The collection of historical scientific instruments of the Liceo "Bonaventura Secusio" in Caltagirone

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Abstract: The history of the collection of scientific instruments, today preserved in the Physics Museum of the Liceo "Bonaventura Secusio" in Caltagirone, will be here briefly reconstructed. The Liceo was founded in 1864, after the closure of the Liceo "Ferdinando" in 1862, which had been created in 1858 within the Reale Accademia degli Studi. While the latter arose from the ashes of a Jesuit college in the late eighteenth century. The historical collection preserves an important unit of scientific instruments, bought in Paris in the years 1844-1846 from the French instrument maker Louis-Joseph Deleuil. This unit was part of the Physics Laboratory of the Reale Accademia degli Studi. The instrumental collection of the Liceo dates back to 1864. Thereafter it was enriched by new scientific instruments from Italy and abroad. In particular, in the years 1885-1886, as many as one hundred and forty-two scientific instruments were purchased in Florence, at the "Società Tecnica di Ingegneria ed Industria", managed by Vimercati.

Keywords: Caltagirone, Louis-Joseph Deleuil, Reale Accademia degli Studi di Caltagirone, Scientific Instruments, Emanuele Taranto Rosso.

1. Introduction

On December 10th, 1864,[1] the Liceo "Comunitativo" was solemnly inaugurated in Caltagirone. In 1865[2] it was named after Bonaventura Secusio (1558-1618), a distinguished character from Caltagirone, former Patriarch of Constantinople, later Bishop of Patti, Messina and Catania. The School institution was vigorously promoted in 1862 thanks to the work of the City Council of Caltagirone and of some notable and influential people of that city (Alcione 1865). These solicited and obtained from the Government[3] to found a school entirely financed by municipal funds,[4] in which the

[1] The lessons, however, had already started in October 1864 (*L'h nell'abbicci, Periodico Settimanale in Caltagirone del 29 Gennaio* 1865, 1865, p. 4, Biblioteca Comunale "E. Taranto" di Caltagirone).
[2] See *Delibera del Consiglio Comunale* (1865b).
[3] With a ministerial decree of June 18th, 1865, the Liceo was recognized on a par with Regi Licei (*Delibera del Consiglio Comunale* 1865a). Also *Registro de' Professori addetti al Liceo Secusio di Caltagirone.*

subjects had the same school curricula and regulations of the Royal High Schools. The new high school was born from the ashes of another high school, the Liceo "Ferdinando" (1858). This school was created within the Reale Accademia degli Studi of Caltagirone; the latter had been established in 1775, after the expulsion of the Jesuits from Sicily in 1767, and its first name was Regia Accademia "Ferdinando IV". This Accademia, which benefited from the City Council aids, despite economic hardships, maintained the power to confer academic degrees and qualifications until 1825. After that date, the implementation of a reform plan for the island's University, colleges and academies turned the ancient Reale Accademia degli Studi of Caltagirone into a high school that provided a preparatory diploma course to university studies in humanities and science. From the beginning the Accademia exerted a great influence on the cultural life in Caltagirone, remaining active until 1862, the year in which it was finally abolished[5] under the new school legislation and in particular for the implementation of Title III of the Casati Act (1859).

2. The instrumental collection of the School

The Liceo "Bonaventura Secusio" in Caltagirone is one of the oldest educational institutions in Sicily. It includes, within its premises, a historical library, equipped with precious volumes of the nineteenth century along with numerous exhibits of physical and natural sciences, which are the unique witnesses for a remarkable scientific tradition that has developed in the city of Caltagirone since the end of the eighteenth century.

Fig. 1. Oil painting of E. Taranto Rosso. Museo Civico al Carcere Borbonico, Caltagirone

[4] *Delibera del Consiglio Comunale* (1862b; 1863).
[5] *Delibera del Consiglio Comunale* (1862a; 1862b).

