

G. W. Leibniz And Scientific Societies

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Efficient scientific study requires organized co-operation between scholars, as well in contemporary science as in the past. The famous philosopher, G. W. Leibniz (1646-1716) regarded as his models for the scientific organizations The Royal Society (founded in 1660) and The Royal Science Academy of France (founded in 1666).¹ These societies were mainly interested in practical applications, although some discussion about natural philosophy and science in general took place. Some scholarly co-operative work took place in the Royal Science Academy in Paris (Ornstein 1975, 145),² which must have particularly impressed Leibniz.

According to the old standard view, established by Martha Ornstein in the 1920's, the universities progressed very slowly and remained fortresses of old and outdated dogmas whereas the scientific societies were pioneers of the new science. This view is later rejected and the universities are generally seen as important institutions in disseminating the ideas of the scientific revolution. New ideas were gradually accepted to the curriculum with various speed and extent. Leibniz, however, did not have a high regard for the universities. This might have been due to the lack of practise in the curriculum of the universities. In Germany societies, like the *Collegium curiosum sive experimentale*, which Leibniz joined in 1666, married theory and practise unlike the universities, who were satisfied with the theory alone.

Whereas the French Academy was dependent of the King (and in practice, minister Colbert, after whom a relative decline occurred in the institution), The Royal Society was independent scientific society (one can read the text "*Nullius in verba*" ("believing in nobody's words") in its coat of arms), which also had its own periodical called *The Philosophical Transactions*. *The Académie des Sciences* had also a clear dominance over the French *Journal des sçavans*, which in some respects was more

influential than the *Philosophical Transactions*. This independent nature of the society can also be seen in the fact, that the Royal Society had no fixed opinions, whereas the French academy tried in the beginning to propagate Cartesianism. The Royal Society was more like a group of amateurs, who practised science with various degrees of enthusiasm. One of these was of course Leibniz, who was accepted as a member of the Royal Society in 1673 mainly because of his invention of calculating machine.

There had been a few unofficial gatherings of learned men like *L'Accademie dei Lincei* in Rome, which met in a certain Duke's house during the years 1600-1657 and featured some of the most famous scientists of the era, like Galileo Galilei. In Paris there was a group, which assembled in Marin Mersenne's house - among the 60 churchmen, over 20 of legal profession and 10 noblemen such "stars" as Pascal, Descartes, Hobbes and Gassendi were frequently present (Butterfield 1980, 75; Lehti 1987, 28).³ Besides these circles there was an academy of Queen Christina in Rome, which drew a lot of learned men in its series of lectures.⁴ This "academy", however, was a far cry from an independent society and hardly a pioneer in scientific work.

In Germany there had been *Societas Ereunetica*, a society founded by Joachim Jungius, *Academia naturae curiosorum* (founded in 1652) which specialized in curious chemical and medical experiments and included physicians only. This society was recognized and supported by the Emperor (Ornstein 1975, 166). Still another was *Collegium curiosum sive experimentale* in Altdorf, an alchemistic society, which once employed Leibniz as its secretary. The German scholars were united by common language, Latin, but no cultural capital, like Paris or London, existed.

Leibniz's account of an academy or a scientific society is a lot different from these institutions. This did not hinder him from greatly respecting these institutions - he declared the Royal Society the most respected intellectual authority of Europe. He tried several times to become a member of the *Académie des Sciences*, which would have guaranteed a regular pension and grants for expenses (The Royal Society, on the contrary, was always in financial difficulties) besides access to the purpose-built

observatory, dissecting theatre and chemical laboratory, as well as the use of the royal zoo and palace gardens (Brockliss 1992, 72). Leibniz's opportunity occurred in 1675 on Roberval's death, but was lost because he refused to convert to Catholicism (Leibniz 1981, xxii).⁵ The academicians were a relatively small group of people : in the years 1666 to 1699 only sixty-two appointments were made and the rejections were not made only for religious reasons - supporters of other than the accepted paradigm (Cartesianism) were not allowed to the academy.

Leibniz thought vital for academies to blend theory with practical matters and vice versa. The Academies should strive for useful goals. These goals could be, for example, medical discoveries, which would ease the sufferings of the sick, or new, more productive ways to produce agricultural goods and improvements in manufactures.

“If the principles of all these professions, arts and even trades were taught in a practical way by the philosophers - or it might be in some other faculty of learned men - the latter would truly be the teachers of mankind. But this would require many changes in the present state of things in literature, in the education of the young, and thus in public policies. When I reflect on how greatly human knowledge has increased in the past century or two, and how easy it would be for men to go incomparably further along the road to happiness, I am not in despair of the achievement of considerable improvements, in a more peaceful time under some great Prince whom God may raise up for the good of mankind.”⁶

Leibniz's plans for scientific academies reflect the mercantile economical system of his time (Totok 1966, 306; Huber 1951, 57) on the other hand, but there is also a strong internationalist aspect : the academies would form an international circle, which would maintain the Christian truth and peace all over the world. Missionary work would be an elementary part of academies - Leibniz followed with

interest the success of Jesuit missionaries in China, which had been achieved partly with help of new scientific discoveries (Manuel & Manuel 1979, 402).

