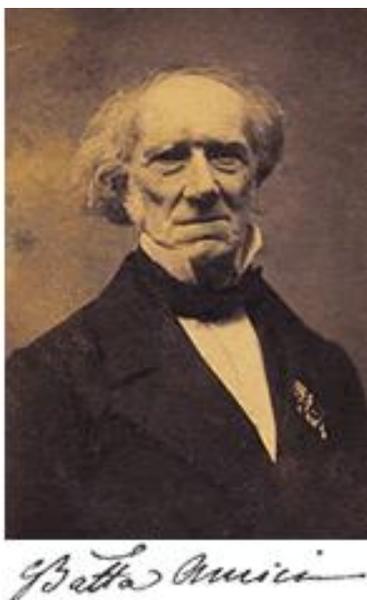


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Exchanges in science between Giovanni Battista Amici and European scientists

THE FIRST VOLUME IN TWO PARTS OF the *National Edition of the works and correspondence of Giovanni Battista Amici (Edited scientific papers)* was recently published (Bibliopolis, Napoli 2006), and will become available within the next few weeks.

In my capacity as Director and Curator of the publication and of the web site <http://gbamici.sns.it>, I would like to provide an inevitably very short summary of the international relationships maintained by this scientist and instrument maker, astronomer and naturalist (Modena 1786 – Florence 1863).



From his *Workshop account book*, kept between 1817 and 1862, and his *Visitors' book*, kept from June 1818 to January 1844, it can be inferred that his international relationships extended from America to Russia, from Boston, Philadelphia and New York to Moscow and St. Petersburg, including several of the leading European capitals (Paris, London, Berlin, Munich and Prague) and numerous universities and research centres.

From the two above-mentioned documents I obtained various names of visitors or purchasers from Poland, Lithuania, Bohemia, Transylvania, Russia and Sweden. In greater detail I will focus on some of Giovanni Battista Amici's important scientific relationships with scientists from Central and Western Europe.

Between 1822 and 1823 the *Visitors' book* records the visit of the Lithuanian Count Joseph Straszewicz and his order for a camera lucida for his country's university. August 1822 saw the visit of Count Vincenzo Kaunitz and his Secretary Giuseppe Likora from Bohemia. The names of Counts Ladislao Esterhazy and Kornis from Transylvania are recorded in 1823. Also in 1823, Amici sold a camera lucida to Count Karaczay. September of the same year saw the visit of Prof. Schöler from Gdansk. In 1824 Amici sold a microscope and a camera lucida to Prince Gustav of Sweden. In September 1826, he received a visit in Modena from two law students from Krakow, Josef Viramer and Michele

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Rostasiricke. In 1833 the Polish count Zamoyschi purchased a pocket microscope from Amici in Florence. Again in 1833 he received a visit from Messers Czachi, from Poland. In 1835 or 1836, Dr. Sauvan from Poland purchased a good quality pocket microscope from his workshop. In May 1837 he received a visit from Major General Tcheffkine, head of the mine engineers of Russia in St. Petersburg, who placed an order for a vertical microscope and a reflecting circle. The name of Alexandr Nikolaevič Draschusov, astronomer and professor of Astronomy at the University of Moscow, is registered in May 1838. In 1848 he sold a microscope and a meridian to Prof. Wallmark of Stockholm, director of the local Technical Institute. The microscope is still conserved. In 1857 he sold a large microscope to professor Josef Hasner of Prague. The same year he sold a small microscope to Dr. August Breisky, dissector at the Prague Anatomical Institute. In December 1861, Moscow Botany Professor, Serge Raczynski, made a purchase of a small microscope and a pocket microscope. In April 1862, Doctor Georg Holdt from Russia purchased a large model microscope with a 160° degree aperture objective, immersed in aniseed and sassafras oil, which is still conserved at the Fondazione Scienza e Tecnica in Florence.

