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Annibale de Gasparis, the sublime calculator of Parthenope's sky

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Abstract

Annibale de Gasparis was a mathematician and astronomer, director of the Capodimonte Observatory, and senator of the Kingdom of Italy, especially famous for the discoveries of 9 asteroids, the greatest number of discoveries made in Italy throughout the 19th century. His correspondence is scattered in some Italian and European archives and consists of more than 500 letters exchanged with over 120 correspondents, like Herschel, Le Verrier, Arago, Secchi, and Sella. De Gasparis played a relevant role in the mathematical developments of celestial mechanics, as witnessed by Hermite's letter. Furthermore, his scientific reputation went beyond the boundaries of astronomy, becoming famous in popular magazines and the protagonist of verses and books, popularizing the scientific value of his discoveries. Reconstructing the atmosphere of those years, the letters give a clear view of de Gasparis' relationships and scientific interests and present a cross-section of the human kindness of the astronomer.

Keywords: Italian Astronomer, Asteroids, Historical Archives

Riassunto

Annibale de Gasparis è stato matematico e astronomo, direttore dell'Osservatorio di Capodimonte e senatore del Regno d'Italia, famoso soprattutto per la scoperta di 9 asteroidi, il maggior numero di scoperte effettuate in Italia nel corso del XIX secolo.

Sparsi in molti archivi italiani ed europei, la sua corrispondenza è di oltre 500 lettere scambiate con oltre 120 corrispondenti, come Herschel, Le Verrier, Arago, Secchi e Sella. de Gasparis ebbe un ruolo rilevante negli sviluppi matematici della meccanica celeste, come testimoniato dalla lettera di Hermite. Inoltre, la sua reputazione scientifica ha travalicato i confini dell'astronomia, divenendo celebre sui giornali e sulle riviste dell'epoca che resero popolare il valore scientifico delle sue scoperte. Ricostruendo l'atmosfera di quegli anni, queste lettere danno una visione chiara delle relazioni e degli interessi scientifici di de Gasparis e presentano uno spaccato della bonarietà umana dell'astronomo.

Parole chiave: Astronomo italiano, Asteroidi, Archivi storici

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Introduction

The life of Annibale de Gasparis seems linked to the history of the Capodimonte Observatory in a flow of events that saw the flourishing of one of the most distinguished astronomers, both in Italy and abroad, and marked the development of the largest temple dedicated to Urania.

Due to the initiative of Charles of Bourbon (1716-1788), king of Naples, and Celestino Galiani (1681-1753), *Cappellano Maggiore*[1] and prefect of the University, a chair of Astronomy and Nautical science was established in 1735. In the following years, professors of astronomy, like Pietro di Martino (1707-1746) and Felice Sabatelli (1710-1786), and ministers, like Gaetano Maria Brancone (1670ca.-1758) and Bernardo Tanucci (1698-1783), proposed to create an observatory, like that established in Bologna and Pisa. But it was only in 1812 that Joachim Murat, king of Naples from 1808 to 1815, gave it a magnificent building in Capodimonte, worthy of his Muse. Seven years later, on the night of 17 December 1819, the astronomer Carlo Brioschi (1782-1833) made the first scientific observation from the eastern dome of the new observatory. A month earlier, on 9 November, Annibale de Gasparis was born in Bugnara, a small town in the Principality of Abruzzo in the gorges of the Sagittario river (Fig. 1). This town was also the birthplace of the pharmacist Beniamino Toro (*1794), who created the recipe for the *Amaro Centerbe* in 1817, perhaps on the occasion of his wedding, and the painter Francesco Paolo Michetti (1851 -1929), an exponent of Italian realism.

[1] He was a priest who depended on the sovereign, exercising an extensive jurisdiction, including civil, criminal, and mixed, over all the ecclesiastics assigned to the royal service over the royal chapels. Furthermore, he provided for all the religious ceremonies in the Palatine Chapel and the spiritual care of the king and the royal family. Since the Aragonese period, *Major Cappellanus* had the superintendence (*Prefectus Studiorum*) of the university with the power to appoint the rector and the readers. During the French domination, the office was suppressed and then reintroduced with the Bourbon restoration, but he became a simple court official. The oldest *Cappellanus* of the Kingdom of Naples was Joannes de Mesnelis, archbishop of Palermo and proto-chaplain of Charles I of Anjou since 1269. The last one was Filippo Gallo (1806-1890), archbishop of Patras, and chaplain of Francis II of Bourbon (Guarini, 1819).

Figure 1: Photograph of Annibale de Gasparis taken in Naples in September 1867 (Historical Archive of the Astronomical Observatory of Capodimonte).

Thirty years later, Annibale de Gasparis would have strung together a series of discoveries from the top of the Capodimonte hill. So much so the director of the ducal observatory in Modena, the astronomer Giuseppe Bianchi (1791-1866), wrote that the sky of Naples "would almost be called the favorite garden of asteroids by his work"[2] (Bianchi 1851, p.310)

A careful surveyor of the sky

De Gasparis completed his classical studies at the seminary of Chieti, and in 1838 he arrived in Naples to attend the "School of Bridges and Roads[3]".

The Kingdom of the Two Sicilies and its capital experienced a period of great institutional stability, after the brief republican period of 1799 and the French domination between 1806 and 1815, which greatly benefited the social and cultural renewal of the Kingdom. The turbulence of 1821 was far away, and the events of 1848 were beyond any possible horizon. Naples was also crossed by great scientific enthusiasm, because of the presence of prestigious institutions, like the Botanical Garden, the Astronomical Observatory, the Mineralogical Museum, and from 1841 the Meteorological Observatory on Vesuvius, as well as the University and numerous academies. Industrial transformations have also marked fundamental stages, above all the first Italian railway: Naples-Portici, a double track of 7,25 kilometers inaugurated on 3 October 1839. The cholera pandemic that had attacked Italy in 1835 had lost its vigor. So commercial exchanges, interrupted by the various health lines, gave new life to a fragile economy that had not yet grasped the transformations, which were already

[2] After the discovery of Ceres by Giuseppe Piazzi (1746-1826) in 1801, the nine asteroids of Annibale de Gasparis represent the main Italian contribution to the discovery of new planets throughout the nineteenth century. To the list are added the discoveries of Esperia, made by Schiaparelli on 29 April 1861, Josephina and Unitas made by Elia Millosevich (1848-1919) on 12 February and 1 March 1891, respectively the 303rd and 306th of the list of "Minor brothers of the Earth".

[3] The School of Application of the Corps of Engineers of Bridges and Roads was established in 1811 on the model of the École Polytechnique in Paris. Subjects taught included descriptive geometry and geodesy, rational mechanics, physics, and chemistry. Access to the school, divided into two biennia, took place through the competition of young people of any age from the Kingdom of the Two Sicilies. The school had several chairs of applied sciences, which are essential for pupils to become talented engineers or architects. Preliminary studies of mathematical sciences, calculus, including the infinitesimal one, as well as the Italian and French language and literature, were mandatory. A comprehensive proof of these subjects was required at the entrance examination. Until 1836, 145 students were admitted to the school (see: G. Ceva Grimaldi, 1839, pp.1-3).

underway in other European countries and partly in the northern states of Italy (Capaccioli, 2012, pp. 1-3).

At the "School of Bridges and Roads" de Gasparis attended courses in geometry and differential analysis held by Francesco Paolo Tucci (1790-1875) and Salvatore de Angelis (1789-1850). The two mathematicians were the promoters of an analytic-Lagrangian school that was opposed to the synthetic school founded by Nicola Fergola (1753-1824), which favored the use of the classical geometry of Euclid and Apollonius for the resolution of mathematical problems. The Neapolitan school vision of "traditionalists", continued by Felice Giannattasio (1759-1849) and Vincenzo Flauti (1782-1863), was opposed by the Lagrangian-type approach of the "innovators" who believed they could tackle mathematical questions with analytical methods. The algebraic formulas could have replaced the classical geometric figures, providing more effective solutions (Petrocelli 2020). In this methodological dialectic, Fergola's students dedicated themselves to studying new synthetic solutions to well-known geometric problems, lashing out strongly against those who fed on the geometry of Euler, Lagrange, and Monge (Nobile, 1843, pp.138-139).

