> *Gazette littéraire universelle* (August 1804), lix.

<sup>37</sup> Note that a similar phenomenon seemed to develop some years later for d'Alembert whose *Œuvres Complètes* (Paris: Belin, 1821-1822) exclude most of his scientific works, which were judged out of date and obscure. The collection emphasizes the image of the philosopher and encyclopedist, man of the Enlightenment, and precursor of the French Revolution.

<sup>38</sup> On this point, see C. Gilain, "Condorcet et le calcul intégral," *Sciences à l'époque de la Révolution française* (Paris: Albert Blanchard, 1988), 110-11, 117; C. Gilain and C. Houzel, "Présentation" of "Mathématiques, Mécanique céleste, Métrologie," in *Condorcet – Mathématicien, économiste, philosophe, homme politique*, eds. P. Crépel and C. Gilain (Paris: Minerve, 1989), 17-18.

<sup>39</sup> See the many references to this subject in G. Thuillier, *Le Premier Actuaire de France: Duvillard (1755-1832)* (Paris: Comité d'histoire de la Sécurité sociale, 1997).

<sup>40</sup> On this point, see B. Bru & P. Crépel, *Condorcet, Arithmétique politique – Textes rares ou inédits (1767-1789)* (Paris: INED, 1994), 605-13 and P. Crépel & J. N. Rieucan, "Condorcet's Social Mathematic. A Few Tables," *Social Choice and Welfare* (forthcoming, 2005, special issue).

<sup>41</sup> *Traité du calcul conjectural ou l'art de raisonner sur les choses futures et inconnues* (Paris: Bernard, Didot, Courcier, Béchot, 1810), XII, note.

<sup>42</sup> For further details about Lacroix, Laplace, and Cournot's view of Condorcet's work on probability, see B. Bru & P. Crépel, "Présentation" of "Probabilités, Statistiques, Mathématique sociale," in *Condorcet – Mathématicien*, 69-70.

<sup>43</sup> "Plan des travaux scientifiques nécessaires pour réorganiser la société" (1822), *Appendice général (3<sup>e</sup> partie) du système de politique positive* (1854), 47-136, *Œuvres d'Auguste Comte* (Paris: Anthropos, 1970), 10: 120.

<sup>44</sup> Lacroix, [*Rapport sur le*] *Traité du calcul intégral* [1824], BIF MS 877, f. 2 and *Lettre de Lacroix à Eliza O'Connor* (7 August 1824), BIF MS 877, f. 1.

<sup>45</sup> “Condorcet,” *Nouvelle biographie générale*, ed. Hoefer (1855), 11: 472.

<sup>46</sup> “Biographie de Jean-Antoine-Nicolas Caritat de Condorcet”, xx.

<sup>47</sup> *Ibid.*, xxv.

<sup>48</sup> “Biographie de Poisson,” *Œuvres complètes de François Arago* (Paris: A. Barral, 1854), 2: 618.

<sup>49</sup> “Biographie de Jean-Antoine-Nicolas Caritat de Condorcet”, xxii.

<sup>50</sup> *Ibid.*, vi.

<sup>51</sup> J. P. Schandeler, *Les interprétations de Condorcet - Symboles et concepts (1794-1894)* (Paris: SVEC, 2000), 168.

<sup>52</sup> *Journal des débats politiques et littéraires* (21 May 1846), n. p.

<sup>53</sup> On this subject, see Crépel, “Ce qu’Arago a fait et n’a pas fait de l’œuvre de Condorcet.”

<sup>54</sup> By comparison, among the forty-five editions of “Œuvres ” or “Collections complètes” noted by J. Sgard (*La Notion d’œuvres complètes*), 10-12 during the period 1764-1799, only three, those devoted to Voltaire, contain more than forty volumes.

