

Original Paper

Biography of the Count Paul Ballada of Saint Robert

Gianfranco Medici^{1*}

¹ Cultural Association Tower of the Count Paul Ballada of Saint Robert-Castagnole delle Lanze, Asti, Italy

* Gianfranco Medici, Cultural Association Tower of the Count Paul Ballada of Saint Robert-Castagnole delle Lanze, Asti, Italy

Received: December 25, 2019

Accepted: January 8, 2020

Online Published: January 21, 2020

doi:10.22158/wjssr.v7n1p9

URL: <http://dx.doi.org/10.22158/wjssr.v7n1p9>

Abstract

The count Paolo Ballada of Saint Robert (1815-1888) as very young boy, he entered the Military Academy of Turin. At 45 years, he left the Army for devoting himself to the study of physical and military sciences. He was a member of the Royal Academy of the Sciences of Turin, the Royal Academy of the Lincei of Rome, the Royal Lombardo Institute of Milan, and of the Society (Academy) Italian called XL (forty). His life was dedicated to technical-scientific studies: Ballistics, Artillery, Mechanic, Hypsometry, Thermodynamic and Natural Sciences. As a passionate mountaineer, he did many alpine excursions and he was the main promoter and organizer of the first Italian ascent to mount Monviso in 1863 with his friend Quintino Sella, and contributed to the foundation of the Italian Alpine Club. He retired in Castagnole delle Lanze (Asti) in 1878 until 1884. He died in Turin in 1888.

Keywords

artillery, ballistic, hypsometry, mechanic, thermodynamic, mountains, botany, entomology

1. Introduction

The purpose of this biography is to draw readers' attention to an extraordinary character who lived in the 19th century. Distinguished scholar, highly appreciated in his time in the institutions of Science both in Italy and abroad. His studies touch on many scientific sectors, some of his theories are still used today as points of reference (e.g., burning rate) and others if they had been taken into serious consideration (e.g., the melting of the glaciers), perhaps the problem of the climate that affects today the whole globe would almost certainly to be less dramatic. In this way, we try to reproduce a figure almost completely and unjustly forgotten.

2. Biography

2.1 *The Military Art*

“Even before that ancient Sardinian army was transformed into the Italian army following the unification of Italy, Piedmont had the good fortune to educate a large group of clever and capable officers, who were able to combine the cult of scientific disciplines with the noble weapons ministry. Among these elected must count Paul Ballada of Saint Robert”.

The count Paul Ballada of Saint Robert was born in Verzuolo (Cuneo), from count Ignazio and Luigia Cavallero on 10 June 1815. When he was 11 years old, entered the Military Academy of Turin and only 20 years old he obtained the rank of lieutenant of artillery. Two years later at the Application School of Artillery and Engineers of Turin was appointed professor of Ballistics. He left the Army in 1857 with the rank of lieutenant colonel, to devote himself fully to his favorite studies.

His affection for the Army did not fade, and also if he devoted himself to pure science never has ceased to meditated on the problems that related to the military art, were born so its valuable works on ballistics and artillery.

He made deep studies on gun powder and the phenomena associated with the explosion and the trajectories of the bullets, his theorems on the similitude of trajectories had, as he wrote the general Menabrea, an indisputable importance in the ballistic theory, and not by chance was considered as reported in the yearbook of military Academy in Turin in 1888, the founder of the science of modern ballistic.

The artillery captain Francesco Siacchi, on the basis of the Saint Robert’s studies has defined later the laws of the shooting practices, laws which in just a short time they were adopted by the artilleries of the whole world. His studies on conditions in which it moves a projectile within a resistant means, led him to the conception of a new projectile with a lenticular shape launched from a cannon of new constitution (curved barrel), where the projectile assume a rotational motion at the contrary of the wheel of a vehicle round its axis, thus achieving a greater range and a greater precision. This theory met interest of the armies of half Europe, and was published in the magazines of military techniques, as well as in Italian, also in French and German. The difficulties to produce a cannon with a curve barrel, however has hindered the production in series of the same, with the consequence of abandoned of the project.

After tremendous explosion of powder factory in Turin (1852) that put in danger the whole city, he occupied himself with sagacity of the security problem related to the production of gunpowder, working on the same chemical composition and the manufacturing methods, which were then adopted in the new plant in Fossano (1861).

He carried out studies and experiments on powder burning rate as a function of generated pressure and defining a mathematical law. Law that bears his name, and which still use today as a reference by all

aerospace organizations in the world to define the size of the solid fuel propulsion systems.