Returning in 1838 from his stay in Paris, which lasted about two years, Ernesto Capocci (1798-1864), director of the Observatory of Naples[4], was looking for capable young people to instruct in the study of the sky to increase the research activities of the Observatory. This is how the young de Gasparis, Remigio Del Grosso (1813-1876)[5], Michele Rinonapoli (1818-1907)[6], and Christian Heinrich Friedrich Peters (1813-1890)[7] arrived in Capodimonte (Capaccioli, 2009, pp. 140-142).

At that time, the scientific staff of the Observatory consisted of the Director, a second Astronomer, Antonio Nobile (1794-1863), and an assistant, Leopoldo del Re (1804-1872). The latter, appointed to this position in 1833, had left the fellowship role

[4] Since its establishment, the Neapolitan observatory used the title of both the Royal Observatory of Naples and the Royal Astronomical Observatory of Naples. On the letterhead in 1888, commissioned by de Gasparis, the title of Astronomical Observatory of Capodimonte - Naples is used for the first time (see de Gasparis, 1888).

[5] Del Grosso, a father of the Pious Schools, was in the Capodimonte Observatory from 1841, working with de Gasparis, of whom he was a close friend. Two years later, Del Grosso moved to Florence at the Ximenian observatory to collaborate with Giovanni Inghirami until 1845. Back in Naples, he taught in some high schools and, in 1860, was appointed professor of applied mechanics and then of celestial mechanics at the University of Naples (see GARGANO, 2015a).

[6] Arriving in Capodimonte in 1839, Rinonapoli was mainly involved in observations of eclipses, determination of longitudes, and calculations of comet orbits. In 1845 he was appointed adjunct astronomer to the Royal Navy Observatory of Naples, where he was also interested in meteorological observations (see GARGANO, 2015b).

[7] After a short time spent at the Copenhagen Observatory, Peters moved to Göttingen, where he worked with Carl Gauss and the geologist Wolfgang Sartorius, Baron of Waltershausen. In 1838 the baron and Peters went to Sicily for a scientific campaign on Etna, carrying out an intense campaign of topographical surveys. During his stay in Sicily, Peters was commissioned to make the sundial in the Church of San Nicola all'Arena in Catania and the Cathedral of Acireale. From 1840 to 1848, he was at the Capodimonte Observatory, where he realized an accurate series of observations of the sunspots, observed comets like C/1843 D1, the great comet of March 1843, and discovered the comet 80P/1846 M1 on 26 June 1846 (see Kronk, 2003, pp. 129-168). Of liberal ideas, Peters participated with Capocci in the uprisings of 1848, so he was forced to flee to France and then to Constantinople in Turkey, where he was a scientific consultant to Reshid Pasha, Grand Vizier of Sultan Abdul-Mejid II. In 1854 he sailed to America, and in 1859 he was appointed director of the observatory at Clinton's Hamilton College. He continued his studies on the comets and the Sun and discovered 48 asteroids and some galaxies and nebulae (see Gargano, 2015c) .

(*Alunno*) vacant, lacking a young student capable of carrying out scientific tasks and activities with rigor and reliability. In December 1839, Capocci proposed to the Ministry of the Interior to give that position to de Gasparis: "Among the students who attended the Observatory to apply the theoretical knowledge of science to practical uses, the younger Mr. Annibale de Gasparis has now finally presented. For over a year, he has given the most certain proofs for his zeal and ability so that the Observatory now relies on his work with confidence for magnetic, and astronomical observations, etc" (Capocci, 1839). In June 1840, the king of Two Sicilies, Ferdinand II, approved the request. In Capodimonte, de Gasparis began to learn how to extricate himself with scientific instrumentation and devoted himself to studying mathematics and celestial mechanics. He also established a relationship of great esteem and friendship with Capocci and his family[8], animated by the same political sentiments and the same cultural interests.

His first scientific activities are testified by the communications made by Capocci and Nobile at the Sciences Academy of Naples and by de Gasparis himself at the Accademia degli Aspiranti Naturalisti[9] of which he was supernumerary member from 29 May 1842, and then ordinary from 9 July 1846. He participated in the thermometric, hygrometric, pluviometric, and magnetic observations, together with the astronomers and the technician of the Observatory, Giovanni Cortese (1789-1857). He compiled the quarterly summary reports of the meteorological measurements made by some members of the Academy of Aspiring Naturalists in various private places in the city, comparing them with those obtained in the observatory. Published in 1843 an essay in which he compared the rainfall measured in the Capodimonte Astronomical Observatory and the Navy Observatory, located in the historic center of the city, de Gasparis proposed an interesting project to realize an extensive stations network for meteorological observations throughout the Kingdom (de Gasparis, 1843). Meteorological observations were no longer considered easy activities to be entrusted above all to pupils, as Capocci wrote, but "Meteorology requires at the same time the complex calculations of the astronomer, the most profound research, and the careful experiences of the physicist. Now elevated to the very noble rank, embracing all the general physics of the globe, this science, by itself, would require the care of an entire observatory" (Capocci 1840, p.78). In this

[8] From his marriage with Maria Almerinta Giacinta Farina (*1799) Capocci had 7 children: Stenore Filippo (1823-1886), Federico Oscarre (1825-1904), Teugro Beniamino (1827-1878), Dermino Carlo (1830-1914), Euriso Giacinto (1832-1910), Ulrico Gaetano (1835-1852) and Fiorina Almerinta Giacinta known as Romilda Dalmivena Nidia Carolina (*1839). It was a family with profound liberal ideas and involved in the turbulent events of the Risorgimento, starting with the riots of 1848, when, on the morning of 27 January, Oscar Capocci, pulling out the tricolor cockade, exclaimed with the other demonstrators: "long live the Constitution, long live Freedom!" Two days later, the Capocci brothers left Naples for Lombardy-Veneto. To learn more about the biography of the astronomer born in Picinisco, in Terra di Lavoro province (see del Pezzo, 2015).

[9] It was founded in 1838 by Oronzo Gabriele Costa (1787-1867), a professor of zoology, aiming to increase the level of scientific knowledge of students. The Academy was a sort of elite school based on the principles of collaboration and friendship. The members were obliged, under penalty of exclusion, to research in a wide field of naturalistic investigation from geology to meteorology, from botany to physics, and to medicine. The Academy was closed after 1848 due to the participation of many of its members in the Springtime of the peoples. It gave new life in 1861 (see Borrelli, 2003, pp. 95.127) .

way the director of Capodimonte highlights both de Gasparis' trusted skills and the establishment of the new meteorological observatory of Naples on Vesuvius entrusted to the direction of Macedonio Meloni (1798-1854).

In the field of astronomical research, by introducing observations and scientific notes on comet C/1840 U1, discovered by Carl Bremiker (1804-1877) in Berlin, Capocci presented to the members of the Sciences Academy of Naples the orbital parameters calculated in the best possible way "with the Laplace method by Mr. de Gasparis, a fellow of our Observatory" (Società Reale, 1841). This one appears to be the first note in the literature about an astronomical computation by de Gasparis. In 1842, de Gasparis participated in the observation of the Perseids shooting stars, counting 473 in 4 hours, as well as having seen "a large fireball to the southeast"; while a year later, Capocci involved him in observations of comet C/1843 J1, discovered by Félix-Victor Mauvais (1809-1854) in Paris on 3 May. Using these measures, the young astronomer calculated the orbital elements of the comet; and the director of the Observatory was fully satisfied with these values. Finally, in the following years, he assisted the Capodimonte astronomers in the observations and calculation of the orbital parameters of comet C/1844 N1 and the other two: 54P/1844 Q1 and C/1845 D1, discovered by the Jesuit Francesco de Vico (1805-1848) at the Roman College Observatory in Rome.