In 1817, through the mediation of Captain Wilhelm von Biela, a German astronomer of Bohemian descent known for his discovery in 1826 of the comet subsequently named after him, Prof. Cassiano Hallaschka had Amici's catadioptric microscope delivered to Prague, which he used in the Physics Museum.

Remembering that instrument, in 1858 Jan Evangelista Purkyne ordered from Amici the small achromatic microscope which at the Paris Exposition of 1855 surpassed all rivals in the continent *hors concours* by virtue of its water immersion objective. But it was from the second half of the 1850s onwards that Amici's microscopes achieved widespread success in Prague. The intermediaries were the Batka brothers, and especially the Bohemian doctor Wilhelm Dusan Lambl, Purkyne's assistant, who during a journey through Italy in 1856 had the opportunity to admire Amici's lenses in Florence.

Naturally he maintained more regular and substantial relations with Englishmen, Frenchmen and Germans.

From the start of his activities Giovanni Battista Amici measured himself against theoretical and practical problems that were debated in the scientific circles of the European capitals, especially Paris and London, against the solutions proposed by the likes of Herschel, Dollond, Ramsden, Bessel, Short, Wollaston, Boscovich, Rochon, Maskelyne, Bouguer, Smith, Barker, etc. The same applies to the botanical observations of Brongniart, Mirbel, Brown, Schleiden, etc. Renowned throughout Europe, Amici maintained relations with some of the great scientists of the times, such as Brewster, von Zach, John Herschel, Airy and Talbot.

In the autumn of 1815 a Wollaston type camera lucida built by Dumotiez was purchased in Paris for use by the Physics Institute of the University of Modena. After examining the instrument and discussing its advantages and defects with Archdukes Maximilian and Ferdinand of Austria-Este, Amici thought he could improve it by adopting a new construction. His version enjoyed great success and he received orders from every part of Italy. Incidentally, J. F. W. Herschel preferred it to Wollaston's model by virtue of its ease of use.

In September 1820, Baron Franz Xaver von Zach visited Amici's workshop in Modena, where he was particularly impressed by the prism reflecting sector that Amici was making. Encouraged by his appreciation, Amici finished the instrument and in the summer of 1822 took it with him to Genoa, where the Baron was living at that time. There, together with Swiss astronomer Johann Kaspar Horner, they tested it by carrying out several observations. Zach was so enthusiastic that he helped Amici look for the optical glass for further prisms from Utzschneider and Fraunhofer in Munich. Between 1822 and 1825 he also published in his "Correspondance astronomique" a total of seven scientific letters from Amici.

In April 1824, John Frederik William Herschel passed through Modena while travelling in Italy. He and Amici used Amici's reflecting telescopes to perform observations of double stars, trying out the new double-image micrometer. On his return to London after the summer, Herschel took one of the micrometers with him and presented it at the first meeting of the Astronomical Society. In the meantime, Joseph Fraunhofer had informed the scientific world of the construction of his large refractor for Dorpat. And since the excellence of the instrument was such that some people believed it to have superseded reflecting telescopes once and for all, on 15 August 1825 Herschel took sides in

the debate with a letter from Slough to the “*Astronomische Nachrichten*”, in which he declared that, “Those who have witnessed the performance of M. Amici’s beautiful Newtonian reflectors, will not readily admit this inferiority.” For several years the two scientists exchanged books, articles and observations on double and triple stars.

Also in 1824 Amici resumed his experiments on lenses after reading Fresnel’s report to the Royal Academy of Sciences of Paris on the Selligie achromatic microscope.

When three years later he made his first journey to Paris and London, along with other instruments he took with him his new achromatic microscope, which prompted great interest amongst instrument makers and naturalists in the two capitals. In Paris it was acknowledged that many observations would have to be repeated and corrected as a result of the great difference between the instruments that had previously been used and the microscope that Amici had brought with him. Vincent Chevalier, who was already making and selling Amici’s camera lucida, wanted to do the same with his achromatic and catadioptric microscopes, and for this reason asked Amici to supply him with the famous elliptical mirror that no one could match.

