

PROPERTY AND INSTRUMENTAL HERITAGE OF THE BORDEAUX ASTRONOMICAL OBSERVATORY; WHAT FUTURE?

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Abstract. In the years 1870, the Government of the Third Republic decided to develop scientific and technical research. Such an effort contributed to supporting and creating universities and other institutes such as astronomical observatories. The dual wish of the Bordeaux council and professors at the Faculté des Sciences de Bordeaux led to the foundation of the astronomical Observatory of Bordeaux. It was set up by Georges Rayet in the years 1880's. The observatory owns a property of 12 hectares with a dozen of buildings, five domes housing an instrument, a Würzburg radiotelescope, a 2.5 meter radiotelescope, and a large collection of about 250 instruments, 4 500 photographic plates, drawings, slides for teaching astronomy, maps of the Carte du Ciel and 200 files of archives. In addition, the library contains about a thousand books for the period 1600-1950. The future of the observatory is not clear at the present time, when the Laboratoire d'Astrophysique will leave to the campus in a few years.

1 Introduction

At the end of the Franco-Prussian war, the defeat of Sedan (September 1870) and the surrender of the Emperor Napoléon III lead to the advent of the Third Republic. After some turbulent years, the new Government decided to develop universities which had been given up during the last two decades. In this framework, some decrees were taken by the Government, in particular about astronomical observatories, under the impetus given by Jules Simon (1814-1896), Minister of Public Education of the Provisional Government and then as Prime Minister. A first decree was signed in 1873 about astronomical observatories, in 1875 about the Bureau des Longitudes. In 1878, several decrees were taken about the foundation of the Besançon, Bordeaux and Lyon observatories. In the meanwhile, Georges Rayet (1839-1906) is appointed lecturer to the chair of astronomy newly created at the Faculté des Sciences de Bordeaux, then given a permanent appointment as professor in 1876. As soon as Georges Rayet settles in Bordeaux, he works for the foundation of the Bordeaux Observatory. In 1877, a property is purchased at Floirac, on the hills of the right bank of the Garonne river by Maréchal de Mac-Mahon, Minister of Public Education, Worships and Beau-Arts. On 16 January 1879, Georges Rayet is nominated Director of the Bordeaux Observatory and works on the definition of the instruments to be built for astronomical works. He was helped in his task by trips to Italy in 1875 and to Germany in 1879 where he visited a large number of observatories, taking numerous hand-written notes in small notebooks kept in the archives of the observatory.

2 Collection of buildings and instruments

The observatory was constructed in an ancient property successively own by various middle-class persons of Bordeaux growing woods and vineyard. The sixteenth century house, rebuilt and extended in 1839, is used as housing of the director. Georges Rayet supervised the construction of four buildings: the main building housing the meridian circle, two towers for equatorial telescopes and a small building with two separated wings for measuring magnetic field and telluric currents. In addition a meteorology station with various instruments was also installed, since G. Rayet was previously in charge of meteorology measurements at the Paris Observatory and meteorology was also a motivation for the new Bordeaux Observatory (Fig. 1). Three instruments were installed in the 1880's. All details of negotiations between Georges Rayet, the Minister of Public Education, the

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Fig. 1. The Rayet building with central part housing the meridian telescope, Cliché Rose©INSU.

city of Bordeaux, and the instruments makers are found in Maison (2004). They were ordered to the instrument maker William Eichens (1818-1884) in Paris. The first one is the meridian telescope with an aperture of 18,95 cm, installed in 1880, in the central part of the building now called the "Rayet building". The meridian circle successively went through different technical modifications to improve the quality of measurements, the last one in the 1980's, when it was completely renewed, automated and controlled by a computer and the installation of a CCD camera. The internationally known instrument participated to the preparation of the input catalogue of the HIPPARCOS space mission. It is still in operation and several observation programmes are going on (Fig. 2).