On the occasion of the vii Meeting of Italian scientists, held in Naples between 20 September and 5 October 1845, de Gasparis presented a table to solve the cubic equations, obtaining great appreciation for the relevant result. The following year he published an article describing the mathematical process to obtain "two very remarkable and suitable equations to determine the inclination of the orbit and the longitude of the node", using only the second law of Kepler. As a practical application of these new formulas, he calculated the orbit of Vesta from four observations of the planet made by Gauss, obtaining "very small errors" (de Gasparis 1846b). In two communications to the Academy of Sciences of Naples, de Gasparis presented a new shorter method to correct the approximate values of the two variables, applying it to calculate the orbit of Vesta (de Gasparis 1846b, 1847) and subsequently to that of Hebe, discovered by Karl Ludwig Hencke (1793-1866) on 1st July 1847. Explaining to the Neapolitan scholars the observations of the new asteroid made at Capodimonte, Capocci said that Hebe "was found by the pupil Mr. Annibale de Gasparis among many little stars in Ophiuchus on the evening of 4th August. Thenceforth it has been regularly observed. The same diligent young mister de Gasparis promptly applied his formulas to determine the place where the new body moves around the Sun, and the result of his calculations conformed to those of misters Faye and Goujon in Paris" (Capocci 1847b). Augustin-Louis Cauchy (1789-1857) took an interest in this work and presented "the method of mister de Gasparis" to the members of the Paris Academy of Sciences, as a simplification of Lagrange's for determining orbits. He placed the method of the young astronomer on par with the solutions given by the most famous mathematicians, such as Lambert, Olbers, and Legendre. This appreciation convinced the Neapolitan academics to ask the King for

the attribution of an "honorary degree in Mathematics so that he can begin teaching it, which will greatly benefit young people who want to learn it". On 25 September, Ferdinand II of Bourbon granted him the degree in Mathematics among the eight planned for the Faculty of Sciences in that year (Rendiconto 1847, pp. 47, 256 and 423).

The gardener of the asteroids

The discovery of Uranus, made by William Herschel (1738-1822) in 1781, was among the first signs of the complexity of the Solar System. Subsequent discoveries: Ceres on New Year's night 1801 by Piazzi, Pallas in 1802 by Heinrich Wilhelm Olbers (1758-1840), Juno in 1804 by Karl Ludwig Harding (1765-1834), and Vesta in 1807, Olbers' second small planet, gave the idea that the area between Mars and Jupiter was heterogeneous and crowded by a great multitude of celestial bodies.

The scientific conjectures did not agree on the nature and formation of this large number of planets. Olbers considered them fragments that belonged to an original planet that had disintegrated due to a violent catastrophe, be it endogenous or caused by the impact of a comet. This hypothesis turned out to be so convincing that the astronomer of Padua Giovanni Santini affirmed that "there was certainly no other scientific hypothesis crowned with happier successes" (Santini 1819, p. 274). On the other hand, Capocci thought it "much more reasonable to assume that... the necessary conditions for the concentration of all the surrounding matter around a single center had not been created. Thus, a considerable number of minor centers have arisen, which remaining independent have... produced many distinct asteroids" (Capocci 1847a). If there were few certainties on these hypotheses, although the idea of the astronomer from Picinisco was not far from the reality of the nature of dwarf planets and asteroids, from 1807 and for the following forty years no astronomer managed to find others.

"When, towards the end of 1845, Mr. Hencke discovered a new asteroid, Astrea, [astronomers expected] to see others gradually recognized" (Capocci 1847a). Unlike Neptune in 1846, calculated by Urbain Le Verrier (1811-1877) through the gravitational perturbations on Uranus, Astrea and the asteroids, that followed over the years, were discovered thanks to "a new powerful means that astronomy had obtained with the famous plates of the Berlin Academy, which offered astronomers the way to recognize a planet, being in them accurately represented all the stars close to the equatorial region up to the tenth magnitude" (Capocci 1847a). The 24 "Stunden" of the Akademische Sternkarten and the related star catalogs were the results of an important scientific initiative commissioned by the Berlin Academy of Sciences (Wolfschmidt 2022). In 1824 Friedrich Wilhelm Bessel (1784-1846), director of the Prussian capital's Observatory, wrote to the leading European astronomers inviting them to collaborate in the creation of the first catalog resulting from an international collaboration. "The knowledge and the description of all the fixed stars in the sky have always and rightly been considered a subject of the greatest astronomical interest", wrote the German astronomer, "if a planet or comet is to be observed off the meridian, this aim will usually only succeed if several stars are always well-determined in its vicinity. If

astronomers work really towards the discovery of all the main planets in our solar system, a complete description of the stars must precede it. Holding it, they will only have to observe a region of the sky through a telescope to immediately decide whether there is something new there" (Bessel 1859). Published between 1830 and 1858, the Berlin plates became a very effective tool for the discovery of new celestial bodies. The experimental verification of Le Verrier's mathematical intuition was also carried out by Johann Gottfried Galle (1812-1910), using the xxi hour, made by Carl Bremiker (1804-1877), of the new celestial charts of Berlin. However, as Capocci wrote in the Calendario di Napoli of 1848, "Thus, it was natural to expect the discovery of other similar asteroids, but no one would certainly have imagined seeing three more discovered in a few months!" Indeed, from July to October 1847, Hebe by Hencke, Iris and Flora by John Russell Hind (1823-1895) were discovered. Commenting on the extraordinary triple discovery, Capocci wrote that "everyone is rightly authorized to imagine an unlimited number in that area which was first considered completely deserted and then recognized as so rich in tiny celestial bodies!" The new star charts were not the only privileged tools for the discovery of new celestial bodies. To these must be added, Capocci wrote again, "the advantages of the more powerful optical instruments for understanding the sky [and] the beautiful project of Mr. Valz, with which it will be possible to proceed methodically in search of all these small bodies" (Capocci 1848).

Benjamin Valz (1787-1867) was the director of the Marseille observatory and a skilled comet calculator. In 1847, he proposed to the Paris Academy of Sciences an observational project to discover all the small planets in just four years with the collaboration of twelve astronomers, each would have to deal with a particular area of the sky using an ecliptic atlas showing all stars up to 11th magnitude within 3° of the ecliptic. According to Valz, these new celestial maps were necessary due to the declination limits of the Berlin maps, which did not cover a large part of the ecliptic area where the probability of discovering new planets would have been greater. Furthermore, Valz underlined the important consideration that the conclusion of the Berlin publication would have taken a few years. The ambitious goal that the Marseille astronomer set himself was "not to find one more planet [but] to find all of them" (Valz 1847). Le Verrier supported this proposal, and in 1852 Jean Chacornac (1823-1873), a young astronomer, was hired to help Valz in this endeavor. The same enthusiasm animated the private observatory of George Bishop (1785-1861), a wealthy London patron who, in November 1846, promoted the product of an ecliptic atlas that would have allowed John Russell Hind to discover ten new planets (Descamps 2015).

Capocci and the Capodimonte astronomers understood the value of Valz's idea for the discovery of new asteroids, "so that within the space of only four years we can expect to see a much greater number discovered" (Capocci 1848). This was the scientific purpose that Capocci and de Gasparis intended to pursue right from the beginning of 1847. The Alunno of Capodimonte began "to mark all the stars up to 14th magnitude included and visible in a non-illuminated field on an area having the ecliptic as its axis and about two degrees

wide, taking advantage of the wise advice of Mr. Capocci" (de Gasparis 1849b). In a communication to the Naples Academy of Sciences of 1849, de Gasparis stated that "a portion of this long work is already complete, and I flatter myself that my eyes and enthusiasm will assist me in completing it... I have often used the plates of Berlin to add the stars, which are slipped out an initial search due to their smallness" (de Gasparis 1849b). In the correspondence with the Dutch astronomer Frederik Kaiser (1808-1872) and the German scientist Alexander von Humboldt (1769-1859), held between 1850 and 1852, de Gasparis described in great detail the method of his observations: about 130 nights a year spent comparing star maps in an area of about 30 square degrees straddling the ecliptic. Thanks to this observational technique, de Gasparis was able to discover new asteroids, "rediscover" those already known, and study some variable stars. "In my research, I had the intuition not to get too close to the ecliptic... I directed my observations to that part of the sky not too far from the opposition point with the Sun... I almost always used the plates of Berlin, adding all the missing stars up to the 11th magnitude" (de Gasparis 1850c). Furthermore, de Gasparis was convinced that the outermost zones of the Solar System were rich in planets, and said he wanted to work hard and incessantly in the hope of finding a new planet beyond Neptune, a thought which he defined as an obsession (de Gasparis 1853).