<sup>55</sup> I am thinking especially of a letter from Barbier to Eliza O’Connor, dated 5 Nov. 1800, where Napoleon’s future private librarian refers to “costs of inheritance” (*frais de legs*), but his precise meaning is unclear. This letter is in “Quatorze lettres inédites de Sophie de Grouchy.”

<sup>56</sup> BIF MS 2475, Pièce 28.

<sup>57</sup> A small part of the text had been printed but not published during Condorcet’s lifetime.

<sup>58</sup> I develop this point in detail in “Quatorze lettres inédites de Sophie de Grouchy.”

<sup>59</sup> This is the case for M. A. Charma, *Condorcet – Sa vie et ses œuvres* (Caen: Hardel, 1863); J. F. E. Robinet, *Condorcet – Sa vie, son œuvre* (Paris: 1893); F. Alengry, *Condorcet, guide de la Révolution française* (Paris: V. Giard & E. Brière, 1904); L. Cahen, *Condorcet et la Révolution française* (Paris: Alcan, 1904); H. Archambault de Montfort, *Les idées de Condorcet sur le suffrage* (Paris: 1915); F. Buisson, *Condorcet* (Paris: Alcan, 1929); H. Delsaux, *Condorcet journaliste (1790-1794)* (Paris: Champion, 1931); S. Schapiro, *Condorcet and the rise of liberalism* (New York: Octagon Books, 1934); Torau-Bayle, *Condorcet, marquis et philosophe* (1946).

<sup>60</sup> On this point, see Gilain and Houzel, “Présentation” of “Mathématiques, Mécanique céleste, Métrologie,” and Bru & Crépel, “Présentation” of “Probabilités, Statistiques, Mathématique sociale,” in *Condorcet – Mathématicien*, 18, 70-71.

<sup>61</sup> *The History of Statistics in the 17<sup>th</sup> and 18<sup>th</sup> centuries* (1921-1933; reprint, London: Griffin, 1978), 435. The 1978 edition was the first publication of Pearson’s lectures, which, until that time, were little known and made little contribution to a better appreciation of Condorcet’s thought.

<sup>62</sup> Notably K. J. Arrow, *Social Choice and Individual Values* (1<sup>st</sup> ed., 1951; 2d ed.: 1963); D. Black, *The Theory of Committees and Elections* (New York: Cambridge University Press, 1958); and G. T. Guilbaud, “Les théories de l’intérêt général et le problème logique de l’agrégation,” *Economie appliquée* (1952), 4: 501-84.

<sup>63</sup> G. G. Granger, *La Mathématique sociale du marquis de Condorcet* (1956; Paris: Odile Jacob, 1989) and R. Rashed, *Condorcet, Mathématique et société* (Paris: Hermann, 1974).

<sup>64</sup> B. Bru, “Condorcet, Mathématique sociale et vérité,” *Mathématiques, informatique et sciences humaines* 128 (1994), 9.

<sup>65</sup> On this point, see P. Crépel, “Condorcet, la théorie des probabilités et les calculs financiers,” *Sciences à l’époque de la Révolution française*, 298-304.

<sup>66</sup> On this subject, consult C. Gilain, “Condorcet et le calcul intégral”, 101-10.

<sup>67</sup> *Ibid*, 109-10.

<sup>68</sup> Bru & Crépel, Condorcet, *Arithmétique politique*. See especially p. 4 for a bibliography of other publications on applied mathematics.

<sup>69</sup> See the frequently republished articles from the *Supplément à l’Encyclopédie* and the *Encyclopédie Méthodique* (Paris: ACL-Éditions, 1987). Note also the reprinting (Paris: Albert Blanchard, 1988), of the *Moyens d’apprendre à compter sûrement et avec facilité* (1794), a treatise on arithmetic for children.

<sup>70</sup> “Je voudrais que le citoyen Arbogast fût chargé de mon manuscrit sur le calcul intégral, il est double & qu’il en fit usage utile en corrigeant les fautes”, “Notes sur un portefeuille”(beginning of March 1794), *Tableau historique*, 1139.