

Pietro Blaserna and the Institute of Physics of the University of Palermo

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Abstract: I will outline the activity of Pietro Blaserna, since his training in Austria and France to the period he spent at the University of Palermo, where he renovated and boosted the Institute of Physics. His activity in Palermo was part of a significant effort of renovation and cultural development of the town, consequence of the Unification of Italy. I will also discuss the particular interest of Pietro Blaserna for Physics Education and, in particular, for the hands-on training, using methods quite innovative for that time. I will also briefly mention the subsequent period in Rome so important for the development of Physics in Rome and Science in Italy.

Keywords: Pietro Blaserna, University of Palermo, Institute of Physics of Palermo, Institute of Physics of Rome, Didactics.

1. Blaserna's youth and education

Pietro Blaserna was born on February 22, 1836 in Fiumicello di Aquileia (Gorizia) now in Friuli, Italy, but at that time part of the Austrian Empire. So he was born as an Austrian and became Italian during his life.

Soon his family moved to Gorizia, where Blaserna went to the high school. Then he moved to Vienna where he went to the University, studied mathematics and physics, and got his degree with full grades in 1857. When in Vienna, he was an assistant of Prof. Andreas von Ettingshausen who was one of the first professors to provide routinely laboratory practices and exercises for the students in the physics laboratory.

During that period Blaserna started his studies of induced currents and of extra currents, a subject that he continued, later, in Palermo.

He then applied to work in the laboratory of the famous chemist Henry-Victor Regnault at the Sorbonne in Paris. His request was accepted and in 1859 Blaserna moved there. At that time, that was one of the best laboratories in Europe: the related, very accurate, studies were focused, in particular, on the specific heat and the thermal properties of various gases. There Blaserna was busy studying real gases and, most notably, CO₂. During his stay in Paris, he was highly appreciated as a scientist and soon gained a solid reputation as a good researcher. In spite of his significant dedication and the high quality of his work, he did not publish any scientific paper during his stay in

Paris. However, when Blaserna left Paris, Regnault gave him a reference letter stating a great appreciation for his work.

2. Blaserna in Palermo

At that time, Blaserna had already become highly renowned as being a good researcher; so the Minister of Public Education of the recently unified Italy, Mamiani della Rovere, wanted him to become Professor of Physics at the University of Florence. At the time of this appointment, in 1862, Blaserna was just 25 years old.

After a short time, the new Minister, Michele Amari, from Palermo, asked him to become Professor in Palermo. That was a very important time for whole Italy and, in particular, for Palermo. Italy had just (in 1861) been unified; as a matter of fact a large fraction of present-day Italy had become a single nation. As a consequence the Italian political class had a keen interest to give a strong and unifying imprinting to the recently unified nation, originating from a set of diverse small and very small states, and to bring it rapidly to the level of the other important European nations, especially for what concerns scientific knowledge and capability in technology, manufacturing and industrial production, given the importance of these latter for progress and development.

Palermo was, and is, a large southern city, the Unification of Italy had brought for it the perspective of a significant innovation and of acquiring a rather new, progressive, characterization. In particular the Minister Amari wanted Palermo to become a top level place, i.e. a centre of excellence, for science and culture.

In order to implement his plan, the Minister availed himself of the aid of Stanislao Cannizzaro, the great chemist from Palermo. Cannizzaro was an excellent chemist and a very good organizer; he got a professorship in Palermo both for his high scientific qualities and for his capability to implement a project turning Palermo into an important cultural centre. To this end Cannizzaro asked that several high level scientists were given a professorship in Palermo. Thanks to the joint action of Cannizzaro and Amari, during that period several good scientists moved to Palermo where they started to work: Cannizzaro, Blaserna, Gemmellaro, a geologist, Doderlein, a zoologist, Tacchini, an astronomer, and a few others.