One implication from Leibniz's *theoria cum praxi*-principle is that the practical arts should be respected. An artisan and a scientist can make discoveries together. As many utopians before and after him, Leibniz dreamed of a singing, happy labour (Manuel & Manuel 1979, 399). The field of activities of an academy is thus a lot larger than the modern institutions. The academies should also feature anatomical theatres, curiosity cabinets and botanical gardens and other facilities and educational property.

The motive in the background is not only to try to improve the human condition and happiness, but also to get to know God better. Since God manifests himself in nature, the study of nature can be taken as a religious mission. The more of nature is known, the more one can know about God and love him. In this respect the final goal for the academies would be a perfect scientific order, which would afford aesthetic pleasure to man and Glory to God (Manuel & Manuel 1979, 398). This aesthetic quality of scientific world-order develops in Leibniz to a kind of mysticism, which can be seen especially in the *Monadology*. This order (universal science) would be edited into an encyclopedia, which would consist all knowledge in the world. The leading principle in the encyclopedia would be a calculus, *scientia generalis*, which is a logical tool for science. The academies would act as a social dimension in the progress of science, which would be most successfully conducted by scholarly co-operation. One contemporary point of comparison could perhaps be internet in its early stages, where scientists mainly used it.

A wise prince understands reasons mentioned above for the progress of science and considers as his moral and religious duty to promote its progress. His first task is to improve the elementary schooling, second to promote science and third to organize a scientific academy (Naert 1964, 45). In a memoir called "*Grundriss eines Bedencken von Aufrichtung einer Societät*" Leibniz describes the advantages for the prince of his virtuous actions :

“Finally this kind of society satisfies the demands of one’s conscience, guarantees an immortal fame to its founder and acts for the common good”⁷

The funds for the enterprise can be arranged by granting monopolies in, for example, calendars and papermaking. Lotteries can also be arranged. This would put the academy to firm basis compared to the Royal Society, where each member paid one shilling a week for the salaries of a secretary and a curator (Bernal 1986, 454).

Leibniz’s plans for the academies are full of practical details and persuasions. The philosopher was possessed by the eschatological view - the idea that there was a particular moment when, under the tutelage of a philosopher who represented theory and a great monarch who represented practice, the proliferation of novel forms could be forced, so to speak, to achieve an accelerated tempo. If the propitious moment was not grasped, temporary regression could stifle a civilization (Manuel & Manuel 1979, 400). Leibniz could not just let go.

From Utopia to Pragmatism

Leibniz made the first project of founding a learned society at the age of twenty-one in 1667. The basis was Leibniz’s proposition to found a semi-annual journal called *Semestralia literaria*, which would review all publications and to whose purposes every publication in the empire should be submitted (Couturat 1961, 503) (Leibniz’s concern for growing amounts of bad information can be seen behind many of his schemes). The idea of an universal encyclopedia is also included :

“The creation and continuance of this Semestria would produce in a few years almost all the best works of all professions, arts and faculties, collecting the whole of human

empirical knowledge to paper. This will be the material and the basis for the perfect encyclopedia.”⁸

This plan grew in his mind to a much larger project, *Societas Eruditorum Germaniae*, which was to consist of a fixed number of learned men, who would keep up a wide correspondence, collect universal library, co-operate with the French, English and Italian academies, perfect medical science, watch mathematical experiments, collect experiments and have a general oversight over commerce and manufacture (Ornstein 1975, 183). The society would thus be a kind of autonomous unit, which would also have some power in the state.

This political power possessed by a learned society can be seen in Leibniz’s proposition, that the society was to have a right to grant licenses for the publication of books and that every author should be required to indicate what matters, either new or useful to the state, his book contained (Ornstein 1975, 183).⁹ This far-stretching plan of scientific control of books came to nothing, since the Emperor was not prepared to give up the privilege of censorship.

In 1669 Leibniz prepared another memoir, which was far more universal of scope than the *Societas Eruditorum Germaniae*. This plan was titled *Societas Philadelphica* and it suggested the founding of an international scientific society, which would be independent of any state. This society reminds a little of the Jesuit order, but it would consist of learned men of different religious orders, who would work together for the future. Thus the *Societas Philadelphica* would function as a model for the rest of the world (Leibniz 1983 1., xxxii). Another religious feature of the society is that the members should not marry and that the members of the “order” should be obedient to the leader of the society. The society would consist of learned men and artisans all over the world and it would co-operate with other institutions and scientific periodicals to promote science and progress, especially medicine.