2.2 *Scientific Studies*

Paul de Saint Robert in addition to the studies on military theories, he took care also a long series of works in the field of the Mathematics Analysis, Mechanics and Physical Sciences, which has made him highly deserving among the scholars of these disciplines. In this context it emerges definitely among all his studies the work entitled “Principes de Thermodynamique” published in two editions in 1865 and in 1870, editions that were adopted as a textbook in some important universities in Europe, as well as being the first thermodynamic treatises published in Italy. In the first volume, the Saint Robert expounds the general principles of the mechanical theory of heat, then follow their applications to the expansion of bodies accompanied or not, by external mechanical work, the effect of the fluids, the movement of projectiles in firearms and to the thermic machines. It can be said that He has considered the cannon a thermic machine thus giving a definitive outline to the problem of the gases in fire arms. In the second volume compared the first, we find a more detailed analysis of his theories, with the addition of biographies of Sadi Carnot and Robert Mayer the discoverers of the fundamental thermodynamic theorems.

We mention also a monograph entitled “Qu’est ce que la force?” which clarifies the different meaning given to the word “force” at that time; pressure, push, traction, mechanical work. Ultimately the Saint Robert was certainly the most important Italian thermodynamic of the period, but also abroad he appeared to be one of the few to understood the theoretical modernity and didactic of the new theory and he exposed it both theoretical and applied to the maximum level.

The many of its works on the Hypsometry have acquired a utility most valuable and practical from being conceived, meditated and controlled by direct observations during his mountains hikes. With his studies and his research, and on the basis of data collected by the British physicist James Glaisher during his aerostatic ascents, Saint Robert had noticed that as you go up in altitude the temperature decrease less and less, identifying for first the need to change the barometric formula of La Place and Bessel, whose formula considered instead steady decrease in air temperature. The Saint Robert has treated these topics in various scientific French and English publications, and in the meantime he invented the hypsologiste, an instrument for determining rapidly on the place the altitude of the level reached in the mountain with only the information of temperature and barometrical pressure. The Saint Robert a scholar of wide interests, was among the most active in re-founding the hypsometry, in the 60’s of the nineteenth century, we have to recognize to him the merit for having kept high in England and in France the scientific prestige of the just born Kingdom of Italy. The main works on the Hypsometry, Mechanics, Ballistic and Artillery were collected by the same author in three volumes under the title “Memoires Scientifiques r unis et mise en ordre”.

2.3 Passions—Mountains and Natural Sciences

The count Paul of Saint Robert always felt until old age a true enthusiasm for the wonderful sights offered by the nature from highest peaks of the mountains. He promoted with Quintino Sella the historic ascent of the first all Italian group that reached the summit of Monviso (3875 mt) in August 1863, which also included the deputy Giovanni Barracco and his brother Giacinto Ballada. The Sella in the famous letter addressed to Bartolomeo Gastaldi where basically wrote the report of the climb defined Paul of Saint Robert the “real organizer of the enterprise”. With the success of the ascent Paul the Saint Robert launched the idea shared with Quintino Sella group leader to found a club for the study of the Alps. On the wave of the enthusiasm, a few days after they founded an alpine club like the existing in England, Switzerland and Austria. Officially the Italian Alpine Club saw the light the October 23, 1863 in Turin. Paul the Saint Robert who was part of the first steering committee resigned a few months later for contrasts within the same committee, because in his opinion the policy adopted by the Club was too much mild and pragmatic. All mountains hike of the Saint Robert have had a scientific purpose; in addition to the already mentioned ascent to Monviso, we remember the trip to the Ciamarella mountain (1867) in the Graian Alps, and the ascent to Gran Sasso of Italy accomplished in 1871 with Giacinto Berruti which described the ascent with views and topographical papers enriched with the lists of plants and insects collected. The ascent to the Torre d’Ovarda (1872) performed with Michele Lessona and professors G. Struver and A. Grass and told and described with scientific details. The same for the first ascension to the top of Gelas and Tinibras. Regardless of the mathematical studies the Saint Robert always had, and more in the last years, a special predilection for the Natural Sciences and especially in Botany and Entomology. So he gathered an important herbarium containing very rare plants such as the *Saxifraga florulenta* Moretti, of which he made a detailed study, and also he formed a valuable collection of Coleoptera and Lepidoptera shrewdly determined and ordered.

Always as part of the issues related to natural sciences we have to remember his written analysis during his stay in Castagnole Lanze and presented in December 1883 to the Accademia of Lincei in Rome on the motivation of the melting of glaciers. We can say that was one of the first warning concerning climate change supported and motivated with scientific data launched almost one century and half ago. “Due to the man’s behavior on the earth’s surface”, Saint Robert concludes.