So a major scientific environment developed in Palermo. Until then the Institute of Physics of Palermo, in particular, had been devoted almost entirely to the study of technical problems – such as those related to telegraphy – rather than to problems of basic research. The characteristics of the Institute, therefore, contrasted with the innovative vision of Amari and Cannizzaro. The appointment of Blaserna in Palermo brought a radical renewal of the Institute. Being a well-known experimental physicist, when in the University of Palermo Blaserna immediately devoted himself to creating a new physics laboratory, acquiring several new instruments and giving new momentum to the research at the “Istituto di Fisica”.

In addition to renovating the laboratories and the instrumentation at the Istituto di Fisica, Blaserna brought a radically new teaching method, a quite innovative one for the standards of those times, and not just for Palermo: many of the instruments had to be

used directly by students, even those of the first biennium. Students, then, had the opportunity to acquire a direct experience of the instrumentation and of the experimental activity, rather than getting it through the teacher and his collaborators, or their demonstrations in the lab. Blaserna's firm belief that a student could directly gain experience, and use the tools and the instruments in the lab, made him an innovator of the way physics (and science in general) has been taught since then.

During his time in Palermo Blaserna performed research on various topics which included:

- a. induced currents,
- b. carbonic acid,
- c. terrestrial magnetism,
- d. polarization of the solar corona,
- e. behaviour of the seas around the pole,
- f. Avogadro's law,
- g. dynamical theory of heat,
- h. refractive index of the methylsalicylic alcohol.

An unusual (for today's habits) and outstanding aspect of the activity of Blaserna in Palermo was his commitment to teaching and education in the high schools in Palermo; such a commitment brought him to take part in the "Consiglio di Perfezionamento" (a sort of supervising board) of the Technical Institute of Palermo. This Technical Institute over the following years spawned many of the Palermo high schools, including the "Cannizzaro" Scientific High School and the "Parlatore" Technical Institute. At variance with what typically happens today, the Technical Institute at that time had an important role in scientific research in Palermo and was strongly related to scientific production: the "Consiglio di Perfezionamento" included some of the best scientists in Palermo and some important scientific results appeared in the publications of the Technical Institute.

Moreover Blaserna paid attention to teaching in the University. Complaining on the presence of several senior researchers and the lack of young, active and brilliant collaborators, he used the sentence "Generals and captains without soldiers".

As recognized by several of his biographers, Blaserna was highly dedicated to the education and training of young people, paying particular attention to their effectiveness and value.

In order to train young people, paying particular attention to brilliant ones, he devoted himself to an intense education project aimed at training promising students in the field of physics and laboratory activities. Thanks to significant government funding he could also improve laboratories and teaching activities. In the following I show a handful of the more than one hundred instruments used by Blaserna and still present in the collection of Physics instruments at the Dipartimento di Fisica e Chimica. These instruments have been studied and catalogued by V. Sagone in his thesis (Sagone 2002). I have extensively used Sagone's thesis for more details and for a complete description of the Blaserna instruments collection.



Fig. 1. Helmholtz resonators. Used to amplify and perceive a specific note. The larger (lower) opening kept contact with outer air; the smaller, on top, had a shape adequate to insert it in the experimenter's ear

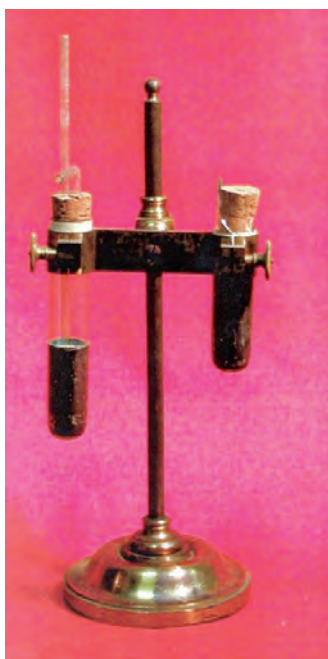


Fig. 2. Regnault Hygrometer. It is a condensation hygrometer, i.e. it measures the dew point, the temperature at which water vapour in the air condenses



Fig. 3. Norremberg polariscope. It is a polariscope with an Amici microscope; these instruments allow to measure crystals with a beam of light polarized at will



Fig. 4. Becquerel phosphoroscope. It measures whether a substance is, or is not, phosphorescent, even for a short time

As an example of the vibrant cultural and scientific renovation that was taking place in Palermo at that time and impacted in many ways in Palermo's life, a series of conferences started in 1866.