The society was to be situated in Netherlands and the Emperor, the Pope and the King of France would guarantee its independence together. The Pythagorean community worked as a model for

Leibniz (Schneiders 1975, 66). The members of the society would also work as councillors, solicitors and doctors in the courts, the universities, the armies and the navies like the Jesuit fathers. Leibniz was not prepared to accept ecclesiastics, however, into the society, since he regarded them more as “friends of tradition than reason.” (Couturat 1961, 506).

“The members of the society would also perform many deeds for free, medical, jurisprudence, governorship, support, councillorship, solicitor, professor, headmaster, scribe etc. without salary for the republic...”¹⁰

A big threat to the society would be the economical one. In order to maintain its independence the society would also have to be economically independent. Leibniz had in mind the selling of patent rights and commerce as the means to maintain the society. He leaves open the question of how to finance the founding of such a society (Schneiders 1975, 65) though, but I presume that he had in mind the generosity of the Pope and the King of France, who would also admit privilegiums, like exception from the customs, which would help financing the society in the long run and grant the success of commercial enterprises of the society.

The society would eventually develop to an important factor in European politics, supervise the Netherlands and strive for the right goals (in another words, to the harmony and general well-being) by use of politics based on reason. One obvious contemporary point of comparison is, of course, the United Nations. The society would also perform scientific missions in the Orient.

By 1671 the tone in Leibniz’s memoirs had become more moderate. In "*Grundriss eines Bedenckens von Aufrihtung einer Societät in Teutschland zu aufnehmen der Kunste und Wissenschafte*" the philosopher proposes of founding of a national academy. Leibniz arguments thoroughly on behalf of his enterprise and hopes for state support from Johann Philipp von Schönborn for whom the memoir is

addressed. The nature of the proposed academy is plainly national and local : the science supports the state and not vice versa. Leibniz emphasizes the importance of the benefits to be gained from science :

“This is why the inventiveness of the Germans will be found beneficial, like their neighbour to whose equal they would one day become, through experiments and discoveries, which can be attained by growing correspondence and communication between the learned men...”¹¹

Great achievements in science had been made. But this was not enough : too often great inventions were not communicated properly or sufficient instruments were not used because of the lack of financial support. Germans should found an academy, which would join forces and spread the results of scientific enterprises all through the Germany and the world.

Leibniz arguments thoroughly how the arts and the sciences, manufactures and commerce could benefit from the institution. He also refers to the former utopias like Thomas More's *Utopia*, Campanella's *City of the Sun* and Francis Bacon's *New Atlantis* as illustrations of the well-making of education and civilization (Leibniz 1969 VII, 47).

The proposed academy was to be all embracing, comprising in its scope science, history, art, trade, commerce, police, medicine, archives, schools, machines etc. Leibniz stresses the value of practical endeavours : for example, manufactures were to be improved by means of new appliances, education should be directed by the academy, and orphans and foundlings should be educated along technical lines. Curiously enough, despite all his memoirs of well-making, Leibniz recommends, that poor people should be treated as clinical material. In another place he suggests self-supporting poorhouses and prisons.

Members of the academy should teach realia and become travelling teachers. Nobles and clergy should be also influenced by the society. This would partly be attained by founding a journal to

encourage correspondence and communication between the learned men. True to his optimism Leibniz believed, that his proposal was so much broader than the work of the Royal Society and *Académie des Sciences* that it should bring better results.

This memoir was followed by a more modest “*Bedencken von Aufrichtung einer Akademie oder Sozietät*”, which is focused on the improvement of science in Germany in a smaller scale. Leibniz presents his version (which is not in every respect truthful!) of history of learning in Germany and names a few scientists to become appointed to his academy. Leibniz stresses especially of the Germans position in the history of chemistry from Albert the Great to Paracelcus and in mathematics from Copernicus to Kepler. The concern for Germany’s cultural state after the Thirty Years War is clearly visible.

According to the memoir, Germans were first to make inventions, but are last to utilize them.¹² All automatically moving things were invented by Germans and *medina practica* (alchemy) and the art of apothecary flourish in Germany. According to the philosopher, Germans are especially talented in practical arts and sciences compared to Italians, who stand out in arts and French, who are excellent in philosophy (Leibniz 1969 VII, x). Leibniz recommends the German princes to follow the example set by the King of England and the Duke of York, who contribute to the expenses of the Royal Society.

These plans were born in the Mainz years when Leibniz was still young and politically inexperienced. Still, they are the basis from where Leibniz would later form his plans for scientific academies. The scale of his plans would diminish somewhat and the practical and political conjectures would show more, but Leibniz never gives up his original ideas. The number of memoirs and the tremendous amount of work poured upon them witness the importance of the promotion of science to Leibniz. Although many of the planned academies would work on international basis, the local and the national interest were an important part of the memoirs.

