

The impact of the relationship between Peter I and Leibniz on the development of science in Russia

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Abstract: Peter the Great (1672-1725), Tsar of Russia, travelled to Western Europe specifically to German Lands, to familiarize himself with new developments and to contact with men of science, like Gottfried Wilhelm Leibniz (1646-1716). The aim of this article is to analyze Peter the Ist relationship with Leibniz, in order to understand better how and in what way the influence of Leibniz's ideas was reflected in the formation and later in the development of Saint Petersburg Academy of Sciences and Arts. The analysis of their correspondence, of meetings and of the projects (memoranda) that Leibniz presented to the Tsar for the modernization of Russia enable us to know better Leibniz's influences on the creation of the Academy of Sciences in Saint Petersburg as well as on the ideas for Tsar's Academy, such as the universality of knowledge and the meaning of scientific knowledge as theory for practice, *Theoria cum praxi*, also lemma for Leibniz's Berlin Academy.

Keywords: Peter the Ist; Leibniz; Saint Petersburg Academy; eighteenth century; *Theoria cum praxi*; Russia.

Introduction¹

Peter the Great (1672-1725), Tsar of Russia, founded the Saint Petersburg Academy of Sciences and Arts [18 and 8],² which became the major scientific centre of the country and has played a key role in the transfer and circulation of knowledge between European science and Russia.

The Academy was created and took shape over a period of many years. The Tsar of Russia drew up a plan for the creation of the Saint Petersburg Academy, which entailed travel to Western Europe in order to familiarize himself with the knowledge, inventions and new developments of the European Enlightenment and to enter into contact with men of science. One of the Tsar's purposes was to devise a model for the modernization of Russia. In fact, many political, military and cultural reforms took place in Russia [2] during the Tsar's reign. Peter the Great acquired the reputation of being a "Philosopher-King" or an "enlightened monarch" [5 and 30], and was deeply interested in the works of art as well as in the development of different trades. In addition to visiting Germany, where he came into contact with men of science, he also travelled to the Netherlands,

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² For an extensive bibliography on the history of the Saint-Petersburg Academy of Sciences of Arts, see the following works: [23]; [27] and [7].

where he learned about ship building. His travels also took him to the Royal Society of London in 1698, and later to the Académie Royale des Sciences of Paris in 1717, where he was elected an «*associé étranger hors de tout rang*». However, the major model for Peter the Great's academy was the Kurfürstlich Brandenburgische Societät der Wissenschaften (later the Berlin Academy of Sciences), founded by Gottfried Wilhelm Leibniz (1646-1716) in 1700.

The philosopher, mathematician and diplomat Leibniz was a contemporary of the Russian Tsar and became his good friend and advisor [3].³ Leibniz, who obtained his doctorate in law in 1667 at the University of Altdorf, later rejected the offer of a teaching post at the university, explaining that he had completely different ideas in mind. In fact, Leibniz's concerns had always gone beyond science to include social and political matters as well [13]. Leibniz first served Duke Johann Friedrich of Brunswick-Lüneburg as a counsellor from December 1676 until the end of 1679. Then, between 1679-1698, he took up a post with Duke Ernest-August of Hanover until his death, and subsequently served Georg Ludwig, who went on to become King George I of Great Britain.⁴ In 1712, we find Leibniz at the court of Vienna, where he was appointed advisor to Emperor Charles VI and private advisor to Peter I. Leibniz died in Hanover on November 14th, 1716.

The aim of this article is to analyze Peter I's relationship with Leibniz, in order to gain a greater understanding of how the influence of Leibniz's ideas was reflected in the formation and later in the development of Saint Petersburg Academy of Sciences and Arts. The analysis of their correspondence, of meetings[21]⁵ and of the projects (memoranda)⁶ that Leibniz presented to the Tsar for the modernization of Russia enable us to know better Leibniz's influence on the creation of the Academy of Sciences as well as on the Tsar's ideas for the Academy, such as the universality of knowledge and the significance of scientific knowledge as theory for the underpinning of practice, *Theoria cum praxi*, which is also Leibniz's motto for the Berlin Academy [11].

