

Introduzione

È consuetudine raccontare ai visitatori del Colle di Galileo (ma lo si trova anche su pubblicazioni passate e presenti) che l’insediamento dell’Osservatorio e di altri edifici della Facoltà di Scienze ad Arcetri sia dovuto ad una sorta di collegamento ideale con il grande scienziato, che passò gli ultimi anni della sua vita nella vicina Villa Il Gioiello. In realtà, la scelta di Arcetri rispose a logiche ben più prosaiche. Per l’Osservatorio fu la necessità di avere la cima di una collina, relativamente vicina alla città, priva di costruzioni e con un saldo sottosuolo roccioso.
ulty of Sciences at Arcetri is the result of some kind of ideal connection with the famous scientist, who spent the last years of his life in the nearby Villa Il Gioiello. Actually, the choice of Arcetri was determined by far more prosaic reasons. The Observatory needed to be on the top of a hill, relatively close to the city, without buildings of any kind and on firm, rocky ground. The other institutes, by contrast, took advantage of land belonging to the Observatory and available to the Institute of Higher Education of Florence for Practical and Advanced Studies (which became the University in 1924).

Fra i primi a proporre l’utilizzo di quel terreno, il Podere della Cappella, fu Antonio Ròiti (1843-1921), titolare della cattedra di Fisica dell’Istituto dal 1880 al 1913. Nel 1884 Ròiti presentò un progetto per impiantarvi un nuovo Istituto di Misure Elettriche, che però non fu mai realizzato. Ne presento qui l’inedita vicenda, insieme ad alcune informazioni storiche sul Podere e su come venne in uso dell’Istituto.

Il Podere della Cappella

Il 23 gennaio 1866 sulla Gazzetta Ufficiale del Regno d’Italia venne annunciata la vendita di una serie di beni demaniali in origine appartenuti alla tenuta granducale della Villa del Poggio Imperiale.1 Fra i lotti offerti, tutti posti fra l’attuale via Senese e la zona di Arcetri, vi era anche quello della “Villa e podere detti della Cappella”, costituito da poco più di 3 ettari di terreno, un fabbricato colonico ed uno civile (Fig. 1).

L’annuncio non sfuggì all’attenzione di Giovan Battista Donati (1826-1873), professore di astronomia dell’Istituto, che nel 1865 aveva individuato nella collina di Arcetri la collocazione adatta per un nuovo osservatorio astronomico. Come scrisse al suo superiore, il fisico Carlo Matteucci (1811-1868), direttore del
The announcement did not escape the attention of Giovan Battista Donati (1826-1873), Professor of Astronomy at the Institute, who in 1865 had set his sights on the Arcetri hill as the suitable location for a new astronomical observatory.\footnote{As Donati wrote to his supervisor, the physicist Carlo Matteucci (1811-1868), director of the Museum of Physics and Natural History and president of the School of Physical and Natural Sciences at the Institute, the Podere della Cappella would turn out to be quite useful:}

I humbly call to your attention a plan to transfer the Astronomical Observatory elsewhere and that the new location that has been chosen is close to the Villa del Poggio Imperiale. Precisely, it is on a farm belonging to Mr. Vitolini. \[\ldots\] quite close by there is a farm which is currently owned by the Government. This one \[\ldots\] is called the Podere della Cappella. \[\ldots\] given that the Podere della Cappella is close to the location that has already been chosen, and considering that when the Observatory will be built on the above-mentioned location we will need to create access to it on the Piazzale del Poggio by means of a road that would have to go exactly through the Podere della Cappella, there can be no doubt that the sale of Podere della Cappella would be quite damaging. Because that land could serve as very important and useful addition for the New Observatory, I believe it is my duty to bring to your attention that halting the sale of the Podere della Cappella would be of the greatest advantage for the future destiny of our Observatory. I therefore humbly ask you to inform the Royal Government of the reasons stated above.\footnote{The sale was duly suspended and the project modified to include the new access road through the Podere.\textsuperscript{4} The land was assigned to Donati by the State Property Office in several}

The Electrical Institute at the Podere della Cappella

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\caption{Maps of the General Tuscan Land Registry, Village of Galluzzo, Section B, sheet 1, 4 and 6. The “Podere della Cappella” is in grey, while buildings, roads and current cadastral borders of the Arcetri area are shown in purple. Images obtained from the website “GEOspio della Regione Toscana” (www.geografia.toscana.it).}
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stages: the first transfer, in August 1868, concerned a small tract of land of about one hundred square meters located in the upper corner of the Podere (at the level of the current Solar Tower), on which Donati provisionally installed the dome of the Amici Telescope. The final transfer took place in 1870, when the Podere was united to the lands on which the Observatory was situated, which had been expropriated from the owners Bartolommei-Passerini and Vitolini. In the meantime, the astronomer was able to incorporate the assignment of the Podere into the official project of the construction of the Observatory. In the report given to the Chamber of Deputies on 30 April 1869, Member Domenico Berti (1820-1897) provided a somewhat colourful justification of its utility for the Observatory:

The location chosen for the new observatory is private property. Access to the location would be gained by constructing a road through a farm (known as the Podere della Cappella). The Podere is state property, of the value of eleven thousand lire, as indicated by a certificate of the State Property Office. The Commission believes that the new observatory would be greatly disadvantaged were construction to take place on this state land located next to the observatory: whether in the form of a building which somehow limited its view, or, even worse, a workshop or factory with smoke coming from large or small smokestacks which would make astronomical observations difficult or in some cases even impossible. The Commission therefore deems that this property should be assigned to the observatory, in the spirit of a saying of a respected astronomer of ours that “observatories are like fortresses: they cannot tolerate having anything around them.”
The sort of defense that the Podere might provide for the “fortress” of the Observatory would have been unusual indeed! The Observatory’s structure, on the top of the hill, was devoid of any protection for almost its entire perimeter and was connected to the Podere, which occupied a lower elevation, merely by a narrow strip of land.

Beginning in 1873, the Institute first “share-farmed” and then rented out the Podere. What is noteworthy is the variety and quantity of plants on the land: 2974 grapevines, 383 grape cuttings, 288 olive trees, 364 poplars, 272 peach trees, 74 fig trees, 45 plum trees, 25 cherry trees, 76 pear trees, 36 apple trees, three jujubes, two walnut trees, three almond trees and 19 willows!

While the Podere was assigned to the Institute, the house known as the “Villetta della Cappella” was included in the Crown Estate. In 1872 the house was rented first to Donati and then to the Institute for use by the Observatory staff. It was still included in the Civil List when some unknown person, “with the consent of the Royal House,” affixed a “note to posterity that on the night of 20 September 1873, Giovambattista Donati [...] died in this house of the plague.” In 1873 the Institute rented another building from the Royal House, the SS. Annunziata Building in today’s via Gino Capponi, to which were transferred the departments of Physics, Chemistry and Physiology, previously located in the Museum in via Romana.
In February 1880, Antonio Ròiti became Professor of Physics at the Institute of Higher Education of Florence. Educated at the University and at the Scuola Normale of Pisa, Ròiti had been Professor of General and Applied Physics at the Technical Institute of Florence from 1871 until 1878 and subsequently Professor of Experimental Physics at the University of Palermo. A talented experimenter and able teacher, Ròiti revived the study of physics in Florence after the position of chair had been vacant for some eleven years.8

Since his years at the Technical Institute, Ròiti had been working on electrical measurements and magnetism. In April 1882, he published the description of a method to determine the unit of measure for resistance, the ohm (Ròiti 1882). This was a topic of great interest at the time, as the 1881 International Electrical Congress in Paris had decided to establish an international commission for its measurement. The Ministry of Education assigned the job to Ròiti, who published his results (Ròiti 1884) and presented them to the International Conference for the determination of electrical units, held once again in Paris between April and May 1884 (Ròiti 1884a).

The scientific discussions at the Conference gave Ròiti the idea of establishing in Italy a “national Institute with the aim of meeting [...] the needs of industry and of science for everything regarding the construction, preservation, reproduction and verification of instruments for electrical measurements.”9 Upon returning from Paris, Ròiti proposed his idea to the Minister
of Education Michele Coppino (1822-1901), who encouraged him to present an outline of the project. Ròiti got working on it immediately.

The project called for the construction of two buildings, the first of which was to be constructed according to precise specifications:

Absolute electrical measurements require a building with very specific characteristics. As far as possible the structure must contain no magnetic substances and must therefore be built solely of stone, wood, brass and bronze. It should have rooms which as far as possible are not subject to sudden changes in temperature; hence it must be positioned in an adequate manner and have thick walls and several rooms below ground. It must be built with maximum stability and therefore have most of its foundation on rock.

As absolute measurements require stability and the consistency of the magnetic field, the building must be erected in an open area far from human traffic and with restricted access. This area must have an extension such that on all sides the building stands about forty meters from the perimeter of the land hosting it.

