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ASTRONOMY IN OTTOMAN IN 16.CENTURY

The history of Ottoman science is the least known and researched field of history of science in Islamic civilization. It will not be an exaggeration to say that it is one of the most neglected areas.

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CHRONOLOGY

1517: Finish of building a shipyard in Haliç

1517: Piri Reis drew his first world map and gave to Sultan Selim

1521: Piri Reis wrote his book named Kitab-ı Bahriye

1528: Piri Reis drew his second world map and gave to Kanuni Sultan Süleyman

1530-1540: Divan-ı Selimi was written

1530-1588: Sinan became the first architect of the empire

1577: Takiyüddin started to do his first observations in Istanbul Observatory

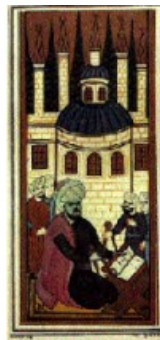
22 Ocak 1580: Istanbul Observatory was demolished

18 Kasım 1583: St. Benoît school was opened by Cizvits in Galata

1629: Saint Georges (French School) and St. Louis (Language Boys School) was opened by Cizvits again

THE EYE OF OTTOMAN THAT OBSERVES SPACE TAKİYÜDDİN AND ISTANBUL OBSERVATORY

The development of Astronomy has many events in its history. The long ocean-goings, the discovery of new continents supplied the development of Astronomy. Sea men drew simple but useful tables. With the help of these tables cheapest voyage increase the life level of people. They got educated and engineering became a job. That's why they started to work on maps and compasses that need brain-power. Parallel to this, Astronomy become a kind of job that makes money and it developed in scientific ways, too. After these the difference between Astronomy and Astrology was understood.



In 1500's in Europe, Copernicus was working on Astronomy and he found the first heliocentric model of our solar system. After these he got so many questions about earth's movement and gravity etc. Kepler, Galileo and Newton worked on these questions and found the answers.



Rasathanedeki gözlem çalışmalarını gösteren bir minyatür.

In 16. century these events were taking place in Europe; but at the same time in Ottoman there wasn't enough information about Astronomy, because they didn't have enough investigation. Islam religious, take the position of sun and moon for the ritual worship time. But for some calculations about the direction of Mecca, they took the help of Astronomic observations. Thus in Islamic country observatories were build. After the calculations and necessary observations all the observatories were closed, this was the first reason of their closure. The second reason was lack of interest and the appropriation wasn't enough.

In 1500's there wasn't enough information about Astronomy in Ottoman; but that doesn't mean that there was no study. In general there was collecting writings and translations from another sources. The important one is Seydi Ali Reis's book named "Muhit". It has 10 chapter. In the first chapter, it includes finding directions, azimuth and calculating the altitude of stars, in second chapter: calculating time, date, years that are related to sun and moon, in fifth chapter: some important stars's names, rising and setting times in navigation, in seventh chapter: important harbor's and island's latitude and in eight chapter: some informations about Astronomy and distance between important islands. The other important book with the sign of Mustafa Zeki is "Süllemü's Semâ". This book also include some informations about Astronomy and the distance of some sky objects from the earth.

Takiyüddin and Tycho Brahe

There was 2 astronomers that made observatories in Europe and Ottoman during 16. century. One of them was Danish Tycho Brahe. He made the first observatory of middle-epoch in 1576 on the Hveen Island with the permission of King II. Frederick.

During Tycho's works, there was another astronomer that was working in Istanbul. Takiyüddin was born in Şam in 1521. He got educatin about fıkıh, hadis and tefsir in Egypt and Şam. After that he was appointed to Egypt. He went to Istanbul and got more information about science. Mr. Abdülkerim, who works in Egypt as a muslim judge, give him some astronomy books and equipments for making an observation. So Takiyüddin started to work on Astronomy. For making new and more believable catalogs he needed to build an observatory.

The emperor III. Murat gave permission, place and money to build an observatory. We don't have enough proofs but e are sure that Istanbul Observatory was used between 1575-1580.