In particular, the school still preserves a few stuffed animals, rock and shell samples and a rich herbarium. These materials largely come from the ancient high school where, since 1843, the Natural History and Archaeology Laboratory had operated. It was founded by scientist Emanuele Taranto Rosso from Caltagirone. Undoubtedly, however, the scientific collection of undisputed prestige is the one related to the historical scientific instruments, now collected and stored in two large halls of the Physics Laboratory of the Liceo. It is a collection of classical physics instruments, most of which of the nineteenth century, consisting of a small but significant group of devices dating back to the first half of the century, and of items purchased, thanks to city funds, from the foundation of the Liceo (1864) to 1923. After that date the school could take advantage of annual ministerial funds which enriched the collection with additional pieces. Recently, the documentary research carried out in the school, as well as in the archives and libraries of the city of Caltagirone has allowed to reconstruct, in sufficient detail, both the history of the oldest instruments, their number and the purchases made when the high school was founded.

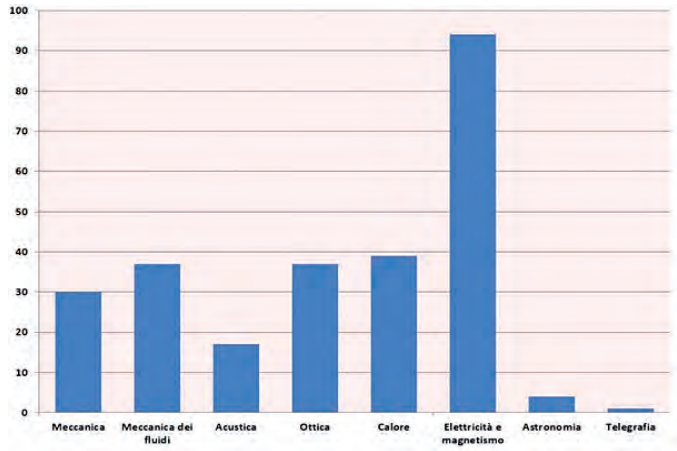

Fig. 2. "Fields" distribution of the scientific instruments of the historical collection at the Liceo "Bonaventura Secusio" in Caltagirone

The discovery of two historical handwritten inventories of the collection was fundamental because the first, dated November 1888,[6] contains a list compiled by a physics professor of the time, Prof. Antonio Di Bernardo: about 246 instruments with relative comments on their state of preservation, operation, purchase dates, costs and origins; the second,[7] begun in 1914, was implemented in the following years and is entitled Inventory of the scientific material which belongs to the Physics and Chemistry

[6] This inventory is in the Register of the *Atti Generali* of the Liceo "Bonaventura Secusio" in Caltagirone for the years 1886-1898.

[7] It is important to point out that the last three data of the inventory are available only for the items marked from N° 105 on.

Laboratory of the Regio Liceo. Here there are 567 pieces divided into two groups: the first 391 were found at the time of the census of 1914 and others purchased by the Municipality of Caltagirone which was obliged, by law, to supply the school laboratories in the city, until June 30th, 1923; the remaining 176 instruments include purchases made after July 1st, 1923, when the school was deprived of municipal subsidies and was then financed with annual funds from the Ministry of Education.[8] These inventories show the presence of a rich collection of instruments, at least until about the sixties in the twentieth century. The current situation is different because today only 259 pieces of the reported 567 in the last inventory have been found and inventoried. An analysis of the instruments, subdivided into traditional fields, confirms the presence of a composite collection having a high prevalence of electricity and magnetism equipment (Fig. 2). This trend was a typical characteristic of the time and is coherent with the interest and progress made in these fields in the second half of the nineteenth century. The collection also includes a number of pieces signed by Italian and foreign instrument makers. Among Italian brands there are Tecnomasio from Milan (it is the period related to such founders as Duroni, Longoni, Dell'Acqua), Officine Galileo from Florence, Ferdinando Rosati Company from Milan, A. Cattaneo from Genoa, Andrea Cesare Zambelli Company from Turin. There are also local instrument makers: Carmelite Martino Vassallo and makers like Mario Sortino[9] and F. Interlandi from Caltagirone. Among foreign makers some French leading manufacturers stand out: Deleuil, Ruhmkorff, Breguet, Breton, Galante, Molteni, Carpentier.