There are some studies on the relationship between Peter I and Leibniz that focus on certain aspects of this relation [31 and 24].⁷ These articles and the correspondence published by Vladimir Guerrier (1837-1919), historian, mathematician and professor at Moscow University, constitute the main sources of this research, together with some of Leibniz's letters referring to the Tsar found in Leibniz's manuscripts.[10 and 16]. In the first part we analyze the letters from Leibniz to Peter's counsellors in the early years, including the memoranda. We also analyze the contacts and the last letters among these authors. In the second part, we analyze the impact of Leibniz's posthumous legacy on the creation and subsequent development of the Academy. Finally, we reflect on the role of Leibniz's ideas in Peter's thought by means of evidence from the Academy regarding the universality of knowledge and Peter's own ideas of scientific knowledge as theory for practice (*Theoria cum Praxi*).

³ More biographical dates about Leibniz in [1] and [14].

⁴In 1685, he was commissioned to write a book on the history of the Guelph or Brunswick house. For this purpose, in October 1687 Leibniz set out to travel through southern Germany, Austria and Italy in order to carry out research. In Rome, Leibniz became interested for Chinese culture through the Jesuit missionaries.

⁵The meetings between Leibniz and Peter I took place in Torgau (1711), Carlsbad (1712) and finally, in Pyrmont (1716), where they took the baths together.

⁶ It is said that Leibniz wrote 9 memoranda, 3 of which were written in the summer of 1716.

⁷ On the relationship between Leibniz and Peter I, see: [29]; [5] and [28].

2. Letters, memorandums and meetings between Leibniz and Peter the Great

Leibniz's interest in Russia began before the Tsar travelled to Europe [9]. Indeed, the realization that Russia was in transition had already sparked his interest in the country and subsequently led to his meeting with the Tsar. In fact, some quotations from Peter the Great can be found in Leibniz's letters before the Tsar embarked on his trip. For example, in a letter dated July 18th, 1695 Leibniz stated that "the czar is inclined to introduce politer ways of our Europe in Moskva." [10, P. 4]

The Tsar's first trip to Europe, referred to as the Great Embassy of Peter I, lasted 535 days, from March 1697 to September 1698, at the beginning of which he travelled incognito. He initially passed through Berlin without stopping on July 20th and was found in Copenbrügge on July 27th, where he had dinner with Sophie of Hanover (1630-1714), widow of the Elector Ernest-August of Hanover, and his daughter Sophie Charlotte (1668-1705), who was a good friend of Leibniz.

Leibniz wished to meet Peter I in order to discuss their ideas, but he had been unable to approach the entourage of the Great Embassy. However, he dispatched letters to the Tsar through his advisers, such as the nephew of François Lefort (1656-1699),⁸ Pierre Lefort, who had for a long time been Peter's friend and adviser, and he and the Tsar arranged to meet in Minden, a small village like Copenbrüge, in the north of Germany. Leibniz asked the Tsar (through Pierre Lefort) about his genealogy as follows: "I have a handwritten family tree of the Czar's ancestors and family, but it would need assurances and clarification" and also the memoir "*Desiderata circa linguas quae sub Imperio Moschico et in vicinis regionibus usurpantur*" (August 1697), in which Leibniz expressed his desire for some examples of the different languages spoken in Russia and also for some territorial information about Russia [10]. At the beginning of this correspondence Leibniz referred to the Tsar's genealogy and his to interest in examples of the languages spoken in Russia as well as Russia's frontiers with China, in order to understand the terrestrial Globus better, while in the following letters he referred to specific projects (memoranda) for achieving the modernization of Russia.

Leibniz continued this correspondence with Lefort by referring to the changes that the Tsar was obliged to undertake in order to make Russia a European country. In one of these letters addressed to Lefort (August 1697), Leibniz wrote that the Peter I wanted to "attract to his country the sciences, arts and manners particularly of our Europe". In the same letter, Leibniz presented a project (memorandum) consisting of seven points, which first enunciated and then described all the Tsar had to do to achieve these objectives [10].