Having defined the observation technique, he had to choose which telescope to use. Actually, de Gasparis did not have many options. The instrumental equipment of the Observatory counted on only two equatorial telescopes: the so-called Fraunhofer telescope with a 17.5 cm lens and a focal length of 302 cm and Reichenbach's one with an objective of just 8.3 cm and a focal length of 120 cm. These were the instruments purchased by Federigo Zuccari (1783-1817) at the time of the foundation of the new Capodimonte observatory in 1812, which arrived in Naples in February 1815 (Gargano 2015, pp. 75-76)). However, only the smaller telescope was housed in a dome, the northern one, while the Fraunhofer telescope, too large to fit in one of the domes, was placed in the hall of columns and used on the forecourt of the Observatory[10]. Trusting in the technical potential of Reichenbach's equatorial telescope (Fig.2), which was far from cutting-edge in the mid-nineteenth century, de Gasparis discovered nine asteroids between 1849 and 1865. Just one less than those discovered by Hind who, however, in the Bishop's observatory in Regent's Park in London, had at his disposal a Dollond

[10] Observing the sunspots with this telescope on 11 May 1845, de Gasparis, Peters and Capocci noticed a meteor shower passing over the solar disk. "A round body with the size of Mercury... passes through the luminous image of the Sun with a linear motion and a specific speed and then disappears... They all had a well-defined circular shape, very black in the center". The unusual phenomenon was also observed by the Irish astronomers Edward Joshua Cooper (1798-1863) and Andrew Graham (1815-1908) with a Cauchoix telescope installed in their Neapolitan residence at Villa Ruffo. It first impressed astronomers and then prompted them to follow and record it carefully. Comparing the different observations, the Capodimonte astronomers concluded that the "large number of small globes" were nothing more than a heavy meteor shower (see Capocci, 1845, pp. 161-165).

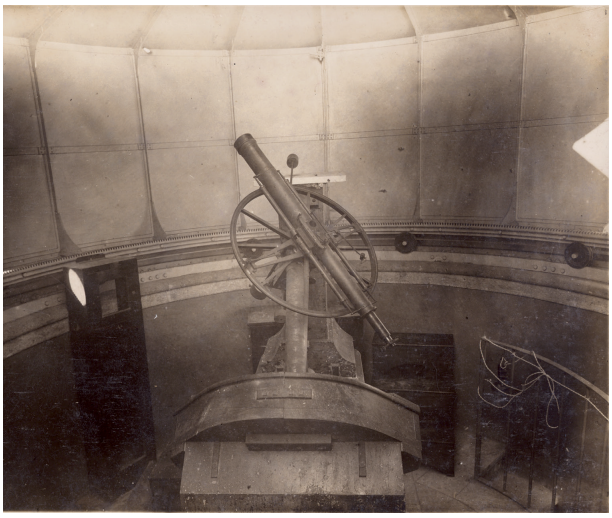


Figure 2: Reichenbach's equatorial telescope in the northern dome of the Observatory, c.1929. (Historical Archive of the Astronomical Observatory of Capodimonte).

equatorial telescope, built in 1836 with an objective of 17.8 cm and a focal length of 327 cm[11]. The discovery of the asteroid Irene joined the two astronomers even more. Hind first observed it on 19 May 1851, four days later, the new small body was found in the sky by the astronomer of Capodimonte (De Ritis 1852, pp. XVIII-XIX). This scientific competition inspired Salvatore Proja (1800-1871), lincean and professor of physics at the University of Rome, to write: "Historians say that the Athenians raised a statue to Anaxagoras for teaching that the heavens were crystal, and the moon a semi-glowing body: *risum teneatis Amici*!... What they would have done for Hind and De Gasperis, I don't know" (Proja 1853).

The nine planetary discoveries

The series of Neapolitan discoveries began on the evening of 12 April 1849 when de Gasparis, following his work scheme, was intent on recording the stars up to the 14th magnitude not present in the xii hour of the Berlin star atlas. A new bright object appeared to him. He continued to observe it in the following nights, and he was able to confirm on 24 April that it was "a new planet", his first asteroid[12]. Out of consideration for his director, "having acted as father and teacher, and bestowed advice and help of all sorts", he offered Capocci the honor of naming the asteroid. Capocci has chosen Hygiea to celebrate the goddess of health, daughter of Asclepius and Epione (de Gasparis 1849a). However, the name of the asteroid was not mentioned in the first communications to the European scientific community. Chosen by Capocci, it was communicated to the King of Naples on 8 May for approval. The English astronomer John Herschel (1792-1871), son of William and known for his extensive catalog of multiple stars, reading the letter from his Neapolitan colleagues on the new discovery, suggested calling the new planet Parthenope, after the mythical founding siren of Naples. In a letter to the English mathematician Augustus De Morgan (1806-1871), he wrote that "no name has yet been mentioned. What do you think of Parthenope (being a Neapolitan)? I should think it will occur as a matter of course for Gasparis if he has any classical

[11] Upon the death of George Bishop, his son George junior first transferred the entire instrumental collection to the new observatory at Meadowbank on the Thames shore, where the observing conditions were better, and then, in 1878, he donated Dollond's telescope to the Naples Observatory, directed by de Gasparis, together with Barraud's pendulum clock, Troughton-Simms altazimuth telescope and a valuable book collection.

[12] The term asteroid was introduced by William Herschel in 1802, after the discoveries of Ceres and Pallas (see Herschel, 1802, pp. 213-232). However, it was long overlooked by calling this class of objects planets or small planets. Herschel's proposal also caused Piazzi to burst out, who believed that the English astronomer's intention was to demean his discovery (see Chinnici, 2020, pp. 22-26).

reading" (Herschel 1849). A few days later, he reiterated the wish in a letter to Scottish physicist James Forbes (1809-1868). But the choice has already been made. The idea of Herschel rebounded in Naples, and, on the evening of 12 May 1850, de Gasparis concluded all his efforts to realize a Parthenope in the sky for Mr. Herschel, as the Capodimonte astronomer wrote to Heinrich Christian Schumacher (1780-1850), director of the journal Astronomische Nachrichten. Afterward to Parthenope discovery, Giovambattista Pianciani (1784-1862), a Jesuit physicist and teacher of Angelo Secchi (1818-1878), wrote that "the discoverer wanted to write in the sky the name of his sunny and beautiful country. He made his siren leave the sea of Posilippo and Mergellina to let her inhabit the celestial space" (Cronaca contemporanea, 1851). Having verified the discovery with subsequent observations, de Gasparis wrote some letters to Italian and European astronomers to inform them. On 13 May he wrote to Schumacher and Le Verrier, to whom, emphasizing that Parthenope was a mermaid and not a divinity, he asked: "the permission of an astronomer so friendly with the sky in order to welcome her to the court of Olympus" (de Gasparis 1850b). On the same day, the Capodimonte astronomer also wrote to John Herschel, confessing "to be indebted to the desire to make him a Parthenope in the sky" (de Gasparis 1850a). He was so happy to have satisfied Herschel, that Schumacher writing to Herschel, with a touch of irony, said that de Gasparis "announces me the discovery of a new planet, of which discovery you are the cause" (Schumacher 1850). The reply of the reserved Herschel was not long in coming. On 27 May 1850, he sent a magnificent letter to de Gasparis in which, flattered by the choice of name, he expressed his "sincere congratulations on the discovery of Parthenope". Furthermore, he wished the Neapolitan astronomer to "soon add another [planet] to the list (? Circe - Themis? - Euphrosyne?) and be the first to obtain a triple planetary crown" (Herschel 1850) (Fig. 3). A wish that came true in less than six months. Indeed, on 2 November 1850, de Gasparis discovered Egeria, an asteroid dedicated to the nymph advisor of Numa Pompilius, the legendary second king of Rome[13]. On this occasion, the French astronomer Le Verrier had the privilege of naming the new asteroid. His father Angelo was the first to be informed of this discovery with a letter dated 4 November in which he recalled that during the last summer holidays, his mother Eleonora wished him "to find as many as four". Because even among scientists the mother is always the mother, There is no Herschel who overtakes!