3. The origins of the Collection

The teaching of physical sciences in Caltagirone probably began in 1628 when, in the Jesuit College, a new philosophy course[10] was established. More detailed information on the subject dates back to the end of the eighteenth century[11] when the ancient Regia Accademia "Ferdinando IV" was reopened to studies. Among the first professorships there is that of Physics, inaugurated by a promising young teacher, Giovanni Silio Borremans (1756-1830) from Palermo. At the Accademia, Silio taught experimental Physics for over fifty years retiring only in 1826. In 1809 the Senate of Caltagirone introduced in the Accademia the chair of "demonstrator" of physics experiments that remained active until 1862. This new chair produced a Physics Laboratory which, however, as we know from found documents, became a stable structure, for the presence of a large number of scientific instruments, only in 1818. Apart from some

[8] The commitment to provide the School with scientific and teaching materials was undertaken by the Department of Education in accordance with Article 103 of the N° 1054 Act, May 6th, 1923 (Regio Decreto 6 maggio 1923, n. 1054).

[9] He was son of Camillo Sortino (b. 1837), a technician and instrument maker of the Liceo "Bonaventura Secusio" from 1864 to 1895.

[10] Unfortunately, we know little or nothing about that period, since our archival research proved vain.

[11] Our researches have received a better success for the late eighteenth and nineteenth centuries, a period towards which, thanks to some general studies about education and good intuition, we have more profitably conducted our study in the major libraries and archives of Caltagirone.

machinery bought in 1820,[12] the Laboratory had its greatest development in 1828, thanks to the work of Emanuele Taranto Rosso (1801-1887),[13] who, in the meantime, had obtained the chair of Experimental Physics in the Collegio left to him by his former master Giovanni Silio.

Fig. 3. Horizontal and vertical Chevalier's Microscope signed by Deleuil. Bought by Emanuele Taranto Rosso, it arrived in Caltagirone in 1844

On his arrival, Taranto found an obsolete Physics Laboratory, closed for several years for the restoration of the spaces in the building which housed the Accademia. His first action was to tidy up and open the Laboratory; secondly, he was anxious to provide at his own expense new tools for the Laboratory and cured the restoration and reuse of older machines, particularly those acquired from the instrument maker Drechsler in Palermo in 1820. In 1831 Taranto became director of the Reale Accademia and in 1843 he founded, at his own expense, a Laboratory of Natural History and Archaeology,[14] which had a wide echo among the scientific journals of the time. Since this new structure lacked a good compound microscope, Taranto bought one in Paris by one of the best instrument makers of that time, Deleuil (Fig. 3). In 1844, after the death of

[12] They were purchased in Palermo from Enrico Drechsler, technician and instrument maker of the University of Palermo, thanks to a municipal donation.

[13] Taranto Rosso was a physicist, naturalist, historian and humanist, an eclectic scientist among the most influential and representative of the city of Caltagirone in the nineteenth century. He distinguished himself in the promotion and development of many cultural initiatives in favour of his city, gaining also prominent civic and political offices in his old age.

[14] Taranto gave to the new Laboratory all of his scientific books and a large and rich array of natural objects, such as herbaria, sea shells, fossils, minerals, which were then collected and classified during the years of passionate scientific research.

doctor Niccolò Calì,[15] demonstrator of Physics, the professorship for physical experiments passed into the hands of Taranto. Once obtained that appointment he undertook with the local deputation and promised to enhance the Physics Laboratory, buying in Paris, at his own expense, some scientific instruments useful for his experimental lectures. In December 1860 he retired.[16] From January 1861 to August 1862, when the Accademia closed, the chair of Physics was hold by physician Vincenzo Ingo (1822-1904),[17] friend with Taranto. At the same time, in Caltagirone, the cycle of higher education was regulated under the new rules imposed by the Casati Act. This Act provided for the establishment of both Gymnasia, which were on charge of municipalities, and High Schools, supported by the public revenue. The two institutions had to guarantee continuity of studies for a total period of eight years. The Gymnasium lasted five years and had to prepare young people to enter high schools through an entrance examination. High schools lasted three years and focused on scientific and literary-philosophical[18] subjects. In Caltagirone, the Regio Ginnasio was first instituted (1861), later the High School was born (1864) as communal,[19] because it could not be Regio yet.