In the first point of the project Leibniz set out the following: "Establish a general institution for the sciences and the arts." He noted that those appointed to this institution should be leading academicians, and explained that it was necessary to have a "suitable" fund. He also added that those chosen must be "well versed in science and the arts and of high genius". In the second point, which he notes as: "Attract capable foreigners". Leibniz suggested that "it is necessary to revoke or modify the laws", so that foreigners can easily enter and leave Russia. He also stated that they (foreigners) must be "treated well", by providing them with privileges and benefits. The third point is entitled: "Import foreign things that are worthwhile". In reference to the foreign items that must be acquired, Leibniz stated that they "will be books and instructions on all kinds of subjects,

⁸ François Lefort was a general and admiral of the Tsar in Russia under Peter I, and also the Tsar's advisor and friend.

curiosities", and went on to say that "there will be large observatories, mills, shops, pharmacies and factories, which will contain all kinds of machines and inventions actually put into practice". The fourth and fifth points read as follows: "Travel subjects with proper precautions" and "Instruct the people at home". On these points, Leibniz specified encouraging Russians to travel and also educating them at home, by founding schools and "Academies of both science and arts and exercises" [24]. It was Leibniz's idea to unite practice and theory (*Theoria cum praxi*). The sixth point is entitled: "Determine the exact relations of the country to determine its needs". Leibniz also stressed the importance of knowing one's own country and customs, including the languages spoken in Russia and its geographical boundaries. In regard to this point, Leibniz stated that "to make the maps, he will need to send engineers and make observations of the latitudes, longitudes and the magnetic variation in order to investigate the entire coastline of the northeast as far as possible to determine if Asia is connected to America, or if one can pass between them." [10, p. 19]. The seventh and final point referred to "Supplement for what is missing." [10, p. 16] Leibniz explains that they must make up for what is lacking in the country by imitating and perfecting what is being done elsewhere.

After his return to Hanover, Leibniz continued his correspondence with Pierre Lefort until October of that year, 1697. Later, at the beginning of December, 1708, Leibniz arrived in Vienna and was able to enter into contact with Johann Christoph von Urbich, the Tsar's Minister Plenipotentiary in Vienna, who asked him to prepare a plan for the advancement of the sciences in Russia [3, p. 465]. Leibniz agreed, and in December, 1708, he wrote a similar memorandum in German.⁹

In subsequent letters to Urbich, dated August 27th, 1709, Leibniz sets out his ideas about the competence and the suitability of the Peter I himself undertake this project in Russia: "For me, who am for the good of mankind, I am very delighted that such a great Empire should be put in the paths of reason and order, and I consider the Tsar to be this person whom God has destined for a great work." [10, p. 120].¹⁰In another letter to Urbich, written from Wolfenbuttel on December 27th 1710, Leibniz characterized the Tsar as a "prince wise and full of moderation". [10, p. 157].

We do not know if Peter I read the letter of 1697 or the memorandum of 1708, but we are sure that the first meeting between Peter I and Leibniz took place in Torgau, a German city to northeast of Saxe on the banks of the Elba. Although in this first meeting, which took place between October 13th-19th, 1711, Leibniz was not received in private audience by Tsar as he had expected, but managed to meet him in person at a dinner in Torgau,¹¹ where they spoke about the project on the modernization of Russia by means of the development of education, science and the arts. This meeting is described in detail in a letter addressed to the Electrice Sophie and dated October 31st, 1711 [16], in which Leibniz stated that he had discussed his plans personally to Peter I. He then went on to

⁹ The memorandum in German can be found at [10] and [31].

¹⁰ And on September 2nd, 1709, Leibniz added in a letter to Urbich showing again the plans for Russia, and the idea of *Tabula Rasa*. On *Tabula Rasa* see [25].