The scientific and academic celebrity gathered by de Gasparis so quickly and in the most unexpected way, obtaining important commendations and awards, made Francesco De Sanctis (1817-1883) affirm: "I no longer believe in the philosophy, and I became an astronomer. De Gasparis guessed it: knight, professor, and a lot of money. Let's talk about the stars, and leave

[13] Ancient Romans celebrated Numa Pompilius for his wisdom and the original framework of laws and rites he implemented to strengthen the new Roman institutions. According to Plutarch and Livy, Egeria, an archaic Roman deity of springs attributed with prophetic and inspiring powers, taught Numa Pompilius to be a wise legislator. During their meeting and walks in the woods, she dictated to him the political and religious reforms, including a lunar calendar of 355 days and 12 months plus an intercalary one, *Mercedonius*, to accord it with the solar cycle (see Titus Livius, 1485, c3v-c4r).

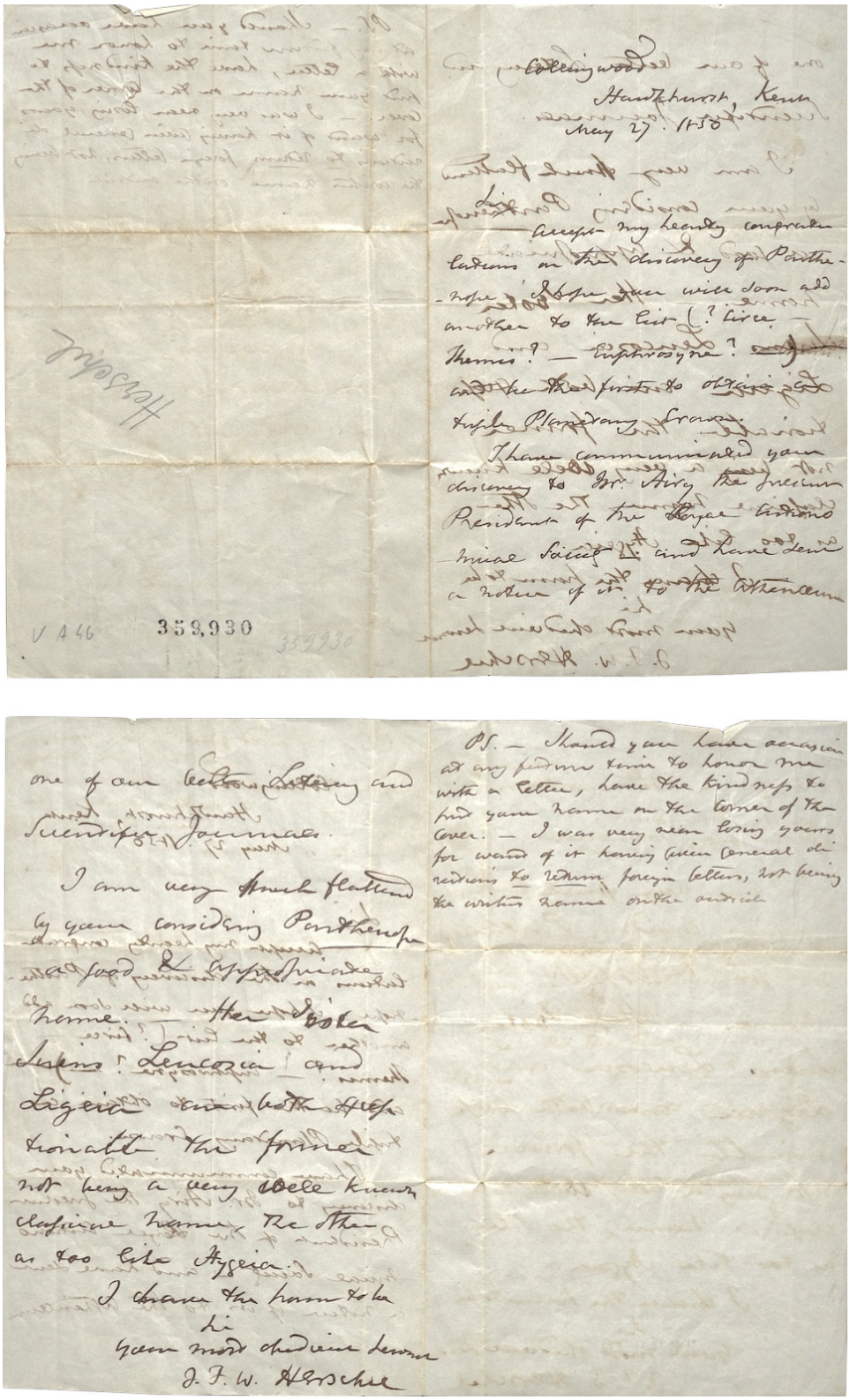


Figure 3: The John Herschel's letter was recently found in the National Library of Naples together with six others signed by the main protagonists of astronomical science and culture of the mid-19th century. In addition to Herschel's letter for Parthenope's discovery, this nucleus of documents includes letters from British astronomers George Airy of the Greenwich Observatory and John Russell Hind, the French scientist François Arago and the Belgian astronomer Adolphe Quetelet. Moreover, the letters of the German scientist and explorer Alexander von Humboldt and the letter signed by Kaiser Frederick William IV of Prussia. (courtesy: National Library of Naples, Manuscripts and Rare Section).

the earth alone" (De Sanctis 1858), while the English industrialist John Ashton Nicholls (1823-1859), meeting the astronomer during his trip to Naples, noted: "I met Annibale de Gasparis, the astronomer [who] discovered three planets; he is quite young and very poor" (Nicholls 1862, p. 75).

The enthusiasm for the Neapolitan discoveries, which occurred in such a short time and made by a young astronomer little known outside the borders of the Kingdom, let to think of abstruse and elaborate observational and computational techniques. De Gasparis described his daily work as a precise investigator of the sky in a clear and easy way, but only in a meeting of the Naples Academy of Sciences. Frederik Kaiser, director of the Leiden Observatory, wanted to highlight the Neapolitan discoveries in the volume on the history of planetary studies that he was publishing, so he asked de Gasparis for details on his very recent discoveries. The astronomer of Capodimonte replied quickly with his usual courtesy, giving deep awareness to the requests of his Dutch colleague. In his volume, Kaiser expressed highly critical considerations toward Italian observers, arguing that "astronomy, which had flourished in Italy at the beginning of this century, subsequently withered away". However, he acknowledged to de Gasparis that he had undertaken an activity that seemed completely extraneous to the Naples observatory while showing disappointment with the techniques used. He wrote: "we can now judge that an endeavor like that of de Gasparis is little proportionate to the resources available at the Naples observatory and more suitable for the amusement of a student than for the notable occupation of an accomplished astronomer" (Kaiser 1851). The book, written in Dutch, was not widely circulated in Europe, and no copy seems to have ever reached Italian observatories.

About nine months after Egeria, on 29 July 1851 de Gasparis, unaware of the severe judgments of the Kaiser, discovered Eunomia, a name imposed by King Ferdinand II, inspired by one of the Hours which is the personification of legality. Egeria's discovery took place two months after Irene, the asteroid identified in the Neapolitan sky four days after the first observation made by Hind in London. Complimenting his colleague from across the Channel, de Gasparis underlined the unusual simultaneity that "enriches science with a unique event of this sort" (de Gasparis 1851). The following year he discovered Psyche (Fig. 4) and Massalia, the latter in honor of the city of Marseilles where Chacornac observed it a few days after the Neapolitan astronomer.