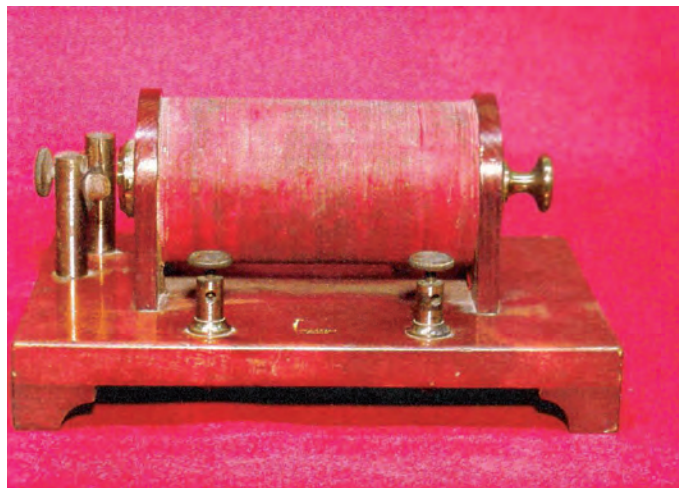


Fig. 5. Induction coil

The speakers were top level scientists and the presentations were made for the educated lay-person. Blaserna, fond of teaching and dissemination, not only took part to the series but in fact was the person who opened the cycle on April 11, 1866 with a

conference on “The formation of sound”; he was particularly active in this activity and made a few other conferences of the cycle. Unfortunately, this cycle was interrupted in May 1867, just after fourteen conferences, owing to a cholera epidemic that was ravaging Palermo.

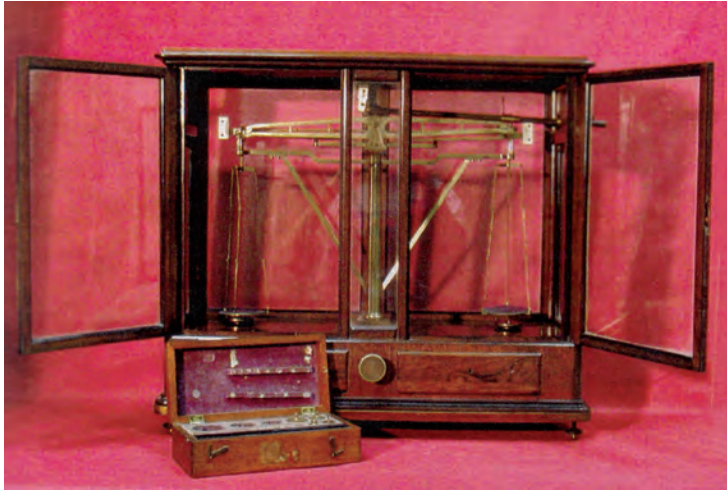


Fig. 6. Precision scale

3. The transfer to Rome

After the annexation of Rome to Italy in 1870, Italy entered another phase. Rome almost immediately became the new nation capital. It was important for the government of that time that the new capital, Rome, had a clear and strong link to the new unified Italy, a nation that wanted to innovate and to promote itself. Rome had to sever any connection with its previous conditions, more conservative and typical of the ruling Pope. A fundamental action to create such a new Rome was to promote science and culture in the new capital, thus bringing there cultural renovation and a greater openness in science. Top level scientists were moved to Rome to provide the scientific renovation of the new capital and, through this new centre, of the whole nation.

According to a well-tested method, the first one to move to Rome was Cannizzaro; shortly after, the Minister of Public Education Quintino Sella, asked Blaserna too to move to Rome; in practice a sequence of events similar to those which had already led Blaserna to Palermo.