Measuring Equipments That Are Used in Observatory

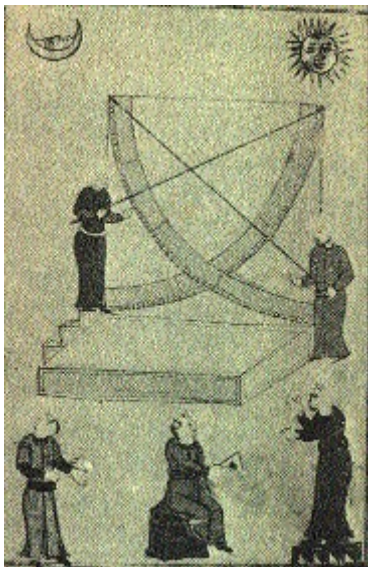


Takiyüddin'in made 9 basic equipments for observations. Zât-ül-Halâk was used to find latitude and longitude of the sky objects. Libne was used to calculate the altitude of the sky objects on the meridian line. We can also find the equatorial coordinates of the sky objects with this equipment. Takiyüddin calculated the slope of ecliptic, too. Zâtü's-Semt ve'l-İrtifâ was used to find the altitude and the azimuth of the object. Zâtü's-Semt ve'l-İrtifâ was primitive state of tedolitin that we use today, too. Takiyüddin used Zâtü's-Semt ve'l-İrtifâ to find the position of Merkury ve Venus when they are the farrest point. Zat-ü's-şu'beteyn was used again for some calculations about the objects. It has 3 rules on it. 2 of them are perpendicular to each other and the 3rd one is hypotenuse of the triangle shape. With the help of Rub-ı mıstar Takiyüddin found the degree of altitude of the object by a arc-system. Zati'l-ceyb is helpful when we want to find the sinus of the altitude of the object. Zati'l-evtar was made by Takiyüddin. He made this instrument to find the time of Sun's equinox. Müşebbehü bi'l-monatik was used to find the angular distance between 2 stars. Bengam is an astronomic clock. This instrument was important to make observations more comprehensive

Takiyüddin's Hand-writings

In Takiyüddin's hand-writings there were titles, tables, drawings etc. in different colors. Also some of his original hand-writings can be found in the present time. He proved that they were also his writings by some explanations and signs.

Some of his hand-writings are kept in The Bosphorus University Kandilli Observatory and Earthquake Investigating Center's library.



The Sad End of Observatory

We don't sure about the basic reason but the first idea was, after observation of a comet in 1577 one year later there were plague contagious in the country and the second idea was, most people think that Takiyüddin and his friends were observing the legs of angels. Because of these with the order of the emperor observatory was demolished to the Mr.Kılıç Ali.

Another upsetting thing is after Takiyüddin there wasn't any scientist who worked on his investigations like Kepler did for Copernicus's investigations.

But we think that the real reason to the closure of observatory was some political problems between Mr.Hoca Sadettin and Şeyhülislam. Because Mr.Hoca Sadettin helped to Takiyüddin while he was working in his observatory.

CONCLUSION

As a result, I think Ottoman was good enough in science in 16.century. The Istanbul Observatory and the scientist Taküyiddin, they were all important developments for Ottoman in science but again because of some ignorant ideas they were all become a garbage.

If Taküyiddin's works, investigations were continued may be today there will be his laws about space like other scientists. In general, Ottoman tried to develop in science. In their education programs there was astronomy, mathematics and philosophy as basic science lessons. Also lots of schools were build for these.

In 16.century Europe developed in science very much. But before Arabians were good at mathematics or another topics of science. So when Europeans became more professional Ottoman started to recession about science. But today we won't be late and we will develop. I believe that we can accomplished everything that Ottoman couldn't.

SOURCES

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<http://www.altavista.com>

<http://biltek.tubitak.gov.tr/dergi/97/subat/takiyuddin.html>

Also the book named "History of Astronomy Literature During The Ottoman Period".