4. The oldest instrumental unit

The collection has an interesting group of scientific instruments purchased in Paris, between 1844 and 1846, by Emanuele Taranto Rosso from the renowned Parisian instrument maker Louis Joseph Deleuil (1795-1862). The first piece was bought for the educational needs of the new Laboratory of Natural History and Archaeology. It was an expensive compound microscope which had a horizontal and vertical configuration, a universal type, according to a model designed by Charles Chevalier, and arrived in Caltagirone the first days of June 1844; in 1846 there was a new purchase from Deleuil of twenty-five scientific instruments that arrived in Caltagirone, packed in four wooden boxes, after nearly a four month journey, in the middle of August 1846. The story of these new instruments is known thanks to the letters received by Emanuele Taranto Rosso

[15] Calì had the chair of physics-demonstrator by the Senate of Caltagirone in 1812 and remained in office for 32 years.

[16] The retirement coincided with the designation of Taranto by the national government as Ispettore degli Studi at the elementary schools for the district of Caltagirone. He maintained this office until 1864.

[17] Very little we know about this scholar. He showed great interest towards the new electro-magnetic discoveries in medicine. From 1855 to 1858 he lived in Paris at the expense of the Senate of Caltagirone. Here he knew the new methods for the treatment of nervous diseases through electro-magnetic or electro-chemical machines. Before coming back from Paris he urged the municipality of Caltagirone to purchase from the Parisian instrument maker Breton a medical electro-magnetic machine at the cost of 300 francs (unfortunately now missing). He also suggested to subscribe, via the Municipal Library, the most famous French magazines of medicine and other sciences, in order to keep the town always informed about the new scientific discoveries (*Sovvenzione proposta a favore di Vincenzo Ingo e Alfio Gerbino per far ritorno da Parigi* s.d.).

[18] In these cycle of studies, Mathematics, Physical Chemistry, Natural History, Classical Literature and Philosophy were taught.

[19] The Casati Act admitted the establishment of Reali Collegi only in capitals of provinces and cities with more than forty thousand inhabitants.

from Michele Chiarandà, Baron Friddani. He was a Sicilian exile, a friend of his, who had moved to Paris for a long time. He offered to help him as a mediator in the purchase of the instruments from the French maker. Actually, to satisfy the purchase requests and favours of a number of Sicilian friends, the Baron was helped by a friend who lived in Palermo, Francesco Lipari, to whom he sent from Paris what was requested. The discovery of Taranto's correspondence with Lipari offers detailed information on the Parisian purchases made by Taranto.

Fig. 4. Some Deleuil's scientific instruments purchased by E. Taranto Rosso in Paris in 1846. From left to right: Atwood machine, fountain in a vacuum, mercury shower, electric egg, double windmill, Magdeburg hemispheres and adhesion plates, double barreled air pump, Guinea and Feather tube

The two expeditions, above mentioned, took place in the same manner: the scientific tools left from Paris to Marseille, then from here to Palermo by ship. Lipari collected the bills for the expenses of the Baron and arranged to deliver the instruments[20] to Taranto. Fortunately, both the microscope and at least a dozen pieces acquired in 1846 have come to us still intact, and are now part of the historical collection of scientific instruments of the Liceo "Bonaventura Secusio" in Caltagirone. Among the instruments purchased in 1846 (Fig. 4), only two are signed by Deleuil: an Atwood machine and an air pump;[21] others, which have been identified with some certainty, are the following: Magdeburg hemispheres, Magdeburg adhesion glass plates, a mercury shower demonstration, a fountain in a vacuum, a double windmill for the study of air resistance, a fall tube (two

[20] The microscope bought in 1844 was picked up in Palermo from an emissary of Taranto, whereas the scientific instruments bought in 1846 first arrived in Palermo, then were transported to Terranova (present-day the city of Gela) by sea and from there to Caltagirone.

[21] It is a classical double barreled air pump, French-type and Babinet system, having solid vertical crystal cylinders. In 1885, on the initiative of Prof. Ingo, it was sent to Florence to be repaired.

meters long) showing the Guinea and Feather demonstration, an electric egg for the light in a vacuum and a clockwork bell for the study of the sound in a vacuum.