A lack of isolation for laboratories was indeed a cause of problems for experiments. Prior to this project, Ròiti was forced to make use of a country villa near Galluzzo to carry out several precise measurements (Ròiti 1878). For ohm measurements, on the contrary, Ròiti had to contend with interferences made deliberately: “another circumstance, which caused me much sorrow, rendered uncertain a long series of experiments: [...] I had the misfortune to have as a neighbour Prof. Schiff, who—difficult as it is to believe—would carry long pieces of iron back
and forth, even after formally promising me that he would abstain from doing this” (Ròiti 1884). This “public complaint” speaks volumes about the problems of cohabitation in the SS. Annunziata Building facing the laboratories of Physics, Physiology and Chemistry (the last of which was chaired by Hugo Schiff [1834-1915]). Ròiti’s later opposition to the installation of electric lighting in the Institute of Physics (Ronchi 1977) is therefore comprehensible: he reacted with the needs of his laboratory in mind, and not on reactionary or old-fashioned impulses. On the contrary, as councilman for Florence from 1888 to 1890, Ròiti played a role in the decisions leading to the first public electric lighting in the city.

The second building in the project, to be used for laboratories and workshops, had by contrast less stringent requirements and could be constructed with less expensive materials (brick and iron). Within this building scientists could conduct the kind of work and experiments requiring “steel and iron instruments and tools, rapid movements, powerful magnets and intense electrical currents,” which would have been adverse to absolute measurements. From this structure, a long connecting corridor would have provided the only point of access to the building for absolute measurements. Finally, a surrounding wall would keep outsiders at bay.

The total cost for the buildings, equipment and personnel would have been far from negligible, had not Ròiti “thought up a plan that on one hand insures the construction of the plant and the smooth functioning of the Electrical Institute and on the other does not require undue financial sacrifices.” The solution was to annex the new establishment to the Institute and to construct it on the Podere della Cappella, thereby saving the cost of a land purchase and also allowing its
Il secondo edificio del progetto, ad uso di laboratorio e officina, aveva invece requisiti meno stringenti e poteva essere costruito con materiali più economici (mattoni e ferro). Al suo interno si sarebbero dovute effettuare quelle lavorazioni ed esperienze che, con l’utilizzo di “strumenti ed utensili d’acciaio e di ferro, movimenti rapidi, calamite possenti, ed intense correnti elettriche” sarebbero state nocive alle misure assolute. Da questo edificio, un lungo corridoio di collegamento avrebbe fornito l’unico accesso all’edificio per le misure assolute. Infine, un muro di cinta avrebbe dovuto tenere lontani gli estranei.

La spesa totale per edifici, strumentazione e personale non sarebbe stato certo modica, se Ròiti non avesse “escogitato tale combinazione che può assicurare l’impianto ed il buon funzionamento dell’Istituto Elettrico, senza richiedere rilevanti sacrifici pecuniari”. La soluzione era di annettere la nuova istituzione all’Istituto e impiantarla nel Podere della Cappella, così da risparmiare sull’acquisto del terreno e poter usufruire delle determinazioni di tempo fatte a breve distanza dagli astronomi dell’Osservatorio. Uno schema del nuovo Istituto su una pianta catastale del Podere della Cappella era allegato al progetto (Fig. 2). Un ulteriore risparmio sarebbe venuto dalla cessione al nuovo istituto di tutti gli strumenti del laboratorio di Fisica dell’Istituto di Studi Superiori di Firenze non necessari alla didattica.

Ròiti aveva ottenuto il parere favorevole della Sopraintendenza dell’Istituto di Studi Superiori, che allegava al progetto. La risposta, datata 12 luglio 1884, era positiva, ma non offriva un appoggio incondizionato: il Consiglio Direttivo era disposto a concedere l’utilizzo del terreno, ma non poteva disporre della Villetta,
richiesta da Ròiti per il personale, nè acquistare una piccola porzione di terreno a sud del podere, che il fisico riteneva necessaria per rendere l’edificio delle misure assolute equidistante dai confini. Inoltre, si riservava di valutare la cessione degli strumenti dopo averne esaminata una lista dettagliata.

Il progetto di Ròiti continuava con una descrizione sommaria dell’edificio per le misure assolute e una stima della spesa totale, di 200000 lire. Sarebbe poi occorsa una dotazione annua di 20000 lire per il funzionamento e il personale consistente in direttore, vicedirettore, assistente, meccanico di precisione, custode/falegname e portiere/inserviente. Quindi, concludeva Ròiti,

la combinazione propostale dal sottoscritto per assicurare all’Italia un servizio regolare ed indipendente di misure elettriche porterebbe ad una spesa relativamente tenue, questo riguardo all’importanza di un’istituzione, che è imperiosamente richiesta dal decoro del nostro paese, il quale non deve lasciarsi in condizioni di inferiorità rispetto a paesi minori per cosa che riguarda la scienza e l’industria insieme.