For the discovery of his fifth asteroid, he had sought the availability of Humboldt to give it the name, but the German polymath, complimenting the Capodimonte astronomer for the "brilliant discoveries due to [his] wisdom and in-depth topographical knowledge of the celestial vault and the stellar world far beyond the 8th magnitude", declined the invitation out of a feeling of modesty (Humboldt 1852). De Gasparis, therefore, decided to call the new asteroid Psyche. After the discovery of Themis on 5 April 1853, so named by Angelo Secchi, de Gasparis was forced to interrupt his observational activity. The cold and night humidity caused severe inflammation in his left eye, which could have irreparably compromised his vision. For the next seven years, de Gasparis returned to his original

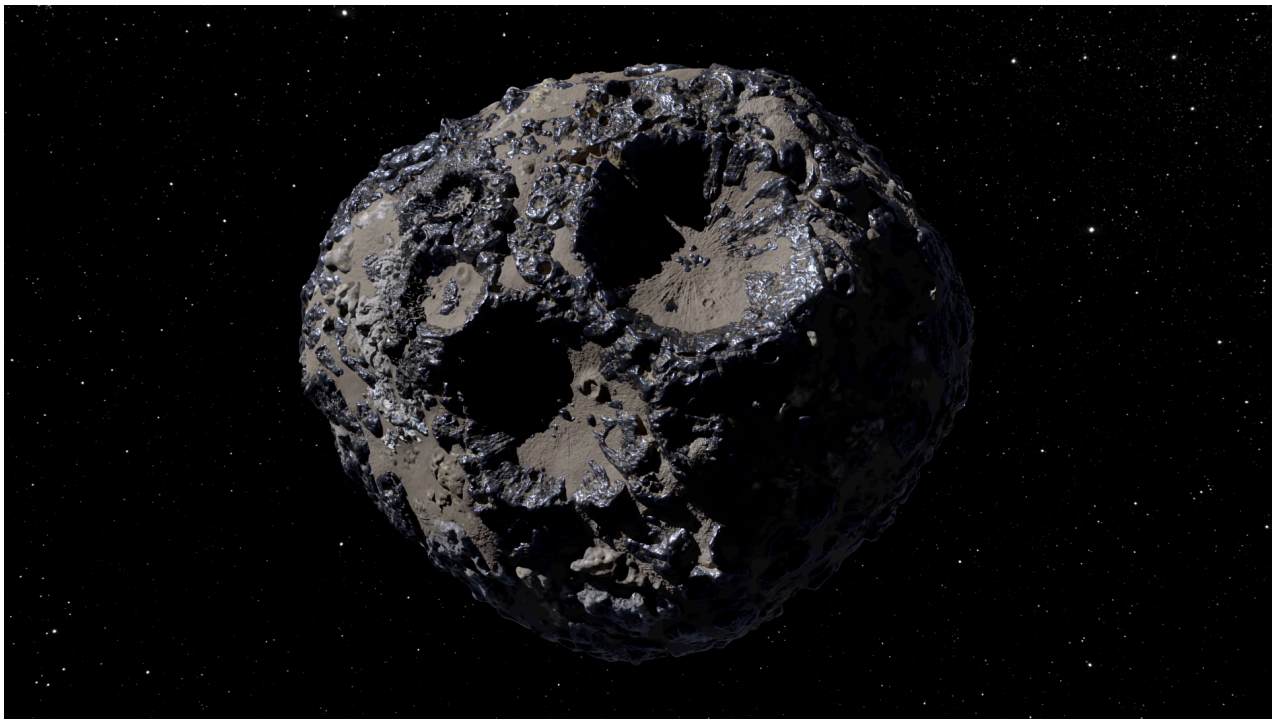


Figure 4: Rendering of the asteroid Psyche, a world not made of rock and ice, but rich in iron and nickel, continues to have a great scientific interest as scientists believe it could come from the nucleus of a planetesimal, a primordial object at the basis of the formation of the Solar System. NASA's Psyche mission, coordinated by Prof. Lindy Elkins-Tanton of Arizona State University will explore this asteroid for the first time to test the hypotheses advanced by astronomers. (courtesy: NASA/JPL-Caltech/ASU).

scientific passion: celestial mechanics, by elaborating mathematical formulations for the calculation of orbits and giving a solution to the three-body problem. He deepened his studies on the Kepler Problem looking for simple ways and sure solutions for the determination of the eccentric anomaly of comets and asteroids. In 1867 he published a work on transcendental functions, which in 1881 earned him the compliments of Charles Hermite (1822-1901) for the elegance and simplicity of calculation of the *functio inexplicabilis*, as Euler defined those functions which can be expressed neither with determined expressions nor with the roots of the equations. Even Wilhelm Klinkerfues (1827-1884), a pupil and assistant of Gauss in Göttingen, praised his studies on the solution of Kepler's equation. Commenting on the judgments of the German astronomer, de Gasparis said he was so proud of them that "he would have gladly donated five of his planets to obtain them" (Mancini 1892).

With the unification of Italy, Capocci and de Gasparis were appointed as Senators of the Kingdom. At the opening of the parliament, which took place on 17 March 1861, the Neapolitan astronomer arrived in Turin with a new planetary discovery (Gargano 2011) which he thus communicated to Terenzio Mamiani (1799- 1885), Minister of Education: "I promised prof. Capocci, director of the Neapolitan Observatory[14], to pay him

[14] For his adherence to the Springtime of the Peoples, Capocci was ousted from the direction and scientific activities of the observatory in 1850. With the arrival of Garibaldi in Naples in September 1861, one of the first acts that the General signed was the readmission to the office of Ernesto Capocci.

homage to the ninth planet, which I was able to discover. Lucky to see my wish fulfilled, I proposed various names, first among everyone that of Ausonia, which Mr. Capocci has adopted. Now the classical name of our classical country is therefore fixed in the sky" (de Gasparis 1861). Finally in 1865 his last discovery, Beatrix, the asteroid dedicated to Dante Alighieri. For this discovery, the poetess Giannina Milli (1825-1888) composed an impromptu poem: "La nuova stella Beatrice", writing these verses: [Italy] "applauded with emotion the happy idea of the philosopher who called you by the beloved name of Beatrice when he saw your pure light. The wise man from Abruzzo fixed his sharp and inquiring gaze on you and thus inscribed in the sky the most solemn homage to Dante all over the world. While every other sacred monument erected to him were to perish, you, traveler of the sky, will remain with the name he eternalized" (Milli 1866). She recited this ode during the meeting of 26 April 1866 of the Academy of sciences, letters, and arts in Modena, of which de Gasparis was an honorary member.