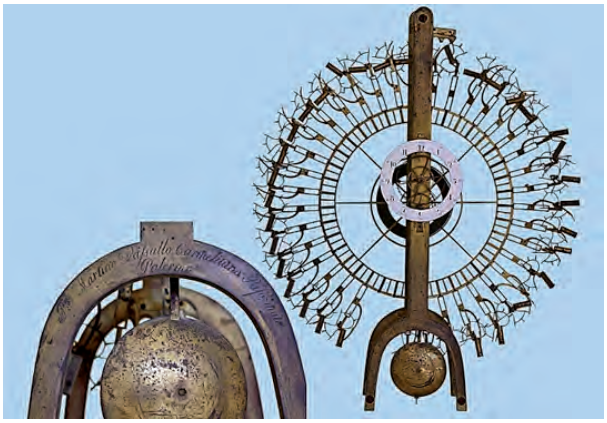

Fig. 5. Martino Vassallo's perpetual motion apparatus with clockwork system and detail of the engraved signature

Finally, among the oldest instruments still preserved in the school, there is a curious apparatus for perpetual motion with a system clockwork, signed by "P_{re} Martino Vassallo carmelitano riformato Palermo" (Fig. 5). Vassallo was born in Caltagirone and was a friend of Taranto's as can be evident from some letters between them. They date back to the years 1828-30, when Vassallo lived in Palermo. That apparatus was probably donated[22] to Taranto in those years.

5. The Collection after 1864

In 1863 the Municipal Council of Caltagirone decided that all the equipment present in the two scientific laboratories (Physics and Natural History) of the Liceo "Ferdinando", had to be used for the creation of a new Liceo "Comunitativo".[23] In virtue of this, the entire collection of scientific instruments, which was an ancient heritage of the Reale Accademia degli Studi and of the Liceo "Ferdinando", was inherited by the Physics Laboratory[24] of the new high school. This school opened in October 1864 with five new professorships: Italian literature, History and Geography; Latin and Greek literature;

[22] The piece is also inventoried, with number 49, in the historical catalogue of 1888. On the margin of the instrument-name there is the following note handwritten and signed by Prof. Antonio Di Bernardo: "Work of absolute imperfection of a monk from Caltagirone. Absurd. A. D. B.".

[23] Article 241 of the Casati Act obliged the new high school to have all the scientific equipment necessary for Physics, Chemistry and Natural History lectures.

[24] In this transition phase, the Municipality of Caltagirone asked Taranto to draw up a note of all the scientific material present in the two laboratories. This note, unfortunately, has not been found during our archival researches.

Philosophy; Mathematics; Physics, Chemistry and Natural History.[25] The last one, which also benefited of the use of the scientific laboratories, was held by Prof. Vincenzo Ingo[26] for 23 years, from October 1864 to July 1887. The teaching of "Physics, Chemistry and Natural History" began from the second year[27] and precisely with two hours of Natural History and three hours of Physics and Chemistry[28] per week.[29] As far as the Physics Laboratory was concerned, a careful reading of the historical inventory, dated November 1888,[30] lets us know that between 1864 and 1885 it was provided with 104 instruments,[31] mostly in good condition. Among the preserved instruments of this period, there is an important and rare Serrin's automatic regulator of the electric light which deserves particular attention. It represents one of the few examples that we know of self-regulating arc lamp designed by Victor Serrin,[32] a significant stage in the evolution of the electric light which has obtained great success since 1860. It has a brass casing, enclosing its mechanisms, with engraved the following signature: "V. Serrin B^{té} - S.G.D.G. à Paris PNE Brevets Etrangers".[33] Other interesting tools of the period 1864-1885, still lying in the Physics laboratory of the School, include a hydrostatic balance, signed "F. Interlandi Caltagirone 1869", a Mascart's quadrant electrometer[34] signed "J. Carpentier Paris", a telescope[35] signed "G & S Merz vorm Utzschneider & Fraunhofer in Munich" (Fig. 6) and some pieces from

[25] The unification of more subjects into a single teaching was necessary to reduce the management costs of the Lyceum, which were all on charge of the Municipality.

[26] After a regular competition approved by the Minister, the City Council of Caltagirone appointed Ingo Professor Regent with three-year term and an annual salary of £ 1600. However, upon every contract expiration, he was always re-elected until 1876, the year in which he became permanent professor (*Delibera del Consiglio Comunale* 1876, approved by the Consiglio Provinciale Scolastico on November 22nd, 1876) with an annual salary of £ 2000. He retired from teaching on July 31st, 1887, receiving a pension of £ 1270 (*Registro dello stato del personale del Liceo (1864-1895*).