Figura 2. Pianta geometrica catastale del R. Osservatorio d’Arcetri e del podere annesso (ASOAA, Appendice). Lo schema dell’Istituto proposto da Ròiti è indicato a matita. Si noti la sottile linea che indica la zona di rispetto intorno all’edificio a est (quello delle misure assolute) distante circa 35 metri dai confini del Podere, dalla strada interna e dagli edifici preesistenti.

Figure 2. Surveyor’s cadastral map of the Arcetri Royal Observatory and the annexed farm (ASOAA, Appendix). The drawing of the Institute proposed by Ròiti is shown in pencil. Note the thin line indicating the buffer zone around the building to the east (the one designated for absolute measurements), at a distance of about 35 meters from the Podere’s perimeter, from the internal road and from the pre-existing buildings.
which is of absolute necessity for the prestige of our country: Italy cannot allow itself to remain in an inferior position with respect to other less important countries in matters concerning both science and industry.

We don’t know why the proposed institute was not built. Perhaps the expenditure was not so “modest” after all; perhaps the response of the Governing Board of the Institute was tepid. To be honest, we don’t even know whether the project, which has come down to us in the form of a draft, was ever sent to the Ministry. Yet we do know that Ròiti continued to harbor his idea for some time: among the documents that we have is an article, which Ròiti copied by hand, published in Nature on 16 September 1886 stating that the Electrical Standards Committee of the United Kingdom expressed its desire for the prompt institution of a permanent home for a “Standardizing Laboratory for Electrical Instruments.” It was therefore not too late for Italy to emerge from its “inferior position,” in this case with respect to more technologically developed European nations. (The United Kingdom’s National Physical Laboratory was founded in 1900.) In Italy, by contrast, a metrological institute in the field of electrical engineering, the Galileo Ferraris National Institute of Electrical Engineering in Turin, was only founded in 1934.

From the Institute of Electrical Measurements to the Institute of Physics

In the last years of his academic career, Ròiti was increasingly involved with institutional appointments. He was director of the School of Physical and Natural Sciences from 1894 to...
1908, when he stepped down from this and other appointments for health reasons. In 1911 he asked to be granted early retirement for the same reasons and delegated his teaching responsibilities to two substitutes, his assistants Luigi Puccianti (1875-1952) and Antonino Lo Surdo (1880-1949). His retirement was finally granted in November 1913. The next month Ròiti was made emeritus professor, and Antonio Garbasso (1871-1933) succeeded him as Chair of Physics.

In spite of the gradual decline of his influence, we are justified in supposing that Ròiti played a role in the process that ported in primo luogo alla stipula della convenzione fra Ministero di Istruzione Pubblica, Tesoro, Comune, Provincia and Cassa centrale di risparmi e depositi di Firenze per “l’assetto del Regio Istituto di studi superiori pratici e di perfezionamento in Firenze” (legge 856 del 22 giugno 1913); and successively ai progetti per la costruzione di un nuovo edificio per l’Istituto di Fisica, previsto (e finanziato) dalla convenzione. Quindi può darsi -ma siamo sempre nel campo delle supposizioni- che abbia in queste circostanze ricordato ai colleghi e agli amministratori dell’Istituto la sua antica proposta. Maggiore luce sull’evoluzione del progetto per il nuovo Istituto di Fisica potrà forse venire in futuro da un’attenta analisi della documentazione nell’Archivio Storico dell’Università di Firenze.

Comunque, il primo progetto -a firma dell’architetto Gino Marchi- privilegiava ancora la comodità della sede cittadina, con il nuovo edificio impiantato in un angolo del Giardino dei Semplici, a scapito dell’Orto botanico e nello stesso complesso di edifici di cui faceva parte la Palazzina di via Ginori (CARDINI & TARCHIANI 1986). Ma questa soluzione, oltre a trovare l’opposizione della direzione dell’Istituto Botanico e di parte della cittadinanza, avrebbe avuto “per la contiguità della strada, […] presso a pochi gli stessi inconvenienti” della vecchia sede. Quindi gli stessi problemi di “isolamento” che Ròiti avrebbe voluto risolvere con il suo progetto. Continuo citando il verbale dell’adunanza del Consiglio Direttivo dell’Istituto del primo maggio 1914:

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the Botanical Institute and a part of the citizenry, this solution, “given its proximity to the street,” would have given rise to “more or less the same inconveniences” as at the old site. These were, then, the same problems of compromised “isolation” which Ròiti aimed to solve with his project.