¹¹ This Meeting in Torgau is quoted in the Czech Encyclopedia of 1859, explaining that Leibniz told Peter that they had the same Slavic origins [12].

outline these plans for Russia in a letter of 1711 entitled "Plan composed by Leibniz during his meeting with the Czar Peter in Torgau",¹² and added 4 points more:

"1) The usefulness of providing studies for young people in all regions of Russia; so that they can learn customs, languages, arts and sciences well. 2) Make observations in the physical and technical realm (which is *Naturae* and *Artis*) to also provide astronomy. 3) Bring from Europe and China or Cathay their practices and introduce them into the Czar's empire, so they can bring a large amount of money into the country. 4) On the economic benefits that Russia can obtain by implementing these plans." [10, p. 180]

Furthermore, he includes a paragraph entitled "Particularities", containing a further 8 points referring to magnetic observations, the calculation machine, and others [10].

In a new letter of 1712 addressed to Tsar through Baron Johann Christoph Schleiniz, Leibniz again explained the plan and the process to Peter I, with the suggestion that he begin by establishing an Academy in Petersburg [10]. In a letter dated September 22nd, 1712, Schleiniz answered explaining to Leibniz as follows: "the mathematical instrument, the translation of memoranda by Leibniz to the muscovite language, the pension (money) that they give him, the decree of nomination as an advisor and the next meeting between Leibniz and the Tsar." [10, p. 226]

In fact, Peter I officially signed off on the appointment of Leibniz as advisor on November 1st, 1712 [10 and 21]. Leibniz explained to Electress Sophie of Hanover in enthusiastic terms about his meeting with the Tsar in Carlsbad, and how after his appointment he almost felt himself to be the Solon of Russia. Through his Grand Chancellor Golofkin, the Tsar told the Electress what he felt he must do for Russia: "to straighten out the rulings and draft regulations on the law and the administration of justice." [10, p. 272]

From 1712 to 1714, Leibniz stayed at the Viennese court where he was appointed advisor to Emperor Charles VI. In September, 1714, he suffered several illnesses that forced him to stay in bed from time to time before returning to Hanover. However, he maintained an exhaustive flow of correspondence during the last years of his life and tried to renew contact with Peter the Great. Finally, Leibniz was again able to meet the Tsar in Pymont, since Peter, who was on his way to Copenhagen, arrived in Herrenhausen on June 5th, 1716, and on the following day went to Pymont to take the baths. They stayed there together until June 26th, when the Tsar continued his journey to Copenhagen via Herrenhausen on June 28th. Leibniz commented on this meeting in a letter dated July 2nd, 1716, in which he expressed again his admiration for the Tsar and referred once more to his geographical concerns about the connections between Asia and America:

"I can't admire enough the vivacity and judgment of this great Prince. He brings in clever people from all over, and when he talks to them, they are all astonished, because he talks to them about it so well. He is informed about all the mechanical sciences; but his great curiosity is for everything related to navigation; and

¹² "Von Leibniz während seines Zusammenkunft mit dem Czar Peter in Torgau aufgesetzte Concepte." [10, P. 180].

therefore he also likes Astronomy and Geography. I hope that we will learn through him whether Asia is attached to America." [10, p. 360]

After his stay in Pymont, Leibniz wrote another letter dated August 3rd, 1716, to Robert Erskine (1677-1718), the Tsar's chief physician, in which he said that he was working on a calculating machine for the Tsar. In the same letter he also mentioned Blumenstrost, whom they had met in Pymont and who later became the president of the St Petersburg Academy [10].

In this journey through Leibniz's letters we can see that Leibniz's prime interest was in the country itself; that is to say, to get to know Russia and thereby gain a greater understanding of the eastern part of Europe. However, it immediately becomes apparent that the Tsar himself also arouses great interest and admiration in Leibniz, eliciting his praises. Furthermore, the fact that the Tsar was able to contribute to Leibniz's most essential purpose, which was the development of knowledge not only for Russia but for the whole of mankind. Their relationship in the last years of Leibniz's life became more familiar and endearing.