[27] *Registro delle deliberazioni del Consiglio degli Insegnanti del Liceo Secusio pareggiato per l'anno scolastico 1867-1868*. The same register was used for the subsequent years.

[28] From the consulted documents we know that from 1864 to 1900 the reference text for all students engaged in the learning of Physics was *Compendio di Fisica sperimentale* by Giovanni Luvini (1862); from 1874, the *Trattato elementare di fisica sperimentale ed applicata e di meteorologia* by Adolphe Ganot was also added.

[29] In 1888, with the transition to the Regio Liceo, things changed: the chair of Natural History obtained two hours a week for the first two years and only one hour for the last year; instead, the chair of Physics provided three hours a week for the second year and four for the third one. Thus in the last year Physics had more hours than any other subjects (*Atti generali del Liceo "Secusio" Comunitativo di Caltagirone*, 1867-1868, vol. IV).

[30] The catalogue compiled, as already mentioned, by Prof. Antonio Di Bernardo, is very accurate especially in relation to the list of the purchases previously made by Prof. Ingo.

[31] These pieces included both those which belonged to the Physics Laboratory of the suppressed Liceo "Ferdinando", as well as those bought from 1864 to 1884. The inventory shows that about 50% of the pieces were related to electrology and that four of them were built in Caltagirone. The inventory also shows a fifth piece built in Caltagirone: a little Foucault pendulum with its frame.

[32] The French inventor and engineer V. Serrin (1829-1905) was among the first to develop in the electric arc a system of self-regulation of the distance between the two charcoals that had to remain unchanged over time despite their continuous and unequal consumption for combustion.

[33] Note that "B^{té} - S.G.D.G." is the shorthand of "Breveté Sans Garantie du Gouvernement".

[34] The instrument was presumably purchased in the years 1882-85.

[35] Almost certainly this telescope was used by E. Taranto and by V. Ingo to observe the prominences of the total solar eclipse which took place in Sicily on December 22nd, 1870 (Taranto Rosso, Ingo 1870). In the inventory started in 1914, at number 195, the telescope was described as follows: "Great model telescope with Merz lens of 9 centimeters, two terrestrial eyepieces, five astronomical eyepieces, two black glasses, in a special wooden crate".

the Atelier Ruhmkorff.[36] In the years 1885-1886, thanks to a substantial funding from the Municipality of Caltagirone, the Liceo was able to buy in Florence, at the Società Tecnica di Ingegneria ed Industria,[37] a great number of scientific instruments, one hundred and forty-two[38] in all, for a total cost of £ 5438.71.

Fig. 6. Merz telescope and detail of the engraved signature. Frontispiece of Taranto and Ingo's publication on the total solar eclipse of 1870

However, at least four[39] shipments had several problems.[40] A first group of seventy-seven tools arrived in Caltagirone on August 1st, 1885; on December 25th of the same year a second group of thirty-six pieces, some of which are still present in the Physics Laboratory of the Liceo "Bonaventura Secusio". Some of this batch of tools are remarkable and deserve to be mentioned: a centrifugal machine with its accessories (£ 140), a Coulomb's torsion balance (£ 90), a Gay-Lussac pump (£ 80), an intermittent fountain (£ 60), forty Bunsen[41] cells (£ 200) and a Geissler tube shaped in order to create the name "E. Taranto". There was also a large Winter-type electrostatic generator

[36] They are: a galvanometer, Nobili pattern, signed "Ruhmkorff à Paris"; a radiant heat thermopile, Nobili-Melloni pattern, signed "Ateliers Ruhmkorff J. Carpentier Ing^{r} Const^{r}. Paris"; an induction coil, certainly made by Ruhmkorff even if it is not signed. The latter has a circuit-breaker or "rheotome", designed by Auguste Arthur de la Rive, which consists of an oscillating piece of iron, the hammer-breaker, which operates with the force of gravity.

[37] The company, founded in Florence, around 1875, by engineer Guido Vimercati, supplied all high schools and several universities. It marketed collections of Natural Science, Mineralogy and educational science equipment assisting teachers of Chemistry, Physics, Astronomy and Meteorology. In 1869 Vimercati founded the *Rivista Scientifico-Industriale delle principali scoperte ed invenzioni fatte nella Scienza e nelle Industrie*, a popular journal on the scientific and industrial discoveries of the time. It had a great success and, by 1879, contributed through advertisements to promote Vimercati's company.