This tendency is also clearly visible in his later memoir in the end of the 1670’s (*Bedencken über die Seidenziehung*), which concerned primarily the promotion of commerce and especially of silk

manufacture. He suggested setting up an academy of commerce and languages, so that the young could be instructed in the current practises and acquires the necessary skills. He also recommended the establishment of a bureau of information from which people throughout the land could find particulars of goods needed and for sale, things for hire and so forth.

In Paris 1672-76, where Leibniz was sent to a diplomatic mission, he did not forget his educational ideas, on the contrary. His great hopes for the future are to be read in an anonymous memoir titled “*Consultatio de naturae ad vitae usus promovenda instituendaque in eam rem sociatate Germana*”, in which he asked the learned of Germany (within was enclosed a list of forty-eight names) to demand the founding of a society under the tutorship of the Emperor. The improvement of German vernacular was particularly stressed, so that scientific study would be open to everyone and a proposition concerning the secularisation of St Benedict’s and St Bernard’s orders was also included. These orders would later participate in scientific studies (Huber 1951, 115).¹³ The tone of the memoir is reminiscent of the *Societas philadelphica*, especially in its organization, which is based on the order of the Jesuits (Leibniz 1969 VII, 97f).

Leibniz’s optimism was in its high peak. He thought that an association of men, imbued with a love of study, would accomplish more in ten years than all humanity has done in centuries (Ornstein 1975, 187). But this mood soon changed. Upon his return from Paris he saw how impossible the scheme of an imperial society was in view of the decentralized condition of Germany - his scheme did not simply gain much feedback.

After his return to Germany Leibniz tried to pursue his ideas gradually (Totok 1966, 299). In one stage Duke Friedrich was favourable to Leibniz’s plans, but the enterprise fell on lack of financial support (Couturat 1961, 510). The philosopher hoped great profits from the Harz mines (where he was involved in improving the transportation of water from the mines) in order to gain support for his scientific plans, but the project failed badly.

The project mentioned above was called *Societas Theophilorum vel Amoris Divini*, which would start where the Jesuits left off, studying the secrets of nature and giving free medical treatment to the poor, instructing the youth in classical studies, especially mystical theology and chemistry. Scholastic theology and philosophy would be left to the Jesuits. Such an order he envisaged spreading throughout the world, but in accordance with the ideal of religious harmony it would maintain good relations with the Jesuits and other orders. This plan resembles clearly the plan for the *Societas philadelphica*, but is more modest in scope. The ends of this institution seemed mainly utilitarian, but whereas the earlier plan had a lot of political ambitions, this plan seems to favour some kind of hermetic or Neoplatonist mysticism.

After Duke Friedrich's death Leibniz's attention moved to his new assignment, the writing of the history of the Guelf dynasty. In 1687-90 Leibniz undertook a great journey in Germany and Italy to collect material for his historical work. The work seemed to occupy his mind for a little while, though in Rome he became a member of a physico-mathematical society. In Italy he also conceived the idea that Italian cloisters should be devoted to experimental study and become branch academies (Ornstein 1975, 189).

New possibilities were opened when Sophie Charlotte of Hanover (1668-1705) was married to the Crown prince of Brandenburg (Fredrik III, 1657-1713). The peace of Ryswick (1697) raised a wave of patriotism in Germany and Leibniz participated with his plan called "*Plan zu einer teutschliebenden Genossenschaft*", where the national sentiments were clearly visible. He praises the scientific accomplishments of the Germans (Couturat 1961, 515), which, as Leibniz himself well knew, were not comparable to the level of the French or the Englishmen.

Leibniz's activities in Berlin did eventually bring some results. It may have been partly because of his influence that Sophie Charlotte proposed an observatory to be founded in Berlin (aiton 1985, 215), which led to the founding of the Berlin academy of science. The Berlin academy was the most significant of Leibniz's practical achievements and dominated the last years of his life. The process

was very complicated and is a great example of the manoeuvres that had to be made in the 17th century in order to get things done. This is why I will next give a detailed description of the process.

The Berlin Society of Sciences

In the background there was a need for a new calendar. Leibniz suggested to Sophie Charlotte that the Elector should keep the monopoly of calendars, and from funds thus accruing establish an observatory and a learned society. With the help of Sophie and the court Chaplain, Daniel Ernst Jablonski, Leibniz managed to convince the Elector of Brandenburg of the need for an academy of sciences. This work was necessary to perform with utmost care, since the Elector was already envious of Leibniz because of his influence to Sophie Charlotte, with whom Leibniz had long conversations of philosophy and politics both in person and by correspondence. The decision of the founding took place in 18th of March 1700 and in 12th of July 1700 Leibniz was nominated as its President (Huber 1951, 263-64). The founding of the academy was the first important achievement of the new monarchy of Prussia.