In Rome Blaserna's career took a turn. He became more involved in management activities of the University, first, and in politics then. In fact, already in 1874, Blaserna was appointed Rector of the University of Rome. Readily involved in politics, he

became a senator in 1890, and later Vice-President of the Senate, a position he held until his death on February 26, 1918 in Rome.

As a politician he promoted the creation of the Faculty of Science in the Italian state University, a structure which has remained alive until almost the present day.

Among the many actions of Blaserna during his Roman period, it is worth mentioning that he directed the effort to build the new Institute of Physics, in via Panisperna, with modern criteria aiming at effectiveness and efficiency. This is the same Institute that soon – just a little more than a decade since the death of Blaserna – will host the work of Enrico Fermi and the “via Panisperna boys”, in particular the studies on nuclear fission that led Fermi to the Nobel Prize.

Interestingly enough I, and other colleagues of mine, have looked repeatedly for such a building, in via Panisperna, Rome, not a long street. We have not been able to find anything identifying the Institute, nor of any mention of the history-marking experiments on fission. We did not find the Institute – certainly still there – nor any commemorative plaque. A couple of rather kind *Carabinieri*, based in the same street, when asked on the location of the Institute, rather promptly answered: “Oh yes, the Institute where Fermi performed fission!” Not bad, those guys knew very well what we were talking about! But then they added: “Unfortunately we do not know where it is: there is no identification, apparently”. If the *Carabinieri* have hard time finding it, imagine if students can find it. Something to ponder about the way we treat our cultural heritage.

4. Conclusion and final comments

Summarizing a life-long activity of Blaserna: he was an innovator who led cutting edge research both within fundamental and applied physics; his interests ranged from geophysics to electrical engineering, from acoustics to the “physics of music”. He devoted himself mainly to the study of the properties of real gases, of the induced current, of the polarization of the radiation emitted by the solar corona during a total eclipse.

He had a leading role in the politics and management of both the academic teaching and the scientific research; his action had a strong influence on the way the Institutes were run and on the national political choices on science.

He brought substantial innovation in the management and operations of scientific laboratories; he also reformed the way experimental physics courses were taught in the laboratories.

He was a dedicated and great teacher who was committed to educating young people to science and research, involving them personally; he reformed the university teaching sweeping away traditional and conservative methods.

Such a strong activity and interest in teaching made him to stop relatively early active research, but the disadvantages of such an “early retirement” from science were largely offset by the many advantages of his development and implementation of innovative teaching methods and by his involvement in the politics of science.

Bibliography

- Amaldi E. (s.d.). *Note biografiche su Pietro Blaserna*, dattiloscritti inediti, Archivio Amaldi, Dipartimento di Fisica dell'Università "La Sapienza", Roma.
- Cantone M. (1918). "Commemorazione dell'Accademico Linceo Senatore Pietro Blaserna". *Atti della Reale Accademia dei Lincei, anno CCCXV (1918): Serie V. Rendiconti della classe di Scienze Fisiche, Matematiche e Naturali*, 27 (2° semestre), pp. 262-269.
- Corbino O.M. (1919). "Pietro Blaserna". *Memorie della Società degli Spettroscopisti Italiani, Serie 2*, 8, pp. 2-5.
- De Gubernatis A. (1879). *Blaserna Pietro*, in *Dizionario Biografico degli scrittori contemporanei. Ornato di oltre 300 ritratti*. Firenze: Le Monnier, p. 162.
- Pisani J. (1958). "Un illustre scienziato dimenticato: Pietro Blaserna". *Studi Goriziani*, 23, pp. 115-122.
- Pozzato E. (1968). *Blaserna Pietro*, *Dizionario Biografico degli Italiani vol. 10*. Roma: Istituto della Enciclopedia italiana.
- Sagone V. (2002). *Pietro Blaserna e la Collezione degli Strumenti dell'Istituto di Fisica dell'Università di Palermo* (Tesi di Laurea in Fisica). Università di Palermo.