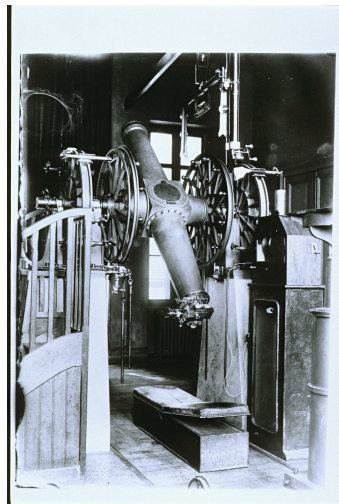


Fig. 2. The meridian telescope around 1890, Cliché M. Dubau©inventaire général ADAGP.

In 1880 a small equatorial telescope with an aperture of 18 cm was ordered, to be built by W. Eichens while the optic was made by Paul (1848-1905) and Prosper Henry (1849-1903) at the Paris Observatory. When Eichens was seriously ill and unable to go on with the construction of the some other ordered telescopes, different negotiations were undertaken between the directors of observatories and the Minister of Public Education to nominate Paul Gautier (1842-1909) in charge of the construction of instruments instead of Eichens' son. Finally the instrument was installed in 1881 (Fig. 3).

A large equatorial telescope with an objective of 38 cm was also ordered to W. Eichens and finalized by P. Gautier. The objective was ordered by G. Rayet during his trip in Germany in 1879 to the lens maker Merz. The instrument was operational in 1883. It served to observe comets and multiple stars thanks to its high

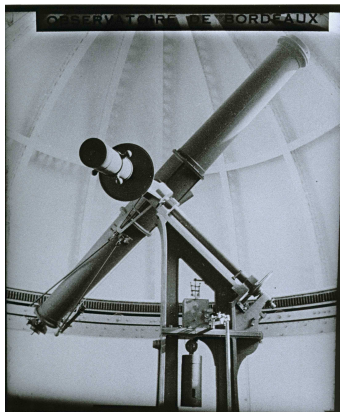


Fig. 3. The small equatorial telescope around 1890, Cliché M. Dubau©inventaire général ADAGP.

resolution power (Fig. 4).

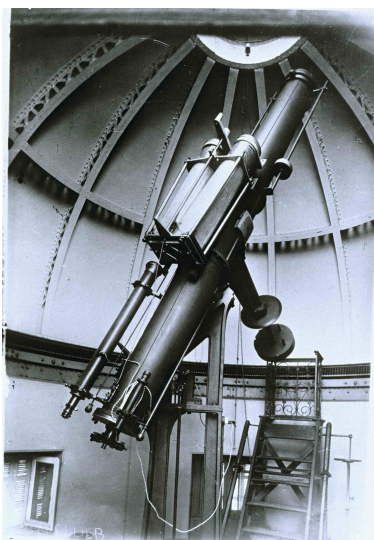


Fig. 4. The large equatorial telescope around 1890, Cliché M. Dubau©inventaire général ADAGP.

In the framework of the first large international project "Carte du Ciel" decided in Paris in 1887 and for Bordeaux described by Le Guet-Tully et al. (2008), an equatorial photographic telescope was built from the model of the prototype instrument designed and built by the Henry brothers at the Paris Observatory. Three such instruments were financed and ordered in 1889 by the Ministry and installed in Bordeaux, Toulouse and Alger. The astro-graphic telescope made by P. Gautier was inaugurated in 1891, the first plates being obtained in 1892. It is composed of two parallel telescopes with objectives of 33 cm, one being dedicated to observations to the eye, the second one to photography with photographic plates of 16 x 16 cm. A specific tower was built associated to a photographic laboratory and to a room for storing and measuring the plates (Fig. 5). After the death of Georges Rayet, Luc Picart (1867-1956) was nominated director from 1906 to 1937. Then Gilbert Rougier (1886-1947), from the Strasbourg Observatory, took the direction and was in charge of the construction of a large building (now named "Bouguer") in the years 1942-1943, as well as the tower containing an equatorial table, now holding up a mirror telescope of 60 cm diameter, equipped with a new CCD camera. Pierre S mirot (1907-1972) succeeded G. Rougier and developed the observatory by introducing radioastronomy techniques et observations in the years 1960's, with the installation of a radiotelescope using a W rzburg parabolic radar mirror of 7.5 m diameter, from the Second World War. P. S mirot also constructed a new building (now named "S mirot" building) in 1968, which was extended in 1986. Thus the Bordeaux observatory displays a panorama



Fig. 5. The photographic equatorial telescope around 1892, Cliché M. Dubau©inventaire général ADAGP.

of more than a hundred years of architecture. Recently, the "Commission régionale de protection des sites" of the Direction régionale des Affaires culturelles decided to protect nine of the twelve buildings (and instruments) of the observatory.

