

Maurizio Buscalioni: The First Director of Caracas Astronomical Observatory

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Abstract: The astronomer Maurizio Buscalioni (1856-1914) who came from an Italian family of renowned political and scientific careers, served as the first director of Caracas Astronomical Observatory in 1890 as well as its first meteorologist. He outfitted the observatory with cutting-edge equipment, concentrating on meteorological and astrometric instruments. The first comprehensive measurements of atmospheric pressure, temperature, humidity, and precipitation were made under his direction. He did astrometric measurements to ascertain the geographic latitude of the observatory and the official Venezuelan time. All of these initiatives were developed in collaboration with astronomers and observatories in America and Europe. Even so, unknown aspects related to his training and career in natural sciences and mathematics, apparently intertwined with important changes in his life, constitute a challenge for historical research in science and in this work we present new elements that may answer some important questions.

Keywords: Carlo Buscalioni, Luigi Buscalioni, Jean Jacques Anatole Bouquet de la Grye, Louis Désiré Léon Brault, Luis Ugueto, Société de Géographie, Observatorio Cagigal, Caracas Astronomical Observatory, Padre Denza, Schiaparelli, Occultation de Jupiter, El Cojo Ilustrado, Cometa di Halley, Ruolo della rifrazione atmosferica, Brigandajes Politiques.

1. Origins and the Buscalioni Family

Maurizio Ermanno Giuseppe Giovanni Antonio Buscalioni was born on August 15th, 1856 and was baptized the same day, right after birth, in the church of Santa Maria di Superga in Turin. His Father, Carlo Michele Buscalioni (1824-1885), was a very well known politician, university professor and writer, and his mother was Clara Angela Maria Teresa Anselmetti (1832-1914). His siblings were Carlo Giacinto Pietro Antonio (1855-1892), who became a well known astronomer, Rosa Lucia Clotilde (1858-1935), Vittoria Massimina Francesca Clotilde (1860-1947), Luigi Napoleone (1863-1954), who became a well known botanist, Pietro Antonio Gerolamo (1869-1945) and Clotilde Genojeffa Giuseppina Scolastica (January 3, 1871 - July 27, 1871). Since Carlo was also an astronomer, it is important to give a brief account of his career which began with his enrollment in the School of Mathematical Sciences at the University of Turin in 1883, where he obtained a degree in Mathematics on July 8th, 1889. Carlo also held the position of Assistant for Meteorology at the Astronomical Observatory of Turin in the years 1888 and 1889 and he joined the fourth group who made observations with Reichenbach meridian circle.¹ Carlo was also in charge of the observations of contacts and other phenomena that could occur in the partial annular solar eclipse of June 17th, 1890 (*Memorie* 1891), two

¹ This observatory was founded in 1754 and one of its major achievements about that time was the determination of meridian arc of Turin by Giovanni Battista Beccaria (1716-1781).

years before his death. On the other hand, and also pursuing a scientific career, Luigi obtained a degree in Medicine in 1888 and then in Natural Sciences in 1889, also in the University of Turin and he was very well known abroad for his scientific production in the most diverse fields of botany.² In that sense, Maurizio was part of a scientific trilogy within the Buscalioni family.³