With the help of astronomy and mathematic he has developed a very interesting note on the exact meaning of a tercet of the Divine Comedy (Purgatory I, verses 22-24) where Dante refers to a precise constellation; “the Southern Cross”, while among the numerous commentators of Divine Comedy starting from the time of Dante until to the present, the confusion is great. The astronomer Ottavio Zanotti Bianco in one of his works he wrote: “the count of Saint Robert is a mathematician, that cultivating the science not for to alive, but for pure love, he left lasting traces of himself in various branches of knowledge he printed a work titled ‘the true meaning of a tercet of Dante’ where the

commentators of the time, but even today are copying each other serious inaccuracies, in which also incur authoritative historians of Astronomy”.

2.4 Commemorative Dedications

Below are proposed short extracts of the commemorations dedicated to the count of Saint Robert by prestigious scientific institutions:

2.4.1 Royal Academy of Sciences of Turin

Those who knew him at closely will not cease the admiration for that strong temperament that drove him without hesitation and inflexibly for the right course pointed out to him by the firmness of his convictions. This could sometimes give to his character excessive rigidity; but if in the contrasts of life and in scientific controversy, he argued passionately to his opinions, intolerant it never was, nor ever was deaf to the impulses of his generous heart and always maintained the manners of the perfect gentlemen. “We hope that our country can boast among young people who are now engaging themselves in the gym of the studies, many who are akin to count of Saint Robert for the high intelligence, the character integrity, the great love for the Homeland and the science”.

2.4.2 Royal Academy of Lincei of Rome

He felt highly of himself without vanity. He complained often, and rightly, that his works were not enough known and cited. He did not seek honors, but the high distinctions not missed to him, attesting the great consideration of the highest scientific institutions of the State. He was decorated with the military cross of the Order of Savoy, he was member of Academy of Lincei in Rome, of the Academy of XL in Modena, of the Academy of Sciences of Turin and Lombardo Royal Institute. “More than companies, he loved the loneliness and more than his near friends, the far ones. However, he had both: Sadi Carnot, Clausius, Rankine, Sella, Menabrea, Genocchi, Sommellier, Grattoni and others. A very few intimate friends, but no enemies. The memory will remain respected and honored not only by lovers of science, but also by people who respect and honor the intelligence, the loyalty, the character”.

2.4.3 Italian Alpine Club

“Of firm character, resolute, loyal to the highest degree, with a noble and generous heart and the manners of the perfect gentleman. Modest by nature was alien from honors and he abhorred by every outcry that could be done around to his name”.

2.4.4 London Alpine Club

“The Saint Robert has to be remembered more for his scientific works than for alpine explorations. He had an absolute and incomparable mastery of mathematics which he used as a tool to investigate the problems of physics. In his later years, Saint Robert lived in retirement and spent the most part of the time in a country house near Asti, close to which he built a tower from which he enjoyed a wide sight of the whole alpine arch, from Monte Rosa to the Maritime Alps”.

2.5 Castagnole delle Lanze (Asti)

It is not clear the reason why the Saint Robert chose Castagnole Lanze to retire after intense studies, from an archive document we learn of a prior failure of the silk mill owned by family Tartara in Castagnole Lanze. Tartara had begun to work the raw silk, but it had not gone well. Maybe without the ensuing bankruptcy today Castagnole Lanze would not have among its elements of ornament the tower of castle suburb. This we can say because the one who, in the course of 1878 bought the house called castle, already of the Tartara family was the right person for built at the top of the ancient village the round tower, which offers a splendid view. It was the count Paolo Ballada of Saint Robert that our ancestors knew as the count of the insects, because of his passion for entomology. From the stories passed down by our ancestors we learn that the children of the hills and villages went through the fields and woods of the surrounding in search of insects that the count would have rewarded to them with a penny. The observation tower was built in 1880 on top of the little mountain, with soil cultivated with mulberry, trees and a small vineyard together with the surrounding area, was ceded by the count to the municipality in 1884, when he begun to have some problems of health and decided to move to Turin, where he died in November 21, 1888. In 1932 the municipality of Castagnole Lanze, resolved to devote to the everlasting memory of the fallen of the first world war, the little hill then called Memorial Park. Since 2012 the above area, including the tower, houses a museum created and managed by the Cultural Association Tower of the Count Paolo Ballada of Saint Robert in order to re-propose his figure, illustrating his scientific works, his passions and his interests.