In London, in the company of Joseph Jackson Lister, Amici’s objectives were compared with the achromatic objectives produced by Goring, Tulley and Dollond, with those made by Lister and by Dr. Hodkin, and with John Cuthbert’s Amician microscope.

When passing through Paris for the second time on his return from London, Amici agreed to sell his achromatic microscope to Adolphe Brongniart, who was very impressed with it and used it for his observations on fertilisation instead of the Selligie that he had used up until then. Mirbel received another further improved model the following year. If we also consider the instrument used by Amici and the one purchased in 1845 by Hugo Mohl for his research on plant cell development, it will be clear that Amici’s microscope played a leading role in this type of investigation and allowed the process to be explained correctly.

In September 1829, George Biddel Airy also visited Amici in Modena. In 1838, using the high-dispersion Faraday glass that Airy had obtained for him, Amici made the hemispherical front lens for the achromatic microscope for Rev. Thomas Romney Robinson, director of the Armagh Observatory in Ireland. The same year, Robinson purchased from the Florence workshop — Amici had moved to Florence in 1831 — a prism reflecting circle, which he assigned to James Clark Ross’s Antarctic Expedition.

The photography pioneer William Henry Fox Talbot and Giovanni Battista Amici first met in Modena in September 1822, when the English scientist, who had read Amici’s paper on catadioptric microscopes, wanted to purchase one of these instruments. The two met again in Modena in March 1826, then in London in 1827. Twelve years later, in 1839, Amici invited Talbot to take part in the First Meeting of Italian scientists in Pisa, of which he was one of the six promoters. Talbot, who in the meantime had heard of the success achieved by Daguerre in fixing images by means of light, decided to take advantage of the event, which would be attended by scientists from all over Europe, to publicise his *photogenic drawings*. For this purpose, he resumed correspondence with Amici, to whom he sent some of his recent works. But it was only after various vicissitudes that in early 1842 Amici received what had become Talbot’s *calotypes*, and presented them in February to a meeting of the Accademia dei Georgofili in Florence.

In his investigations into the fertilisation of phanerogamous plants, Amici could hardly have failed to have met up with Robert Brown, whose acquaintance he had first made in London in 1827. In 1841, Brown took part in the Third Meeting of Italian scientists in Florence and on 17 September, visiting Amici’s workshop, he purchased a vertical microscope with nine objectives. Brown made an important contribution to the success of Amici’s observations on the fertilisation process when he suggested that he should concentrate on Orchids. Hugo Mohl and Wilhelm Hofmeister subsequently confirmed Amici’s conclusions contradicting the theories of Schleiden.

When in the early 1850s the vineyards of half of Europe were infested by cryptogam, Amici, who had been appointed by the Accademia dei Georgofili to make microscope observations of the fungus, engaged in an intense correspondence on the subject with French agronomist Victor Rendu, General Inspector of Agriculture in France, with botanist Jean-François Camille Montagne, with Hugo Mohl, with Rev. Miles Joseph Berkeley, author of the first article on *Oidium Tuckeri* in the “Gardeners’ Chronicle” of 1847, and with Christian Gottfried Ehrenberg.

Amici had met Ehrenberg in Berlin in 1844, and together with him and Alexander von Humboldt had visited the instrument maker Friedrich Wilhelm Schiek. Through the mediation of Emile Du Bois-Reymond, in 1852 Amici notified Ehrenberg of the results of his observations on the grapevine disease, which Ehrenberg presented to the Society of Naturalists in Berlin. Ehrenberg travelled to Florence in October 1858 and purchased a small achromatic microscope from Amici's workshop. A similar model, with a water-immersion objective, was purchased by Ernst Haeckel the following February in Florence, on his way to Messina. This instrument proved crucial for his research on the *Radiolarians*.