2. His Personal Life, Intense Travelling and Political Activities

Maurizio got married with Angela María Llambías Morello (1858-?), native of Gibraltar, on August 22nd, 1888 in Morocco and their three children were registered after birth with the names of Clotilde Giuseppina Scolastica Buscalioni (1889-?), who was born in Marseille, France; Nepomuceno Venezolano Buscalioni Llambías (1891-1965) and Cleopatra Dominga Buscalioni Llambías (1893-?), who were born in Caracas, Venezuela.⁴ Maurizio acquires the Venezuelan citizenship on February 28th, 1894 and in this very same year he left the astronomical observatory in Caracas and the country for good.⁵ In an open declaration before his departure, he said that the reason for doing so was related to a severe illness. The fact of the matter is that Maurizio died in Turin, two decades later in 1914 (*Almanacco italiano* 1915)⁶ and the nature and evolution of this alleged illness is completely unknown. Due to the political unrest at the time in Venezuela,⁷ it is not impossible that it was an excuse to justify a sudden departure from the country. Another fact in his life was his intense travelling through Europe, Africa and America, which began in Greece in 1880. In that year, Carlo Michele, his father, founded the Philellic League in Turin, to promote the autonomy of Greece, i.e., its true and not just political independence from the Ottoman Empire, with the creation of a zone of influence for Italian foreign policy. In this way Carlo Michele was the Commissioner President of the League Central Committee in Turin and Maurizio was the League Commissioner in Corfu, Greece. After that assignment, the sequence of places and countries visited by Maurizio were Massawa in the Italian Eritrea in 1882, Algiers, Ménerville (Thénia after 1962) and Biskra in Algeria since 1884, Morocco in 1888, Caracas, Venezuela, in 1890 and his return to Europe in 1894. In his book *Brigandajes Politiques*, published in 1906, there is a very critical narrative based mainly on his experience about African affairs and politics, which unfortunately in most cases were characterized by a blurry or an almost indistinguishable borderline between organized crime and failed and/or colonialist governments.

An aspect that stands out when opening the book is that Buscalioni signed as the former director of the astronomical observatory in Caracas and that is also the case with all his publications written after 1894.

² Luigi Buscalioni was director of various botanical gardens and also a professor of botany at various universities in the fields of plant anatomy and physiology, cell biology, genetics, morphology, teratology, ecology and phytogeography, as well as microscopic techniques applied to plant parasitology.

³ Luigi and Maurizio developed their scientific research in South America, where Luigi organized an expedition to the Amazon region in order to collect 5000 plant samples (Buscalioni 1901) and Maurizio was engaged on astronomical observations in Venezuela.

⁴ The difference in their last names is related to different legal requirements in France and Venezuela.

⁵ In our research we were not able to know in a complete way the actual whereabouts of his children and wife after that date. It is known that some of his children died in Spain during the next century.

⁶ In this publication, the deceased Maurizio Buscalioni is referred as (see *Necrologio*, Ottobre 1913-Settembre 1914) “già professore della Università e già direttore dell’Osservatorio Astronomico di Caracas nel Venezuela, † Torino, giugno”, i. e., his death took place in June of 1914 and not in 1894, as it was presumed as a consequence of a severe illness in most of the previous references.

⁷ In 1893 a period of economic recession began due to an important decline in the prices of export agricultural items. As this recession was getting deeper in time and without any consultation, the government made effective a reduction of employees' salaries between 10 and 30%, which caused a major impact in the people and a severe confrontation between the government and opposition parties.

3. Problem of Unknown Education and Training: Unexpected Clues Came from the *Géographie Société* in France, the Travelling Journalist Franzoj and an Attempt of Robbery in the City of Biskra

To date there is no documentation which can tell us how Maurizio Buscalioni was able to acquire his knowledge in meteorology, astronomy, physics and mathematics.⁸ It is a real challenge for researchers in history of science and if this difficulty persists, it could naturally lead to question the existence of formal studies of any kind. However, in our research it was found that Maurizio Buscalioni in 1884, while he was in Algeria, became a member of the *Société de Géographie* in France⁹ (*Liste* 1885). For his acceptance as a member, Maurizio Buscalioni and his professional profile had to be presented and endorsed in an open meeting by two members of this society. Then, this presentation was done by two outstanding figures, both in engineering and science, such as Jean Jacques Anatole Bouquet de la Grye (1827-1909)¹⁰ and Louis Désiré Léon Brault (1839-1885). In their presentation, they should have referred to the proven professional performance of a young Maurizio Buscalioni, who they had to know personally very well and then there is no question that these three people share the same environment for long enough time. This reasoning leads to think that in fact Maurizio Buscalioni should have a formal education or some kind of equivalent systematic studies in the aforementioned fields.¹¹ Also, this training in depth should happen before 1880, when his intense travelling began, because after that year there was no room for this kind of time-consuming learning activity. A piece of additional evidence came from the journey of the travelling journalist, Vercelli Augusto Franzoj (1848-1911),¹² when he was in Massawa in 1882 and then ventured into the interior of Abyssinia. He wrote down the following vivid memories of his experience on paper: “Here I have been for two weeks with my good traveling companion Maurizio Buscalioni” (Franzoi, 1892). And in another reference related to Franzoj, we find:

In 1882 we find him [he refers to Franzoj] in Alexandria in Egypt, then in Cairo and then in Suez, where on May 13th he embarked, in the company of a scholar of natural and mathematical sciences, Maurizio Buscalioni (Surdich 1998).

There is still another important reference related to his professional skills and his association to the *Société de Géographie* and it came as a press release from a newspaper in the city of Batna which describes an attempt of robbery in the city of Biskra in 1884, both of them in Algeria:

In a modest guest room on the ground floor, Mr. Maurice¹³ Buscalioni has been living for a month, traveling with a small library and a considerable number of manuscript volumes which will later form a complete work of mathematics, physics, astronomy, etc. The day before yesterday, at 10 o'clock in the evening, taking advantage of a moment of his absence, criminals had started to lose the wall to enter his room and rob him. Fortunately the thieves were disturbed by passersby when only a few centimeters separated them from their goal. Mr. Buscalioni undertook to make a trip of several years to the country of the Tuareg people, in correspondence with the *Société de Géographie* of Paris, and saw himself obliged, from the start, to suspend his work and hide with a friend all his scientific equipment until his departure from Biskra, with the hope of finding more tranquillity and security in the less civilized regions of the South (*L'Echo* 1884).

⁸ Knowledge he demonstrated as director of the astronomical observatory in Caracas.

⁹ Which was founded in 1821 and it is the oldest in the world.

¹⁰ Who was at that time president of the central committee of this society and later he became the president of the *Société Astronomique de France* from 1892 to 1893.

¹¹ Then, his presenters at the *Société de Géographie*, as renown masters, most probably were his instructors and/or mentors at some degree of commitment.

¹² Who was already famous for having brought the mortal remains of the explorer Giovanni Chiarini (1849-1979) to Italy.

¹³ In several reports and articles, Maurizio Buscalioni used the french version of his first name.

This incident provides by accident important relevant information about Buscalioni's scientific activities in Africa during and after 1884, mostly in Algeria, which should last at most until 1889. It can be inferred when the fact that his membership in the Société de Géographie ended in 1889¹⁴ is combined with the information provided in this press release, which reveals a commitment and/or project with members of this society for several years. Another interesting fact is that Buscalioni was working with a portable scientific equipment,¹⁵ which should include scientific instruments as the actual target for a robbery, aside books and manuscripts. This means that Buscalioni was capable of getting the most in results with minimal resources, which is something that his performance showed at the astronomical observatory in Caracas (Hubschmann 1988).

4. His Arrival and Work as Astronomer in Venezuela

The best account of the surprising arrival of Maurizio Buscalioni at the astronomical observatory can be found from the words of the Venezuelan astronomer Luis Ugueto Pérez (1868-1936), Buscalioni's mentee and successor as director of the observatory:

The Italian scientist Mauricio Buscalioni, an expert in astronomical questions, appears unexpectedly in Caracas. The government deemed it appropriate to make use of Buscalioni's knowledge and appointed him director of the observatory with a monthly allowance of four hundred bolivars¹⁶ (Hubschmann 1988, p. 8).