3 Collection of small instruments and other pieces

In addition to these observation instruments, the observatory owns a collection of about 250 smaller instruments: 150 instruments used in astronomy, 25 clocks and apparatus for time measuring, 15 instruments for meteorology and Earth physics measurements, 12 apparatus for geodesy, 7 instruments used for telegraphy, 5 photographic cameras, about 15 instruments for various uses. There are also 15 pieces of furniture as the director's desk and six associated arm chairs (end nineteenth century), leather beds and stepladders associated with the telescopes (Fig. 6) and (Fig. 7).

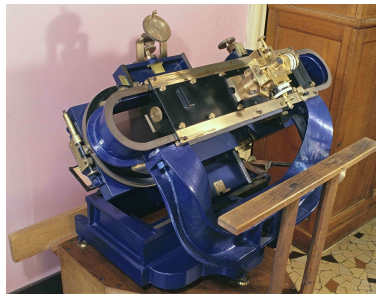


Fig. 6. Blink microscope built by P. Gautier in 1908, Cliché M. Dubau©inventaire général ADAGP.

For the period 1891-1996, the equatorial photographic telescope produced more than 5 000 photographic plates of which 4 322 are perfectly identified and well preserved at constant temperature and hygrometry. 500 of them were digitized (Ducourant et al. 2006; Rapaport et al. 2006). In 1890's, in order that astronomers be acquainted with photographic techniques, about 50 plates were taken of the buildings, instruments and persons of the observatory. Later on in the 1940's, Dubois (1950) took several hundredths photographic plates and spectra either at Floirac or at the Pic du Midi Observatory to study the Earth's shadow. There is also a large collection of glass slides used for teaching astronomy at the university.

A few drawings and watercolours complete the collection of observations made at the end of the nineteenth century. A very large number of printed maps either of the "Carte du Ciel" or of the Schmidt telescope of the European Southern Observatory is also kept in specific drawer furnitures. Finally, the observatory owns a very large of ancient and more recent documents of astronomy: a thousand books from 1605 to now, notices, periodic journals, etc. 200 files contain scientific, administrative and historical archives since the foundation of the observatory.



Fig. 7. Heliostat of Silbermann type, built by Duboscq in 1883, Cliché M. Dubau©inventaire général ADAGP.

4 Conclusions

The important collection of the Bordeaux astronomical Observatory belongs to the Université Bordeaux 1 as one of the nine scientific collections: Prehistory, Anthropology, Geology, Mineralogy, Palaeontology and micro-Palaeontology, oceanic cores, animal Biology and the collection of ancient books of the university library. All collections are presented in a brochure (Collective team 2006). At the present time, all collections are scattered in different places and buildings, sometimes in very bad conditions of preservation. Scientists in charge of the various collections are working together to speak in favour of getting a position of curator, to make known the great variety and the importance of university collections by publishing papers and preparing an exhibition to be presented in Bordeaux in 2010.

Therefore, there is a threat of danger for the astronomy collection since, in October 2006, the Direction of Research of the Ministry of National Education has scheduled that astronomers and technicians of the Laboratoire d'Astrophysique de Bordeaux should move to the Université Bordeaux 1 campus in Talence, as soon as possible. The desertion of the historic site of the observatory hangs over the future of the site threats of housing estate if the university, in the framework of its autonomy, does not decide to build a project of science animation site, as it could be possible in the framework of plans of a green belt of parks on the hills Hauts de Garonne, made by the urban community of Bordeaux.

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