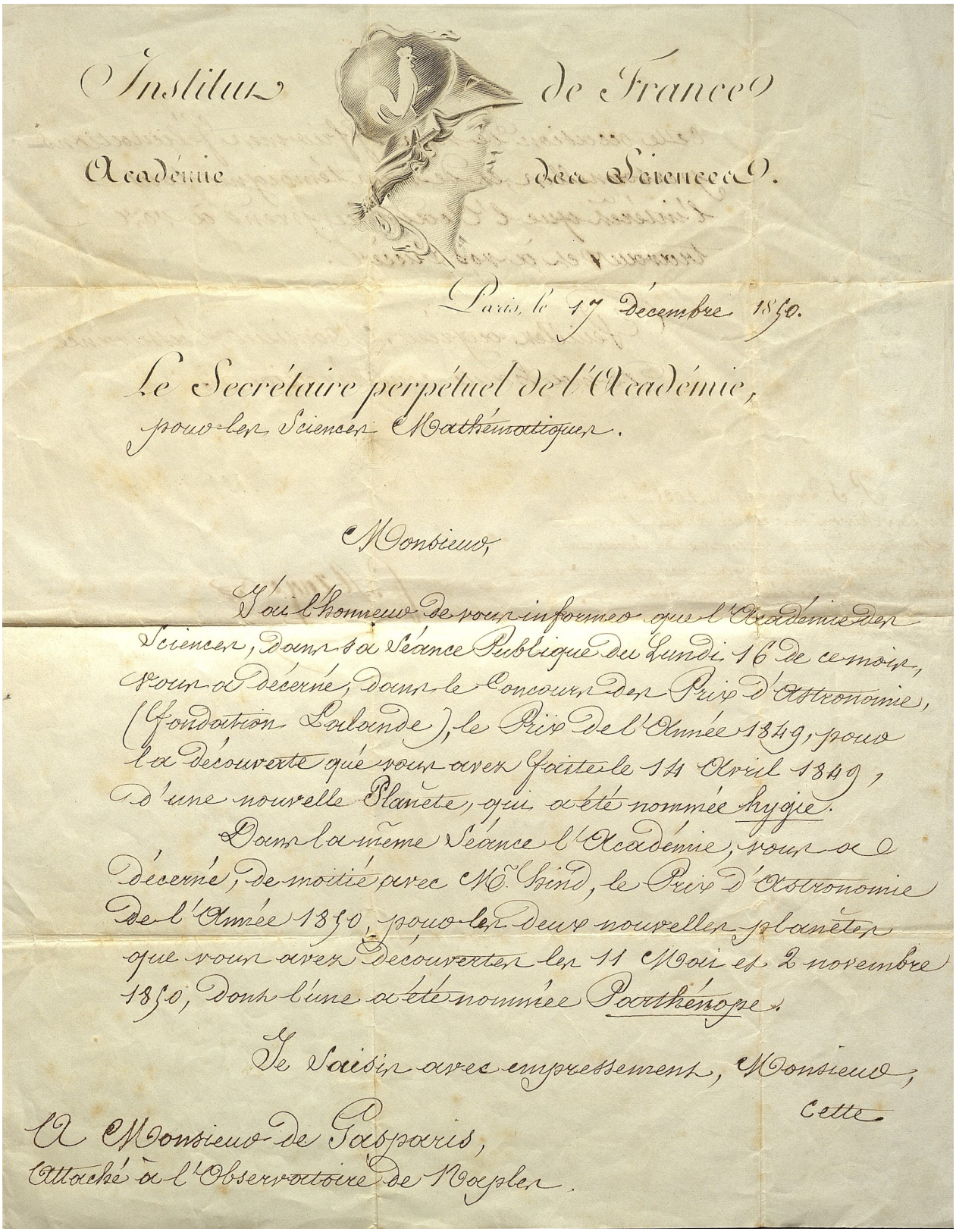
Scientific glory and popular fame

The impressive sequence of discoveries brought him a celebrity in the country and esteem among the eminent scientists of the time, François Arago (1786-1853) and Urbain Le Verrier in France, Heinrich Christian Schumacher in Germany, John Herschel and George Biddell Airy (1801 -1892) across the Channel, just to name a few.

His elegant method for calculating planetary orbits proposed in 1847 has already earned him the appreciation of Cauchy and an honorary doctorate in mathematics. His astronomical discoveries then gained him numerous national and international honors. In 1851[15] the Royal Astronomical Society awarded him the gold medal, making de Gasparis the second Italian astronomer out of five who have received it to date. Furthermore, he was the only astronomer to be awarded the "*Prix d'Astronomie*", better known as the Lalande Prize (Fig. 5), by the Académies des Sciences of Paris for five consecutive years, from 1849 to 1853. Frederick William IV of Prussia awarded him the knighthood of the Red Eagle in 1854, while the emperor of Brazil Pedro II, in 1872, granted him the title of knight of the Imperial Order of the Rose. In his country, the University of Naples entrusted him with the chair of astronomy in 1851, and the following year the Academy of Sciences of Naples awarded him the Prize in Transcendent Astronomy, while at the Capodimonte Observatory, he continued to be an "Alunno", an ante litteram temporary position[16], until 1855 when he was appointed assistant astronomer (de Gasparis 1855). In 1861, Quintino Sella (1827-1884), general secretary of the Ministry of Public Education, announced to him the decision of Vittorio Emanuele II to create him as an officer of the Order of Saints Maurizio and

[15]He held the chair of astronomy on 29 July 1851, then became Full Professor of astronomy, geodesy, and mathematical geography on 29 October 1860, and Professor Emeritus in September 1889. Furthermore, de Gasparis also held the position of president of the Faculty of Mathematical Sciences for the years 1862-1863, 1874, and 1881-1882 (see Gatto, 2000)

[16] A complete list of the honors granted to De Gasparis and the academies of which he was a member is available on the *Polvere di Stelle* web portal at the address: https://bit.ly/3baMCl3 (last access: 2 January 2023).



Institut de France
Académie des Sciences.

Paris, le 17 Décembre 1850.

Le Secrétaire perpétuel de l'Académie,
pour les Sciences Mathématiques.

Monsieur,

J'ai l'honneur de vous informer que l'Académie des Sciences, dans sa Séance Publique du Lundi 16 de ce mois, vous a décerné, dans le Concours des Prix d'Astronomie, (Fondation Lalande), le Prix de l'Année 1849, pour la découverte que vous avez faite le 11 Avril 1849, d'une nouvelle Planète, qui a été nommée Hygie.

Dans la même Séance l'Académie, vous a décerné, de moitié avec M. Hind, le Prix d'Astronomie de l'Année 1850, pour les deux nouvelles planètes que vous avez découvertes les 11 Mai et 2 novembre 1850, dont l'une a été nommée Parthénope.

Je saisis avec empressement, Monsieur, cette

A Monsieur de Gasparis,
Attaché à l'Observatoire de Naples.

Figure 5: Diploma of the *Prix d'Astronomie* for the discoveries of Hygiea and Parthenope signed by Francois Arago (courtesy: National Library of Naples, Manuscripts and Rare Section).

Lazzaro Together with the knighthood granted to Giovan Battista Donati (1826-1873) of Florence and Giovanni Virginio Schiaparelli (1835-1910) of Milan,

Figure 6: Sketch for the discovery of Beatrice in 1865 by Luigi Borgomainerio published under the pseudonym of Don Ciccio in the *Strenna dello Spirito folletto* of 1866. (courtesy: Biblioteca di Storia Moderna e Contemporanea - Rome).

the three astronomers formed "a beautiful triad of illustrious discoverers of celestial bodies, to whom the Sovereign today attested his consideration" (Sella 1861).

The political role played by de Gasparis and Capocci in the new Italian institutions came to a partial renewal of the scientific instrumentation of the Neapolitan Observatory. In 1861 the two senator-astronomers persuaded De Sanctis, minister of Public Education, to assign the necessary funds for the purchasing of a new telescope: "I come to beg you to provide this Observatory, without further delay, with an achromatic telescope with an objective from five to six inches of aperture, specially mounted, to be used in the search for new planets and comets... since de Gasparis had to use it above all in these searches in which he achieved so much celebrity" (Capocci 1861). The Ministry granted a special fund for the purchase of an equatorial telescope which was commissioned from the Merz company of Munich. The first Italian telescope, with an objective aperture of 13.5 cm and a focal length of 220 cm, arrived in Naples in September 1863 and was housed by de Gasparis in the east dome of the Observatory (Gargano 2017, pp. 116-122).