The process was summed up by Harnack as follows : “Seldom has an undertaking been started with so carefully elaborated a program....Jablonski, entirely in Leibniz’ spirit, made definite suggestions. He proposed to erect an observatory with a complete college of science including physics, chemistry, astronomy, geography, mechanics, optics, algebra, geometry etc, because an opportunity had fortunately presented itself to do so without expense. The rules of the Royal Society and *Académie des sciences* were to be copied and improved....Kirch, a pupil of Weigel, the leading German astronomer, was to be put in charge of the observatory. ..the plan was to build over the middle wing of the Royal stable an observatory, an assembly room, a library, a room for instruments, and the apartment of the astronomer. All was to be established from the money hoped for from the calendar monopoly.” (Ornstein 1975, 191).

The main difference of the Berlin academy when compared to the Royal Society and the French Academy is the stress laid on the cultivation of German language. This was due to the Elector himself, who thus was the author of the academy's philological and historical features (Ornstein 1975, 191). All in all, the Elector was fairly enlightened - he exercised a fair degree of religious tolerance and sought to give Prussia a leading position in the promotion of German culture, notably before the academy by founding the University of Halle in Prussian Saxony for the teaching of the new studies of history and science. Leibniz had nothing against this – in fact he had in numerous pamphlets lamented the lack of scientific terminology in the German language and strived to form some terms himself. On the other hand, the Elector tried to imitate the French court and in consequence French took over German in the formal etiquette of Prussian court.

Leibniz's role in the negotiations is mainly to do with some practical aspects - he stressed particularly the point that German nobles, like English nobility should be directed to develop scientific interest, and that scholars and university people should become affiliated with the society (Ornstein 1975, 192).

In a memoir to the Elector, Leibniz set mathematical and physical sciences in the forefront. According to him, mathematics consisted of a) geometry, including analysis, astronomy and its related fields, such as geography, chronology and optics, which would be supported by an observatory provided with all the necessary instruments, b) civil, military and naval architecture, together with painting and sculpture, and c) mechanics with its applications to technology. Physics consisted of chemistry and the three kingdoms; that are, the mineral, vegetable and animal kingdoms. While the mineral kingdom was concerned mainly with mining and smelting of metals, the vegetable kingdom embraced agriculture, horticulture and forestry, and the animal kingdom included in its domain the study of anatomy, animal husbandry and the science of hunting, to say nothing of the higher science of medicine (Aiton 1985, 251).

Leibniz's goals were directed to the economical and practical goals. Jon Elster has even made Leibniz as the first theorist of capitalism.¹⁴ In another memoir Leibniz stresses the importance of utilitarian character of the academy :

“...I have most humbly said that the objective of the society, other than the studies of astronomy, history, philology and other curiosities, would be also realia, like the medicine, chemistry, economy and the mechanics, and particularly the education of the youth to virtue and the arts so that the improvement of agriculture and the manufactures, what good there is to be found...will propagate the right religion and science among the people, especially from Moscow to China.”¹⁵

The Berlin Society of Sciences (*Kurfürstlich-Brandenburgischen Sozietät der Wissenschaften* or *Societatis Scientiarum Brandeburgicae*) was now ready - in paper. It was to consist of an observatory, laboratory, library, museum, a curiosity cabinet and a theatre of natural arts, animals and plants.¹⁶ It was also to arrange a Protestant mission to China, whose knowledge and arts would be useful. Leibniz also suggested several financial actions, which included manufacturing of silk, standardization of measurements and weights, commerce between Prussia and the East and construction of channels.

Leibniz as the President of the academy was supposed to get the enterprise started. At first he was very active, but soon difficulties arose. The gravest of them all were the financial problems. The Elector had understood that the calendar monopoly would cover all costs, but it was far too insufficient for that purpose. Leibniz had to devise additional means of income (he suggested, among others, lotteries and in 1702, monopoly of silk manufacture) (Aiton 1985, 253),¹⁷ but this work was hard because personal frictions between the philosopher and the two Jablonski brothers (Ernst and Theodor, the latter worked as a secretary in the academy); in addition to this, Leibniz was unpopular in Berlin

because of diplomatic complications especially after the death of the queen in 1705 (Ornstein 1975, 192-93). Leibniz was, after all, in service of Hannover, a competing state.

Still, there were some results. Leibniz as the most active of the fellows, the academy experimented, corresponded and made magnetic observations in Russia - the report to the King in 1702 sounded promising. In 1701 the academy consisted of 23 scientists both from Germany and abroad. In addition to Leibniz, an astronomer was nominated : Gottfried Kirch was a well-known astronomer and maker of calendars. Johannes Bödiker made great efforts in developing the German language and Christian Spener began to put together anatomical theatre and a cabinet of curiosities. Leibniz tried to improve the relationship of the academy and the court by writing numerous memoirs on reforms of jurisprudence, developing the military system, the justification of monarchy and the need for commercial collegium.