3. Leibniz's influence on the creation of the St. Petersburg Academy

According to Gordin [7, p.4], Leibniz's main influence on the Tsar and Russia centers on the St Petersburg Academy: "the most significant influence was in fact that of Leibniz, and the Berlin Academy of Sciences... The Imperial Academy as it was finally formulated bore remarkable similarities to Leibniz's own Berlin academy". Both Leibniz and the Berlin Academy exerted an even greater influence on the creation of Saint Petersburg Academy of Sciences and Arts, which was imitated for its historical and linguistic subjects, among other features. Moreover, later scholars who were candidates for becoming academicians at the Saint Petersburg Academy were recruited on the advice of Leibniz's correspondent, Christian Wolff (1679-1754).

In fact, Peter I contacted Wolff in 1720, and in 1722 the Tsar sent Schumacher with the purpose of offering him the vice-presidency of the Academy with a good salary, although Wolff did not accept it. However, he helped the Tsar recruit foreign scientists for the Imperial Academy of Sciences, such as Jacob Hermann (1678-1733) and Daniel Bernoulli (1700-1782) [6].

Peter the Great submitted a document outlining the Academy Project to the Russian Senate in January 1724. As set out in this document, the academy consisted of three classes or departments: a) Mathematics and mathematical physics concerning the related sciences of astronomy, geography and navigation; b) the whole of the physical sciences, including experimental and theoretical physics, anatomy, botany and chemical sciences, and finally, c) the humanities, embracing rhetoric, the study of antiquities, ancient and modern history, law, economics and politics. Indeed, the Tsar incorporated the third class on humanities in accordance with Leibniz's Academy and his memorandum.

Furthermore, the project included a proposal for a university as a part of the academy, consisting of three faculties (until 1747): law, medicine and philosophy. The Academy was staffed by 84 people: 17 academicians who were also professors; 1 adjunct; 1 master of astronomic instruments; 1 sprach-master; 11 students; 7 engravers; 2 illustrators; 6 translators; 3 library assistants; 7 printers; 8 unofficial students; 10 staff members and 10 service personnel [7]. In addition, in accordance with Leibniz and Wolff's idea, the Project had to include a proposal for a university as a part of the academy. Thus, Academy

members were required both to teach and to conduct research. An academic gymnasium for preparing young men for university studies was also included.

Peter the Great offered the highest salaries (as Leibniz had asked the Tsar to do in the memorandum) and ordered a construction on the Neva, which included laboratories, a library, a museum, a conference room, an anatomical dissecting theatre, faculty offices and service rooms, all of which provided the ideal conditions for academic training and research, as Leibniz had described in his memorandum

Peter the Great died on January 28th, 1725, and on December 7th, 1725, his widow Catherine I issued a decree to the Russian senate confirming the establishment of the Academy of Sciences and Arts in accordance with Peter's project from January 1724.

Academicians were to meet weekly in order to present and discuss scientific topics, and also assembled at 4:00 pm on Thursdays and Fridays. The Petersburg Academicians were expected to present a few reports annually at these twice-weekly conferences. They published the results of their research in the academy's journal, the *Commentarii Academiae scientiarum imperialis Petropolitanae*. These conferences were lively and sometimes heated affairs. The subject of these meetings ranged broadly from the shape of the Earth or whether the Cartesian, Newtonian and Wolffian belief that there was life on the moon could be confirmed. Indeed, at the first meeting the physical theories of Leibniz and Wolff came up for discussion. Academicians learned about new fields as well as participating actively in these discussions and writing many reports on the conferences, in which Leibniz's scientific ideas were often addressed.

Among the academicians who arrived at the Academy between June and December 1725, we find the following: Hermann, Joseph-Nicolas Delisle (1688-1768) [15 and 26], Christian Goldbach (1690-1764), Georg Bernhard Bülfinger (1693-1750), Friedrich Christoph Mayer (1697-1729), Nicolas Bernoulli (1695-1726), D. Bernoulli and later, Leonhard Euler (1707- 1783) [19 and 20]. In fact, all these people were of outstanding ability and well versed in science and the arts, just as Leibniz had requested of Peter in his memorandum.