[38] Of this group of devices today only about 35% survived; currently this equipment is still preserved in fair condition in the Physics Laboratory of the School.

[39] The number is known from the reading of the historical inventory of 1888. Here two additional invoices, dated March 31st and July 30th, 1886, demonstrate the purchase of other laboratory tools.

[40] Some apparatuses arrived broken, others, though regularly ordered, did not arrive. In all these cases, the school requested the replacement or reshipment of the missing pieces to the Florentine firm.

[41] Actually only thirty-seven cells arrived, whereby a letter was sent to request the missing cells. Each of them had its own porous vase.

(£ 530), which arrived damaged[42] and which today has unfortunately disappeared. A third batch of thirteen pieces arrived in Caltagirone on March 28th, 1886; among these there was also a double anchor dynamo-electric machine, Siemens system (£ 280), still preserved in the Liceo; its advertising[43] image (Fig. 7) circulated in the scientific-industrial magazine of Vimercati in those years and was certainly noticed by Prof. Ingo[44] who bought it.


Società Tecnica di Ingegneria ed Industria
FIRENZE — Via San Pietro, 4 — FIRENZE

Materiale Scientifico

Macchina dinamo-elettrica a mano

Fig. 7. Advertising insert about a dynamo-electric machine and the apparatus purchased in Florence in 1886

Finally, a couple of scientific instruments arrived on December 31st, 1886; between them there was a portable camera obscura, Chevalier tent type (£ 100), which is still preserved in the Physics Laboratory of the Liceo. In 1887, Prof. Ingo retired, and his chair passed to Prof. Antonio Di Bernardo. At the same time, with the transformation of the Liceo into Regio Liceo and with the improving of the municipal accounts, the Natural History chair was separated from that of "Physics and Chemistry" teaching so that this latter field of study became a single subject of study once again.[45] Prof. Di

[42] The machine, whose circular glass plate had a one meter long diameter, arrived with the brass globe of the primary conductor dented and the green glass rod foot broken. Both problems were promptly notified, by letter, to the Technical Society of Florence, which provided to send the spare parts.

[43] Since 1885 the image has been on the back cover of several issues of the magazine, accompanied by an explanatory note of the instrument. It was part of the advertising used by the company to promote its scientific equipment.

[44] Such apparatus is mentioned in the inventory of 1888, N° 220. Next to it there is the following note: "in conformity with the cover [image] of the magazine [*Rivista Scientifico-Industriale*], as amended in accordance with the Siemens system £ 280". For an example of such advertising see the back cover image of the *Rivista Scientifico-Industriale delle principali scoperte ed invenzioni fatte nella Scienza e nelle Industrie*, Volume XVIII, N° 1, January 15th, 1886.

[45] In addition to Physics and Chemistry, also Italian became a single teaching chair. As consequence chairs in the high school increased from five to seven. Approving the transformation of the Liceo, the City Council was obliged to give the government £ 17,500 per year and to pay the seven teachers, one of whom was hired with the role of headmaster in the School. The single chair of Physics and Chemistry was maintained until 1936. After this date the teaching of Physics was linked to Mathematics.

Bernardo held the new chair of Physics and Chemistry from September 1887 to August 1898. With the separation of Natural History from Physics also their laboratories also passed under the direction of two different teachers and the Municipality arranged to supply them with new scientific materials in order to meet teaching needs.

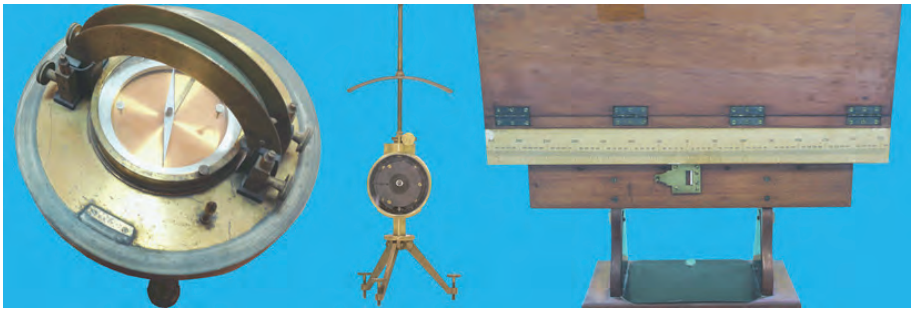

Fig. 8. From left to right: sine and tangent galvanometer Siemens model, Thomson's astatic mirror galvanometer with related optical scale