A decline followed, however, in 1705-06, which ended in a revival from 1707 to 1710 (Ornstein 1975, 193).¹⁸ The building of observatory finally started, new members were appointed and as a landmark in the progress was the first volume of the *Miscellanea Berolinensia*. The publication consisted of 6 articles, divided into three parts. Leibniz contributed by editing the publication, writing preface to each part and seeing to its printing, besides writing many articles.

Soon things got worse. Kirch and the medical member Hoffman died and the strain between Leibniz and the Jablonskis got worse after 1710. Leibniz's salary was frequently denied and he was treated suspiciously despite the fact that the philosopher was still the driving force of the academy, although he stayed at this time exclusively in Vienna, where he tried to argue on behalf of imperial scientific academy to the emperor and various of his employees.

The academy was finally officially opened, but the throne of Prussia was soon (1713) occupied by Frederick Wilhelm I, "The Soldier King", who did not care about science and thought Leibniz was not good enough to stay on guard. The king's interest in solely military affairs made the development of the

academy very difficult. Although the relations between Leibniz and the academy got persistently worse, the last letter Leibniz wrote concerned the support of the academy from the king.

The Berlin Academy of Sciences (later the name was changed to the Prussian Royal Academy by Frederik II the Great)¹⁹ was Leibniz's only permanent achievement in his educational politics. The academy Leibniz planned was not to stay very long - different directors changed its policy and Leibniz's leading idea of blending practise with theory did not last long.

The scientific academy of Berlin remains Leibniz's greatest achievement in his scientific politics. His work, for once, did not go ashtray. In March 1993 a ceremony was held in the Berlin State Opera, where the Berlin Academy of Science was revitalised. This new life began with fifty scientists from different branches. The amount of scholars will eventually rise to two hundred.²⁰

Encouraged by his success, Leibniz tried next to found an academy in Dresden with the support of the Polish King, August II and the Elector of Saxony. The academy of Saxony was to be very much like the Academy of Berlin. The Dresden academy should also draw up demographic statistics, develop military skills and surgeology (Couturat 1961, 522). It was also to include the publication of the statistical table of disease and to be "a house of intelligence" and have the oversight of education. The funds would be provided by privileges on silk industry, lottery and the monopoly of tobacco cultivation. Leibniz also proposes the censorship of books (like in *Semestria litteraria* in his early days)

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"The censorship of books is also necessary, particularly at the time of the market days of Leipzig. We would like that the President of our society, or during his absence, one of the members in charge, supervise the censure, and that his orders will be executed."²¹

The academy would accept also foreign members, who “are willing to bring along their knowledge”. There should be no distinction between religious sentiments and the number of the members should not be limited (Leibniz 1969 VII, 227-28). Involved in this plan were also Sophie Charlotte and her mother, Electress Sophie. Their trusted man, father Vota delivered the plan to the King, but his misfortune in the Great Northern War crushed all these schemes (Leibniz 1969 VII, xxv). Leibniz was not a man to give up that easily. He concentrated on the plan of founding an Academy in St. Petersburg.

The plan of Russian academy is in line with Leibniz's other similar plans and the academy of Berlin would act as a model. Leibniz was well aware of Peter the Great's interests and accordingly emphasized the importance of an academy to the shipbuilding industry.²² The capital for the enterprise would be supplied by means of calendar monopoly, lottery and the profits from the printing press. The President of the academy should be the Czar's privy councillor. The main task for the academy would be to produce an encyclopedia.

Leibniz's memoir was crafted with thoroughness and with great details and gained some support. Financial problems and the Great North War were a hindrance though, and the most important institution of the memoir, the academy, was not founded until nine years after Leibniz's death in 1725. The academy did not resemble Leibniz's plans, but the spirit was somewhat kept alive by the Leibnizian professor, Christian Wolff, who was nominated to vice-chancellor of the academy (Donnert 1988, 208).

The activities in the direction of Russia took a long time, but at the very end of his life Leibniz tried once more to pursue his scientific aims in the Holy Roman Empire. As we saw before, Leibniz tried already once to establish an imperial academy. This second time was far more successful. The philosopher managed to gain a supporter in the person of Empress Amalia and was thus able to present his plan to the Emperor Charles VI in person. He had already won Prince Eugene of Savoy to his side.

Leibniz was nominated to privy councillor and acquired a status of a Baron of Empire in 1713 (Rescher 1967, 4).²³

In his letter to Eugene of Savoy Leibniz describes his plan in details (Leibniz 1969 VII, 317f). The academy was to be divided amongst the faculty of letters, faculty of mathematics and the faculty of physics. The faculty of letters would comprise in itself the study of history, geography, blazon, philology, heraldry, the science of justice and administration and the study of manuscripts, documents and medals besides numismatics.

The faculty of mathematics would consist of astronomy, architecture, artillery, navigation, machinery and manufacture. The faculty of physics included the soil science, biology, gardening, anatomy and surgery. Facilities like botanical gardens, zoos etc. should also be included in the project. In addition there should be a number of paid officials, like historians, gardeners, doctors etc. The finance of the academy would require an annual tax.