In our research we found elements that support the possibility that the retired commander of the Italian army, Cesare Alberto Blengini (1838-?), might have played a fundamental role in this appearance of Maurizio Buscalioni at the observatory in 1890. In 1880 Blengini became a member of the Philellic League of Turin (Blengini 1884), founded by Carlo Michele Buscalioni and on December of the same year, he made a first epistolary contact with Maurizio Buscalioni as the League Commissioner in Greece (Blengini 1884), country where Blengini served as consul¹⁷ of the United States of Venezuela.¹⁸ There is no question that Blengini must be aware after that meeting of Maurizio's professional skills and expertise and later, in his condition of consul, he should know about the needs of the Venezuelan government in regard to find a qualified personnel for the project of the astronomical observatory in Caracas, which was created in 1888. Even though we continue with the search of evidentiary government documentation, our assumption is that Blengini intervened to open the necessary official channels as soon as he had information about this project and made in this way a connection with a potential Maurizio's successful role. Once in charge of the astronomical observatory and the major developments under his service took place, Maurizio Buscalioni said:

This observatory has long enjoyed the precious relationships of other more ancient ones in the Americas, and to date I have also had the pleasure of receiving support in this regard from the two great scientific notables of Italy, Mr. Schiaparelli, director of the Astronomical Observatory of Milan, and Father Denza, director of the Italian Central Meteorological Observatory of Moncalieri and of the Vatican Observatory of Rome; who, in addition to having already sent very useful books and publications to this institution, declare themselves ready in our favour, recognizing the importance of our situation, and all with very flattering expressions (Hubschmann 1988, p. 10).

¹⁴ Information kindly provided by the Société de Géographie.

¹⁵ Which, with very high probability, was also used in 1882 during his travelling with Franjoj.

¹⁶ Which was a very good salary at that time.

¹⁷ In the previous year he served as consul of Argentina in Moscow, Russia. The commitment with Venezuela, which began in 1880, lasted several terms as it is accounted in the *Gaceta Oficial* and it went beyond 1890.

¹⁸ That was the official name of the country at that time.

and in regard to the necessary everyday routine, Buscalioni also said:

Meteorological and astronomical observations have continued. Caracas time is marked by the lowering of a national flag, raised five minutes earlier. Daily meteorological observations are published in the *Gaceta Oficial*¹⁹ and recently in the *Diario de Caracas*.²⁰ The calculations of occultations and Lunar eclipses were made for Caracas and also solar eclipses. A statistical summary of the climate of Caracas was published on April 15, 1894 in the Public Wealth Bulletin. Other astronomical observations were made of the Moon with Mars, transit of Mercury through the disc of the Sun (Hubschmann 1988, p. 13).

Buscalioni provided the observatory with equipment that corresponded to the state of the art of the time, concentrating on meteorological and astrometric instruments and also created an environment (Hubschmann 1988) appropriate for the work to be carried out.²¹

5. His Most Relevant Scientific Research and Outreach

As scientific outreach we can find publications in a Venezuelan journal devoted to art, politics, history and sciences, which was known as *El Cojo Ilustrado*,²² in which Buscalioni introduces two interesting concepts, the solar chronometer or clock and the solar cooker. For the solar chronometer or clock, Buscalioni developed a simple instrument where a first component was a chart with a closed curve (just valid for Caracas as location) based on what is known as the equation of time and this chart should be placed on a horizontal table. The second component was a top which was hanging perpendicularly to such a chart, on which, due to the effect of the shadow projected by the top, the real time can be read directly while there is daylight (Buscalioni 1893). The cone solar cooker was invented by Augustin Mouchot (1825-1912) in 1878 and the original purpose was to provide cooking power to French soldiers in Africa. The reflecting cone has a span of 90° and a hollow cylinder was placed along its axis, which could be oriented parallel to solar rays. These rays reach perpendicularly the hollow cylinder that contains the food to be cooked. Clearly, Buscalioni must have known this device first-hand while he was in Algeria and then, he envisioned it as an alternative to the use of coal as fuel in a Venezuela with an economic crisis (Buscalioni 1894). In regard to his scientific research,²³ it could be highlighted that in 1892 Buscalioni as astronomer was able to predict and observe a very rare event where there was an occultation of Jupiter and four of its largest moons, with their immersion behind our Moon and in the emersion only three of these moons were directly visible. The missing moon was Europa and its shadow was observed on Jupiter in what was a solar eclipse on the planet (Buscalioni 1892a and 1892b). Also, in 1910 Buscalioni wrote a book *Comete e catastrofi celesti. Estratto dagli annali astronomici in*

¹⁹ The official journal for government announcements and communications.