The consultation of the second found handwritten inventory, the one started in 1914 by Luigi Mendola, a professor of Physics and Chemistry, has given a number of information about purchases of instruments made in that period. The comparison between the latter inventory and the one of 1888 shows that from 1888 to 1912[46] about one hundred scientific instruments were bought by the Municipality for the Physics Laboratory. Among the tools acquired, which are still preserved in the collection of the School, at least a couple of galvanometers (Fig. 8) deserve to be mentioned. The first is a Thomson's astatic mirror galvanometer,[47] tripod and astatic type, signed "Elliott Bros. London N° 926", provided with a lamp (missing) and a calibrate scale[48] that registered the beam of light reflected from the galvanometer; the second is a sine and tangent galvanometer. It is a two needle Siemens model with two coils of wire of different resistance. From September 1900 to August 1902, the chair of Physics and Chemistry in the College passed from Prof. Di Bernardo to Prof. Lavoro Amaduzzi,[49] and from

[46] Later, from 1912 to 1914, forty-three other pieces were purchased by Mendola.

[47] This highly-sensitive apparatus was invented in 1857 by William Thomson (Lord Kelvin). Due to its extreme sensitivity this mirror galvanometer was used as receiver in telegraph systems for submarine cables in the second half of the nineteenth century. The piece preserved in Caltagirone is an astatic version of the original mirror galvanometer and is dated about 1890. It is equipped with a curved and adjustable magnetic bar used to neutralize the earth's magnetic field and with a light concave mirror placed at the center of a vertical coil. The mirror reflects a beam of light onto a scale that was usually provided with the instrument.

[48] It is a graduated horizontal scale mounted on a mahogany and brass support for the reading of small angular deflections. The scale is signed "Elliott Bros" and is provided with 700 divisions and a vertical central narrow slit for the lamp (missing).

[49] Amaduzzi (1875-1931) graduated in Bologna in 1898 with Augusto Righi and soon after he became his assistant. After teaching in Caltagirone he moved to the technical school in Bologna. In this period he substituted Righi and also taught university courses in Bologna and Ferrara. In 1923 he obtained the chair of experimental Physics at the University of Parma.

December 1904 to August 1923 to the above mentioned Prof. Luigi Mendola.[50] Finally, from 1923 to about 1960, 175 new instruments were bought with funds from the annual endowments of the Ministry of Education for a total cost of about £ 100,000.

6. Conclusions

Today, the entire collection of historical scientific instruments of the Liceo "Bonaventura Secusio" in Caltagirone is preserved in twenty large fir closets (recently restored) placed in two large rooms on the ground floor, about 30 square meters each. In recent years, with foresight, the Liceo has promoted the retrieval, restoration, cataloguing and study of this large and important instrumental heritage, which is a source of pride for local school and town community as a whole. It is a very important cultural opportunity, not only for the promotion of the scientific tradition of the Liceo but also in the context of a more general study aimed at the rediscovery of the physical, astronomical and natural sciences which have developed in Caltagirone since the end of the eighteenth century. On this basis, the creation of a Physics Laboratory Museum within the Liceo "Bonaventura Secusio" plays a key role both as a place of "memory" and cultural identity for the community, and also for a more effective and problematized scientific teaching.

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[50] Mendola was headmaster at the Liceo "Bonaventura Secusio", from 1923 to 1938. Before teaching in this school, he had also been assistant in the Physics department of the R. Università of Catania, from 1894 to 1901, and assistant in the R. Osservatorio Astronomico of the same city, from 1901 to 1904.

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Abbreviations
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Delibera del Consiglio Comunale (1863), N° 11, May 15th, 1863, reg. 69. ASCC.

Delibera del Consiglio Comunale (1865a), N° 2, April 27th, 1865, reg. 72. ASCC.

Delibera del Consiglio Comunale (1865b), N° 1, July 15th, 1865, reg. 72. ASCC.

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