The letter and the others like it are very detailed by character and the theological and utilitarian grounds are less visible than in other plans. Another distinctive features of this plan are the historical and administrative aspects of the imperial academy. The faculty of letters would maintain a historical college, which would issue *Corpus annalium imperi*, a series dedicated to historical manuscripts of the Holy Empire (Couturat 1961, 523). The academy should also be open to all Germans, not only to Austrian scholars.

The plan experienced severe drawbacks because of negative influence from the Jesuits, who would not tolerate a Protestant as a President of such an academy. Count Bonneval, one important supporter, claimed also that Leibniz should convert to Catholicism (Leibniz 1969 VII, xxxi). Besides these difficulties, Leibniz received no help in practical matters - the enterprise progressed very slowly in the summer of 1714.

Leibniz's death drove the development to a halt, and when the academy in 1749 was finally founded, it didn't have much to do with Leibniz's original plan (Totok 1966, 303).

Conclusion

Although most of Leibniz' educational plans seemed very practical and down to earth by nature, his original attitude to the progress of science had not altered during the years. This can be clearly seen in his letters, where the idea of intensive working community of scholars turns at times to utopian and mystical directions.

The main task of the academies was to create an universal science and to edit an encyclopedia, where the knowledge of the world is collected and arranged by logical principles provided by the universal science. All brilliant minds of the Christendom should participate to this end. Methodology (logic, analysis and synthesis), the universal language (*characteristica universalis*) and natural sciences were the foremost sciences to develop.

In order to "sell" his scientific plans to princes, Leibniz stresses the practical goods provided by the academies. Military aspects (for example, the study and utilisation of astronomy, navigation and artillery) are important in many of his plans, but also commercial and medical aspects are clearly visible. The humanist sciences are mostly in the background, except in the plan for the academy of Vienna. Theology is somewhat wexing, since all the work in the academies is meant to benefit for the Glory of God and knowledge of His work.

The tone of the plans changes considerably during the years, which is probably due to Leibniz's maturization and political experiences. The utopian optimism of *Societas Philadelphica* does not care much about political realities whereas Leibniz's latest plans were very sophisticated and achieved serious attention in court circles.

Leibniz's scientific plans were so ambitious, however, that realizing these plans would have required much more political stability and funds than were available at the time. The Great Northern War, which lasted from the year 1700 to 1721 was fatal for the Dresden and St. Petersburg academies. In

Vienna the academy experienced drawbacks because of Leibniz's over-optimism and suspicions of his Christian conviction. One main obstacle was also the fact that Leibniz seldom had time to devote himself to one project only, but was always coming and going.

One interesting question remains : if Leibniz had succeeded in his plans, how independent the universal science would have turned out to develop? In France, for example, the King's ministers were very much aware of the achievements of the scientists in the Royal Academy (The King was not very interested in science - Louis XIV visited the *Académie des Sciences* only once, in December 1681, and then unwillingly (Brockliss 1992, 69)). The "state scientists" were not very eager to disappoint or displease the King or his ministers, which resulted in the relative lack of creative inventions in the academy.²³ Especially the academy of Vienna would hardly have been very independent - one has only to keep in mind the strong emphasis on the administrative and military sciences in the academy.

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Notes

¹ As a predecessor for the science academy there had been Literary Académie Française (founded in 1635), the so-called Richelieu's Academy, but the two academies had hardly anything in common and should not be confused with another. (Ornstein 1975, 139).

² This method was no success. Huygens, for example, refused to participate in groupwork. (Ornstein 1975, 163). The academy reached important achievements by singular scientists, though. For example, Mariotte's enunciation of the laws of shock, Huygen's work with pendulums and J. D. Cassini's discovery of a second satellite orbiting Saturn were major contributions to the development of science in Leibniz's lifetime. (Brockliss 1992, 72).

³ At this time, science was very popular amongst the public. There were arguments about Cartesianism in the countryside as well as in Paris. Later this interest turned into the great fight between the antics and the moderns (Baumer 1977, 29).

⁴ The Original plan for the Queen's academy was drawn by Descartes while in Stockholm in the winter of 1649-50.

⁵ However, in 1700 Leibniz was nominated as a foreign member of the French Academy of Sciences.

⁶ "Et si les principes de toutes ces professions et arts et memê des metiers, estoient enseignés practiquement chez les philosophes, ou dans quelqu'autre faculté de sçavans que ce pourrait être, ces sçavans seroient veritablement les precepteurs du Genre humain. Mais il faudroit changer en bien des choses l'estat present de la litterature et de l'education de la jeunesse, et par consequent de la police. Et quand je considere combien les hommes sont avancés en connoissance depuis unsiecle ou deux, et combien il leur seroit aisé d'aller incomparablement plus loin pour se rendre plus heureux, je ne desespere point qu'on ne vienne à quelque amandement considerable dans un temps plus tranquille sous quelque grand Prince que Dieu pourra susciter pour le bien du genre humain." (*Nouveaux essais...*) (Leibniz 1960 V, 509; Leibniz 1981, 527-528).