Appointed as director of the Capodimonte Observatory in 1864, de Gasparis made every effort to strengthen the Institute and gave new impetus to meteorological and geomagnetic measurements. Although he was a pure celestial mechanic, he broadened the scientific horizons of the Observatory towards the astrophysical studies of the stars, supporting the foundation of the "Società degli Spettroscopisti Italiani", the first scientific society dedicated to the new science (Chinnici 2008). In 1869 de Gasparis managed to obtain further substantial funding to purchase a new meridian circle with an aperture of 165 cm and a focal

length of 202 cm built by the Repsold firm of Hamburg (Gargano 2017, pp. 128-130). Furthermore, in parliament, he worked hard to ensure that the Chamber of Palazzo Madama allocated the necessary funds to the Brera Observatory to purchase a new telescope for Schiaparelli's studies on the cartography of Mars. In this circumstance, De Sanctis praised the astronomer of Capodimonte for having given a so noble speech that it seemed to hear the music of the stars mentioned by Pythagoras, and for having transformed the discussion on a bill into a scientific party. "Already famous for ancient discoveries, the old astronomer… demonstrated a high nobility of mind, he took the young Schiaparelli under his patronage... and said to him: Italy is not rich enough to provide you and me a telescope... get it you, and give prestige to Italy with other discoveries" (Taddei 1878). The renewal of the instrumentation of the Capodimonte Observatory continued throughout the 25 years of direction. The volume "*Sullo stato del R. Osservatorio di Capodimonte*", published by de Gasparis in 1883, represents the direct evidence, sober and plain, of scientific research and instrumentation of the largest among the Italian observatories of the time.

However, his celebrity went beyond the boundaries of astronomy, finding space among the ordinary people and writers who dedicated numerous poems to him. The scientific value, unanimously acknowledged to the Capodimonte astronomer, is testified by many essays. The songs and stanzas written for the discovery of Egeria by Giovanni Chiaia (1799-1888), poet and magistrate, the ode for Beatrix by the poet Giovanna Milli, the sonnet by Giovambattista de Santis, a priest from Rieti, and the works dedicated to him by Angelo Camillo De Meis (1817-1891) and Vincenzo Caracciolo (*1853), nephew of the 4th prince of Marano, are a vivid proof of the celebrity of the astronomer and his discoveries. The "Giornale del Regno delle due Sicilie" and the humorous newspapers of the time, such as "Arlecchino, Il lampione, Il palazzo di cristallo", and "Lo spirito folletto" published many articles on discoveries and celebrity of de Gasparis. Countless joking and burlesque articles testify to his popularity (Fig. 6). He became the protagonist of puzzle games and was appointed as Minister of Foreign Affairs together with Plato in Education and Giuseppe Verdi in the Navy (Dispaccio Elettrico, 1861, p. 376). Commenting on the poor performances of the Marchand and Ellenberg's theatre, an editor of the magazine "Il palazzo di cristallo" wrote that "this mechanical theater from the Netherlands wants to create a de Gasparis audience, educate the spectators, and introduce them into the secrets of the Sun, Moon and other planets". The same journal reports that "de Gasparis has found a planet at the bottom of the sock" and "romantics go to sleep in Capodimonte within range of de Gasparis's telescope" (Il Palazzo di cristallo, 1856, Vol. I, pp. 126, 606 & 755). The astronomer is mentioned in the comments for the construction of new railways: "De Gasperis will be able to use it for free with the agreement to discover some planet from the observatory of the Moon to be engaged as prima donna at the S. Carlo theater" (Il Palazzo di cristallo, 1856, p. 114), and among the things to do in Naples: "Demolish the museum to make the telescope of de Gasparis easily visible from via Toledo" (Il Palazzo di cristallo, 1856, Vol. I, p. 126). The magazine "La Favilla" reports a story that

seems to have come out of the book "Cuore" by De Amicis: poor Celestino Romaniello, a talented orphan student, caused so much emotion during the exams that "the distinguished Mr. de Gasparis invited that dear boy at the observatory for a meeting, assuring him that he would especially recommend it" (Un bravo fanciullo, 1863). Furthermore, with the discovery of Parthenope, the author of an article craved de Gasparis's mastery of tracking down "new planets in the sky, while I on the ground with the lens in my eyes, now with the binoculars, I wander around Toledo in vain, I wander around Chiaia in vain. Dear de Gasparis, tell me the recipe for making discoveries, lend me your telescope. As soon as I have discovered a worthy planet... I will call it Neapolitan beauty!" (Il Palazzo di cristallo, 1856, p. 697). And finally, at the hypothetical announcement of Le Verrier, "the astronomer who foresees the planets from his desk observatory that a hundred planets, between Mars and Jupiter, would have been discovered in 1866... de Gasparis hurried to Capodimonte to discover about fifty of these hundred... [because] when de Gasparis hoists the incredible telescope, the firmament trembles, and the planets appear themselves in front of its lenses". After all, as Adolfo de Cesare (1828-1901) wrote in the journal, "the planets will remain calm and not be afraid of being denounced by de Gasparis's terrible telescope as long as the fog will be permanent even at night on the proscenium of the sky" (Il Palazzo di cristallo, 1856, Vol. I, p. 558 and 1013).

Conclusions

The reconstruction work of the scientific correspondence of Annibale de Gasparis made it possible to census and catalog more than 500 letters, exchanged with over 120 correspondents and distributed in around 40 Italian and foreign cultural institutions. This historical research was presented in Pisa in September 2019 during the xxxix annual congress of the Italian Society of History of Physics and Astronomy and on the occasion of the Annibale de Gasparis Workshop, held in Naples to celebrate the second centenary of the astronomer's birth (Gargano 2020). The study of the letters has continued over time with the analysis of the themes and the discovery of new documents and archival collections, such as the one identified at the National Library of Naples (Redazione Media Inaf 2022). This study helped to understand and clarify de Gasparis' scientific relationships and interests and brought out the atmosphere in more detail over the years of his cosmic explorations. To highlight all recognized documents, a virtual archive of the Annibale de Gasparis Correspondence was created that can be consulted on the INAF portal for cultural heritage at the address: tinyurl.com/correspondence-degasparis.

The letters are characterized by an extreme synthesis and by analyzing them four main fields can be identified: astronomical observations and discoveries, renewal of the Observatory's instrumentation, studies of celestial mechanics, and familiar topics. In the years of his discoveries, the correspondence contains annotations and observational data, but never illustrations or sketches. The only exceptions are a letter to Le Verrier on the observation of Jupiter in 1864 and a communication from the University of Naples recycled first for administrative use and then for a sarcastic drawing on the Turkish-Russian war of 1877-78. In addition to a sibylline verse that

reads: "I have this fanatic smell / in my big pocket / against the fetid smells of my friend [Abbott?] / which [who?] always". Besides the scientific interests outlined in the previous paragraphs, from the few family letters, Annibale de Gasparis appears as an affectionate and considerate man towards his wife and children[17], as well as reserved and discreet about his thoughts. Even in the tensest situations, he didn't indulge in comments or judgments above the lines. "Absorbed in my little family in which, with whom and for whom I live, I don't take trouble at all of the affairs of others (even if they were people of a close acquaintance or kinship)" (de Gasparis 1852). A man of "small stature" and with a beard that he wore "almost entirely" (de Gasparis 1848), Annibale de Gasparis was a simple and gentle person, far from "luxury, parties and pompous receptions". He liked theater, the light and popular one staged at the Partenope Theater and San Carlino Theater, where a young Eduardo Scarpetta (1853-1925) performed, and the comic opera in music and prose of the Mercadante Theater in Largo delle Pigne.

In 1889 the signs of progressive paralysis and physical suffering forced him to abandon all public office. Although also suffering from almost total loss of sight, de Gasparis found the only relief in his youthful passion for classics, reciting Virgil and Ossian by heart (D'Ovidio 1892). The day after the death of Annibale de Gasparis, which took place on 21 March 1892, the president of the Senate, Domenico Farini (1834-1900), paid homage "to his lofty ingenuity, to his sublime calculations, to his mind, admirably suited to the most abstruse speculations, to the scientist accustomed to pointing his gaze and intellect upwards" (Farini 1892).

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[17] In 1848 he married Maria Giuseppa Russo (*1825) and had nine children: Teresa (1850-1856), Eleonora (1852-1856), Alberto (*1853), Aurelio (*1860), born on the same day as Garibaldi's triumphal arrival in Naples, Anselmo (1869-1871), Angela, Amedeo, Chiara, and Maria. It is noteworthy that the names of de Gasparis's sons begin with the letter A, like his name and that of his father Angelo.

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