5. Some comments on the role of Leibniz's ideas

First of all, it is worth emphasizing the mutual admiration that existed between the Russian monarch and Leibniz, examples of which have been given in this article.

Leibniz regarded knowledge as universal and should be available to everybody. Knowledge needs to be ordered and systematically organized, a task that properly falls to the academies. To this end, Leibniz envisaged the creation of a network of academies and scientific centers in Europe, including Russia, in order to coordinate all knowledge.

However, to fully assess Leibniz's influence on the Tsar in this matter, it is fitting that we return to his letters in order to understand his vision of the development of science. Thus, in the letter dated January 16th, 1712, to Chancellor G. I. Golovkin, Leibniz stated that his main purpose was the growth of knowledge and his belief that the Tsar was the right person to achieve this undertaking in Russia:

"And since my youth my great purpose has been to work for the glory of God through the improvement of the sciences,...., (as I have succeeded in part by divine grace, having made important new discoveries quite well known in the republic of letters), and since I have preferred this purpose to honors and fortune. I am always ready to turn my thoughts towards this great purpose and I only searched

for a great prince who has the same purpose than me. I think that I have found him in the person of the Great Tsar...”[10, p. 203]

Leibniz went on to talk about the flourishing science in Russia and knowledge as a treasure of the mankind:

“And in this I distinguish neither nation nor party, and I would better see the sciences made very flourishing in Russia than see them poorly cultivated in Germany. The country where it will be best will be the one that will be dearest to me, since the whole human race will always benefit from it and its true treasures will be increased...Because the true treasures of the human race are the arts or sciences.”

Later, in accordance with Leibniz’s ideas, Peter explained that the purpose of the new academy was not merely to transmit knowledge but to invent and expand it. The main purpose was the establishment of:

“an edifice which will not only serve to spread the sciences of the present day to the glory of the state, but also through the teaching and propagation of the same be of use to the nation in the future.”[22, p. 15]

This is the point that unites Leibniz and the Tsar, and it is the confluence of ideas of these two characters that made the project in Russia a success. In addition, like Leibniz, Peter the Great himself regarded mechanics, mathematics, astronomy and chemical science as tools in the construction of ships, canals and docks to provide for navigation, to improve artillery, to develop mining facilities and to benefit public health. This is the vision behind uniting theory with practice (*Theoria cum praxi*), which Leibniz had already expressed in the motto of his Academy in 1700.

That is why Leibniz had advised Peter I on the creation of a scientific academy in St. Petersburg and the realization of Tsar’s dream: that Russia could become a European country on an equal footing with all the others. Indeed, Leibniz wrote many memoranda directly to the Tsar or his advisers, examples of which we have provided in this study.

Further evidence of Leibniz's influence on the Tsar can be found in the words formulated by Fontenelle in his eulogy of Leibniz, which he wrote after Leibniz's death in 1716. Fontenelle praised him in the following way:

"The Tsar gave Mr. Leibniz a magnificent gift, and accorded him the title of his Private Counsel of Justice with a considerable pension. But, what is even more glorious for him, the History of the Science Establishment in Muscovy will never forget him, and his name will be mentioned after that of the Tsar. "[4, p.124]

These words show two things: the close relationship between Peter I and Leibniz, and that in 1716 Fontenelle was convinced that an Imperial Academy of Sciences and Arts would be created in Russia, in accordance with Leibniz's ideas.

In fact, the creation of the Imperial Academy became a reality in 1725, 9 years after Leibniz's death, but in consonance with his recommendations as to the type of people

appointed, changes in the law, and the creation of a school and university for the training of Russians, quite unlike other academies established in Europe.

Thus, there is no doubt that all the contacts, memoranda and letters between Leibniz and Peter I eventually produced satisfactory results: on the one hand, a general development of science, and on the other the modernization of Russia.

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