

SAN FERNANDO NAVAL OBSERVATORY: 250 YEARS WORKING IN ASTROMETRY AND GEOPHYSICS (1753-2003)

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Abstract

San Fernando Naval Observatory is an ancient institution, founded in 1753 in Cádiz. It was the first Observatory deployed in Spain. The beginnings were devoted to research on positional astronomy and related fields, as Celestial Mechanics, in order to issue Nautical Almanac, and Astronomical Ephemeris. But soon the researching interest was extended in different ways, as Geophysics, Geodesy or Time Keeping and Dissemination. The researching in Spain on several Geophysical branches (Seismology, Geomagnetism, Meteorology) started here. The Observatory was also the first Spanish Institution hosting a satellite tracking device: The Baker-Nun Camera delivered by the Smithsonian Institution. It is also remarkable that the observatory has got the responsibility for Time Keeping in Spain. In this paper, we point out the main features, in order to show a general view of the history of this ancient but living Observatory

Introduction

We would like to show the historical evolution of the main duties developed at the San Fernando Naval Observatory since 1753, when it was founded, until now. It is the oldest astronomical observatory in Spain. Its origin is directly related to the Navy and the Science reactivation enforcement made by the illustrated governments during the 18th century. Jorge Juan was a naval officer and scientist who developed the idea of the installation of an astronomical observatory in a tower at the *Castillo de la Villa* in Cadiz, where the Naval Academy was placed. He was the director of the Naval Academy, and he tried to promote learning and practice Astronomy among the future naval officers.

A brief historical summary

In 1753 first instrumentation was mounted at Real Observatorio de Cdiz (Royal Cadiz Observatory), how it was called in the beginning. However, there were needed some years before the Observatory astronomical works gained some scientific notoriety. Vicente Tofio was the Naval Academy Director who organized the first systematic astronomic observation plan (1773-1776). After that, and with the aid of the King Carlos III government impelling scientific activities, Cadiz Observatory became a truth astronomical academy for the new generation of sailor scientists. They got scientific education needed to organize and participate in the expeditions developed at the end of the 18th century.

In 1798 the Observatory was moved from its original place at the *Castillo de la Villa* in Cadiz to a new building made at Torre Alta Hill in Isla de León, which was the name for San Fernando until 1814. In such a way the former *Real Observatorio de Cádiz*, changed its name for *Real Observatorio de la Isla de León*. So, the observatory came to

the 19th century with new installations and also with the first director who had no relationship with the Naval Academy. The observatory was becoming to reborn as an independent institution.

Along the 19th century, and once the crisis of the beginning of the century was overcome, the observatory was adding new missions to its astronomical duties, besides the yearly issue of the Nautical Almanac. First of all some scientific works were undertaken, as organizing, realizing and publishing meteo, magnetics and seismic observations, as well as the Observatory participation in the international project known as Photographic Sky Map. Moreover new duties were assumed, because the Naval Nature of the Observatory: Instrumentation and Timing Devices Store, Mathematics and Physics Naval High School, Magnetic Needles Center, and Coastal Meteo Service.

San Fernando Naval Observatory today

At present, two hundred and fifty years after its foundation in Cadiz, San Fernando Naval Observatory organizes its duties in four scientific departments. Astronomy Department main mission is due to astrometry, i.e. to determine positions of celestial bodies. The observatory has got its own astrometric instrument, a Grubb-Parsons Meridian Circle. In 1996 it was moved to the University of San Juan (Argentina) facilities at *Estación de Altura Carlos Ulrrico Cesco*. Furthermore, the observatory participates in the observation works made at La Palma Island by using the University of Copenhagen Carlsberg Meridian Circle.

The Ephemeris Department is also directly related to the Astronomy. Its main duty is to determine astronomical ephemeris, since 1791, at Cadiz, besides to disseminate this information among sailors, astronomers and geodesists. Other missions of this department are to perform theoretical studies related to Celestial Mechanics, and to report on astronomic phenomena, such as sunrise and sunset time, moonrise and moonset time, lunar phases or eclipses.

Geodesy and Geophysics are the duties of the Geophysical Department. It was born in mid nineteenth century. This department counts on the Naval Geophysical Observatory. It is the responsible unit for performing and yearly publishing meteo, geomagnetic and seismic observations. There is also a third generation satellite laser tracking station, and a set of GPS permanent receivers at the Alboran Sea Region.

Time Department was created in 1971, from the Time Service which belonged to the Astronomy Department until then. The task of this department is to keep time scales in use with the maximum precision and accuracy, and to disseminate this information in the most efficient way not only to the sailors necessities, but also to the scientific community and the national industry as well. It counts on a set of Cesium Atomic Clocks to keep the Universal Time Coordinate (UTC) scale at ROA, and to determine the Official Time in Spain.

On the other hand, San Fernando Naval Observatory develops a teaching activity which started with the so called Greatest Studies Courses given during the 18th century, in

order to improve the illustrated naval officers scientific knowledge. At present teaching duties are still given at the Physics and Mathematics Naval High School, to prepare naval officers to teach those subjects at the different Naval Schools.

Historical and cultural heritage accumulated at the institution is composed of the Ancient Instrument Collection, the Historical Archive and the Library. San Fernando Observatory has needed a lot of instrumentation to develop its activities along two hundred and fifty years working. The Historical Archive watches over administrative and scientific documentation generated at the departments since their very beginnings. At last, but not least, bibliographic funds kept at the Library are composed of a very interesting collection of books and scientific periodic publications.

References:

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