²⁰ Main newspaper in Caracas.

²¹ These resources can be listed as: equatorial telescope, meridian circle with large telescope, sidereal clock, marine chronometer, sextant, Piazzzi circle, declination compass, inclination compass, various thermometers and hygrometers, instrument for solar radiation measurement, Fortin barometer, electro-automatic hygrometer with clock, recording barometer with clock, Osler anemograph-pluviograph with clock, Beckley thermometer-hygrometer with clock, Robinson anemometer, rain gauge, automatic sun recorder, electrometer, a library with 60 volumes and wooden casing for thermometers.

²² The journal was published for first time in 1892 and its last number appeared in 1915. There is no doubt that this journal is practically a time window that allows us to learn about the cultural activity of Caracas at the time. In that sense, the choice made by Buscalioni to publish in this journal his short scientific notes about meteorology, astronomical observations and eclipses as well as his outreach articles, could not have been better and thus he was able to maintain his visibility through this works until his departure in 1894. His successor as director of the astronomical observatory in Caracas, Luis Ugueto Pérez (1868-1936), managed to maintain the same outreach approach, but just for the following two years.

²³ Mostly published in *L'Astronomie* while he was in Caracas and later in *Saggi di Astronomia Popolare*.

occasione del ritorno della cometa di Halley about the expectations in regard to the Halley comet as astronomical phenomenon. Most probably, his edition was a very limited one because copies are very hard to find. But perhaps the most important work came in 1912, when Buscalioni wrote an article about an overlooked effect in astronomical sciences (Buscalioni 1912) at that time. The issue to be examined was the role of atmospheric refraction in eclipses and occultations and it was done well in advance to the very well-known article on the same subject by Alexander Anderson (1858-1936), published in 1919 right after the results related to the Eddington-Einstein experiment were known. The goal of Anderson (Anderson 1919) with that article was to show that the observed light deflection could be explained as a refraction phenomenon in the Earth's atmosphere with no relation at all with general relativity. Buscalioni's article, on the other hand, was just focused on the light refraction within the Earth's atmosphere as a transport problem in a continuous medium, which was characterized by distributions in density and temperature, with no mention at all to the role of gravity. Then it was an important shortcoming because as early as 1801, Johann Georg von Soldner (1776-1833) published an article where the light deflection in question was just based on plain Newtonian gravitational theory (Ginox 2021). Moreover, the Einstein's first estimate of light deflection due to gravity, published in 1911, which was based on his general relativity theory, was also overlooked by Buscalioni. This first Einstein's estimation turned out to be comparable to the one obtained by Soldner (Ginox 2021). All these effects, optical as well as gravitational, are very small and one important matter of concern for Buscalioni was the precision that could be achieved in practical terms (Buscalioni 1912) even for the determination of an overall effect, not to mention to attempt their discrimination, as it was indeed pursued later on. It is fairly clear that Buscalioni, who died in 1914, could not be acquainted of a more complete Einstein's work in general relativity, published in 1915, where the new estimated deflection was bigger by a factor of two when it is compared to the one of Soldner (Ginox 2021) and moreover, this result was the one finally tested in the Eddington-Einstein experiment. Of course, these results generated a violent controversy where many renowned researchers took positions on both sides of the aisle and then in this work, we are not going to pursue its discussion because it goes far beyond our original goal and scope. Our final remark in regard to this issue is that in such a controversy, Buscalioni's work was completely ignored as a relevant and valid antecedent, which was at the same level of what was done by Anderson.

6. Conclusion

We can conclude that Maurizio Buscalioni was able to provide an important start with very high standards to the astronomical observatory in Caracas in just five years. This was possible due to his solid knowledge and training in meteorology, mathematics and astronomy, whose existence was proven in this work, although the details of its origin have yet to be precisely determined. His research work in astronomy continued up to the very end of his life, by looking at challenging problems. At the same time, he was a man who not only worked in science but also fought for a more equitable world.

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