Let us continue our story by citing the report of the meeting of the Institute’s Governing Board on 1 May 1914:

It was then proposed that we look into other locations for the construction of the building for Physics. After numerous sites were examined by the Director of the Faculty of Sciences, the Professor of Physics and others, a project was presented calling for the construction of the Institute at Arcetri, specifically, on the most inclined portion of the land near the Poggio Imperiale. In its meeting on 30 April, the above-named Faculty decided to make a formal proposal to this effect, which has already reached the Superintendence.

After discussing possible inconveniences resulting from its distance from the town center, the Board unanimously approved the move to Arcetri. Architect Marchi promptly prepared a
new project (Fig. 3). For subsequent developments I refer the reader to the recent centenary celebration of the placing of the roof on the new building and its accompanying publication (CASALBUONI ET AL. 2016).

The new construction meant the definitive elimination of the Podere, both with regard to its cultivation and its buildings: as had already been planned in Marchi’s 1914 project, the farmhouse was demolished to make room for the new entrance gate on “Galileo’s Hill,” which was inaugurated in 1934 (RONCHI 1977).

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RÒITI, A. 1884a, *Della conferenza internazionale per la determinazione delle unità elettriche adunatasi a Parigi nel 1884: ragguaglio fatto a S.E. il Ministro...*

Notes

1 According to *RONCHI* (1977), the estate consisted of “four farms [...] which took the collective name of *Quattro Capanne* (‘Four Huts’). Actually, only one of the 12 farms up for sale in 1866 bore the name ‘Farm of the Quattro Capanne.’”
For the history of the planning and construction of the Arcetri Observatory, see Bianchi, Galli & Gasperini (2013).

3 Draft of letter to the director of the Museum, 29 January 1866, Archive of the Astronomical and Copernican Museum, INAF-Monte Porzio Observatory, Donati Collection.

4 Minister of Education to the Superintendent, 8 January 1867, Historic Archive of the University of Florence, Carteggi della Soprintendenza, year 1867, file 9 (hereinafter Sup.). The same archive houses the Reports of the Meetings of the Governing Council, cited below.

5 Documents relating to the transfer of the Podere are to be found in the Historic Archive of the Galileo Museum: ARMU affairs 71, file 56, and in Sup. 1868/123, Sup. 1873/36. References to the contracts of expropriation are to be found in Sup. 1888/6, 1891/67 and in the Historical Archive of INAF-Arcetri Astrophysics Observatory (ASOAA), Donati Collection, 1013.

6 Rent contract to Giovanni Favilla, 8 February 1895, Sup. 1894/156.

7 The Cappella House and the SS. Annunziata Building were included in the Civil List by law 4527 of 26 August 1868 and transferred back to the State Property Office by law 3853 of 31 May 1877. For the Institute’s tenancy see the reports of the Meetings of the General Council of 31 March and 12 July 1873. For the Via Ginori Building, see Cardini & Tarchiani (1986), who maintain that the state-owned buildings were given to the Institute free of charge and in perpetuity with its advancement to University in 1923.

8 For a history of the study of physics in Florence see Mandon (1986); for a biography of Röiti, see Bianchi (2017).
Consiglio Direttivo del 31/3 e 12/7/1873. Per la Palazzina di Via Ginori si rimanda a CARDINI & TARCHIANI (1986), secondo cui gli edifici demaniali passarono in uso gratuito e perpetuo all’Istituto con il riconoscimento di questo in Università nel 1923.

8 Per una storia degli studi di fisica a Firenze, si veda MANDÒ (1986); per una biografia di Ròiti, BIANCHI (2017).

9 Qualora non indicato altrimenti, le citazioni riprodotte in questo paragrafo vengono dalla minuta del progetto, non datata, conservata in ASOAA, Appendice, Istituto di Misure Elettriche. La minuta e gli altri documenti relativi, fra cui alcune mappe catastali e topografiche, sono stati acquistati sul mercato antiquario alla fine del 2007. Altri documenti si trovano in Sopr. 1884/243.

9 Unless otherwise indicated, quotations in this paragraph are taken from draft of the project (undated), preserved in ASOAA, Appendix, Institute of Electrical Measurements. The draft and other related documents, including cadastral and topographical maps, were purchased from antique dealers at the end of 2007. Other documents can be found in Sup. 1884/243.