⁷ "Schliese also, dass solche Gesellschaft 1. Gewissens 2. un sterblichen Ruhms der Stiffenden wegen, und dann 3. umb gemeinen bestens willen aufzurichtern" (Leibniz 1969 VII, 28-29).

⁸ "Durch Einrichtung und Fortfessung dieser Semestrium, und wann dergestalt in wenig Jahren fast alle die besten Bücher der Welt durchgangen, auch durch Beschreibung aller Facultaeten, künste und Professionen, gleichsam die ganze menschliche Erfahrung zu Papiere gebracht, wird endlich Materi zusammengetragen und der Grund gelegt zu dem Rechten Haupt-Gebau Encyclopediae perfectae." (*Semestria litteraria*) (Leibniz 1969 VII, 161).

⁹ This proposition is also a means to reduce the amount of books publicated.

¹⁰ "...Societas membra ubique omnia faciunt gratis, fiant medici, iudices, praefecti, praesides, consilarii, advocati, professores, rectores, scribae etc gratis sine ullo salaria à Republica..." (*Societas Philadelphica*) (Leibniz 1983, 1., 554).

¹¹ "Dadurch die Ingenia der teutschen, nach dem Exempel aller ihrer Nachbarn, denen sie es verhoffentlich bevorthen sollen, auf gemuntert, eine mehrere Conspiration und engere Correspondenz erfahrner Leute erwedet, viele schöne nuzliche Gebanden, Inventiones und Experimenta, so oft verlohren gehen..." (Leibniz 1983, 1., 536.)

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- ¹² See Leibniz 1983, 1., 547.
- ¹³ Leibniz seems to have been envious to the religious orders of their riches and thought science should also be promoted. After all, they both worked for the same purpose, the glory of God!
- ¹⁴ See Elster, *Leibniz et la formation de l'esprit capitaliste*.
- ¹⁵ "...so habe dabey allerunterhänigst vorgeschlagen, dass das objectum der Societät neben den astronomischen, historischen, philologischen und andern curiositäten auch auff solche realia gehen möchte, dadurch die rechtschaffenen Studien, unter andern aber die arzney, chymie, oeconomie und mechanick, vor allen Dingen aber die erziehung der jugend zur wahren tugend und guthen tünsten, dann ferner den feldbau, die tünste und manufacturen verbessert, was guthes in vergleichen erfunden...propagatio verae fidei per scientias, sonderlich über Moscau nach China vorgenommen würde." (Leibniz 1969 VII, 280).
- ¹⁶ This would include museums together with botanical and zoological gardens (Aiton 1985, 251).
- ¹⁷ According to Foucher de Careil (Leibniz 1969 VII, XXI), Leibniz was in this respect ahead of his time.
- ¹⁸ One reason for this may have been the fact that Leibniz concentrated in his work *Nouveaux essais sur l'endement humain*, which is a commentary to John Locke's *An Essay Concerning Human Understanding*.
- ¹⁹ Leibniz preferred the name "society", since "academy" referred in Germany to teaching basic education (Aiton 1985, 252).
- ²⁰ According to news in *Helsingin Sanomat* 3. 4. 1993.
- ²¹ "Und weil sonderlich den Unsrer Leipziger Mass, auch sonst einer Censura librorum nöthig, so wollen Wir, dar der praeses Unsrer Societät, oder wenn er es in seiner abwesenheit auftragen wird, solche censuram mit zu beobachten haben solle und seine erinnerungen beobachtet werden." (Leibniz 1969 VII, 223).
- ²² "Finally, your Majesty can achieve great advantages to shipping when letting observe the magnetic declinations of the empire. That way can the longitude or the way from east to west, or with a word, the way to the sea be found not entirely without problems but with a much more easiness." (Guerrier 1873, 360; Richter 1846, 122).
- ²³ Aiton (1985, 312) claims, however, that the status never existed, which seems sound to me, since Leibniz used the title seldom and usually in special diplomatic purposes. According to Aiton, "Leibniz's great-great grandfather had a nephew who was ennobled in 1600 by the Emperor Rudolf. The coat of arms (which added embellishment) of this Paul von Leibniz, who died childless, was used by Johann Friedrich Leibniz in his letters to his half-brother, and was also adopted by Leibniz when he entered the service of the Guelfs. Apart from the first letters to Bossuet, where he signed himself "de Leibniz" his use (or rather misuse) of the title seems to have been confined to his letters in German." (Ibid. p. 252). Leibniz was nominated to the President of the academy, though, in August 1713 (Aiton 1985, 319).