3. Conclusion

We believe to have done to emerge the figure of an important promoter of the scientific culture. Scholar of the military technology among the most distinguished ones of its time, he succeeded in combining pure and applied science, art and social interests into one of the most elevated synthesis. We can therefore define count Paul Ballada of Saint Robert one of the best scholars of the foundations of the Physics in Europe.

References

- Basso, G. (1888-1889). Commemoration of count Paolo Ballada of Saint Robert. *In Proceedings of the Royal Academy of Sciences of Turin* (Vol. XXIV, pp. 141-146).
- Crivellaro, P. (1998). *Q. Sella A climb to Monviso*, Tararà, Verbania.
- Drago, A. (1993). *Forza ed energia l'Analisi critica di St Robert* (pp. 91-113). Quad.Pristem n. 4 Univ. Bocconi Milano.
- Gianelli, G. (1888). Commemoration of the count Paolo Ballada di Saint Robert. *Monthly Journal of Italian Alpin Club*, 11, 387-389.

- Gianuzzi, R. (1977). *Castagnole delle Lanze from the Romans to the present day*.
- Maffioli, F., & Medici, G. (2014). *Cultural Association Tower of Count Paul Ballada of Saint Robert: Sciences and Interdisciplinary Culture in the 19th Century, Receding of the glaciers and The True Meaning of a Tercet of Dante, Advances in Historical Studies* (pp. 221-228). <https://doi.org/10.4236/ahs.2014.34019>
- Mathews, W. (1889). Commemoration of the count Paolo Ballada of Saint Robert. *Alpine Journal*, XIV(10), 236-238.
- Medici, G. (2013). Il conte Paolo Ballada di Saint Robert: note biografiche. *Il platano, rivista di cultura astigiana, anno, XXXVIII*, 176-186.
- Ottavio, Z. B. (1905). *Astrology and Astronomy, Bocca Typography, Turin* (pp. 102-103).
- Pavarin, D. (2004-2005). *Propulsion Systems Lesson for Space Applications*. Dept. of Aerospace Engineering Padova University.
- Pisano, R. (2007). Notes on Principes de Thermodynamique di Paul de St Robert. In *Proceedings of XXIV SISFA Congress, Bibliopolis, Naples* (pp. 129-134).
- Saint Robert, P. (1872). *Revue Scientifique de la France et de l'etranger, Deuxième série—Tome II, Paris Libraire Germer Baillière* (pp. 985-993).
- Saint Robert, P. (1872-1874). *Mémoires Scientifiques réunis et mise en ordre, Tome I Ballistique Tome II Artillerie, Tome III Meccanique—Ipsometrie*. Bona, Turin.
- Saint Robert, P. (1867). *Trip to Monte Ciamarella in the Graian Alps*. quarterly bulletin of the Italian Alpine Club.
- Saint Robert, P. (1871). *Trip to the Gran Sasso d'Italia*. Bona Typography, Turin.
- Saint Robert, P. (1872). *Climb to the Torre d'Ovarda*. Piero Gribaudo publisher, Turin.
- Saint Robert, P. (1866). *Saxifraga Florulenta Moretti*. In *proceedings of the Royal Academy of Sciences of Turin, meeting of January 7* (Vol. 1, pp. 203-205).
- Saint Robert, P. (1883-1884). Why the glaciers are retreating. In *proceedings of the Royal Academy of the Lincei, Rome, series 3, Transunti* (Vol. VIII, pp. 56-62).
- Saint Robert, P. (1866). The True Meaning of a Tercet of Dante. In *Proceedings of the Royal Academy of Sciences of Turin* (Vol. 1, pp. 588-601).
- Saint Robert, P. (1865). *Principes de Thermodynamique, J Cassone, Turin* (1st ed.).
- Saint Robert, P. (1870). *Principes de Thermodynamique, E Loescher, Torino* (2nd ed.).
- Siacci, F. (1889). Commemoration of count Paolo Ballada of Saint Robert. In *proceedings of the Royal Academy of the Lincei Rome* (Vol. V, pp. 243-246).
- Spinella, A. (2019). Cultural Association Tower of Count Paul Ballada of Saint Robert. Miserie e nobiltà: il conte Ballada, l'artiglieria italiana e Caporetto. *Il platano, rivista di cultura astigiana anno, XLIV*, 130-144.

Stefanini, L. (2013). Measuring the eight of the mountains: The contribution of count Paolo Ballada of Saint Robert. *Journal of the Italian Phisical Society*, 54, 93-109.