

Jean Picard and his Love for Accuracy



Jean-Félix Picard (1620 – 1682)

On July 21, 1620, French astronomer, cartographer and hydraulic engineer **Jean-Félix Picard** was born. He is regarded as the founder of modern astronomy in France. He introduced new methods, improved the old instruments, and added new devices, such as Huygens' pendulum clock to record times and time intervals.

Background Jean Picard

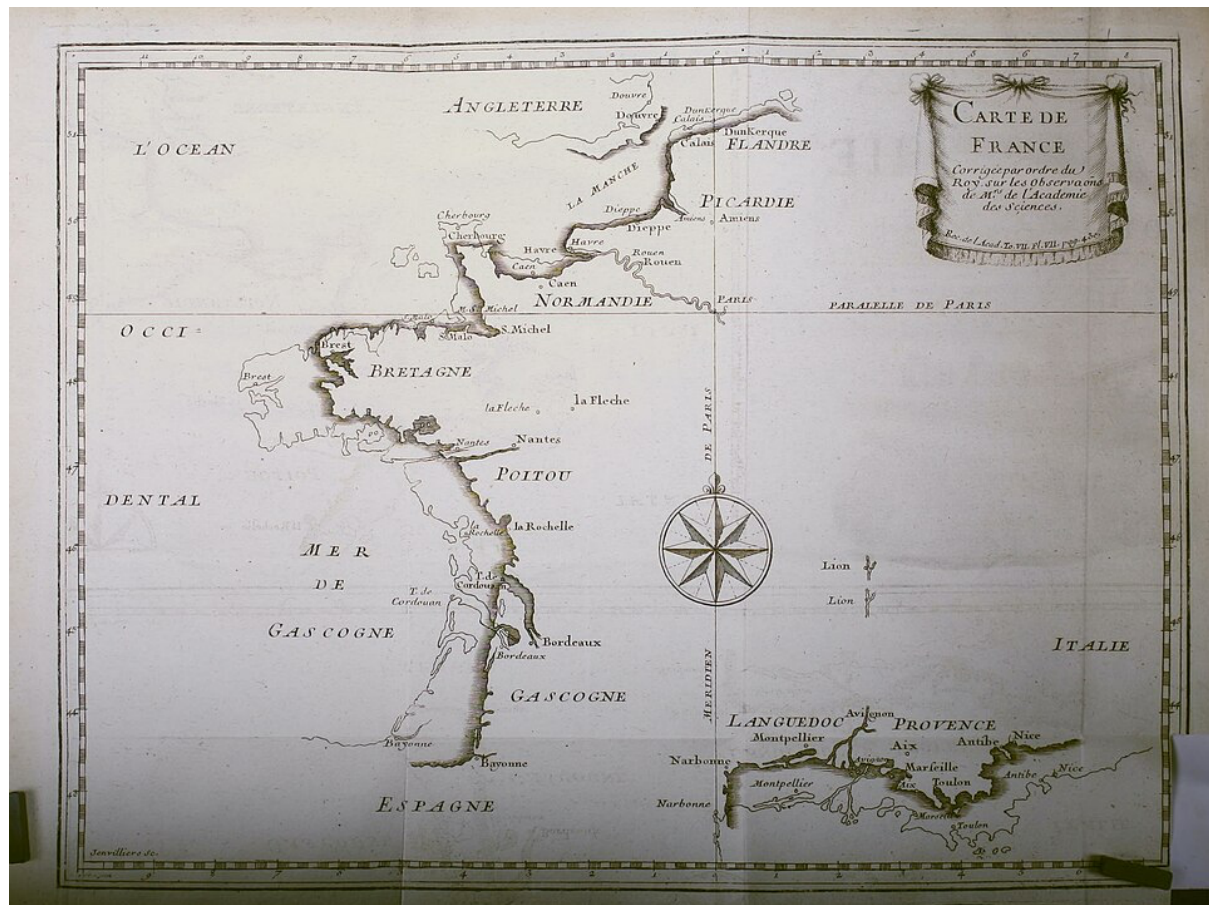
Jean-Félix Picard was born as a son of a bookseller and was allowed to study at the Jesuit Collège Royal Henry-Le-Grand, which was considered one of the best educational centers in France. It is assumed that he left the institution without a degree and moved to Paris due to the unstable situation in France. In Paris, he met the well established astronomer and mathematician Pierre Gassendi. He motivated Picard to study astronomy and Picard was allowed to assist with observations of solar and lunar eclipses. In particular, he assisted in observing the solar eclipse of August 25, 1645, and other astronomical events in the following two years. He probably also heard Gassendi's lectures at the Collège Royal. Probably around 1650, he acquired the title of prior of Rillé, a small town near his birthplace, which helped him earn a small income. Picard became a professor of astronomy, as it is assumed, in 1655. He continued his career at the College de France in Paris, but unfortunately, there is no published work by Picard known from this period.

Astronomical Research

However, it is known that he exchanged letters with Christian Huygens [7], Ole Rømer [5], and Giovanni Cassini [6] and it is assumed that he was highly respected as a scientist at that time. Also, he became one of the first members of the Academie Royal des Sciences one year after its founding by Colbert in 1666. Between 1669 and 1670, Picard was the first person to measure the size of the Earth to a reasonable degree of accuracy, building on Maurolycus' methodology and Snellius' mathematical discoveries. Picard was honored with a pyramid at *Juvisy-sur-Orge* for his significant scientific effort.

Towards More Accurate Maps

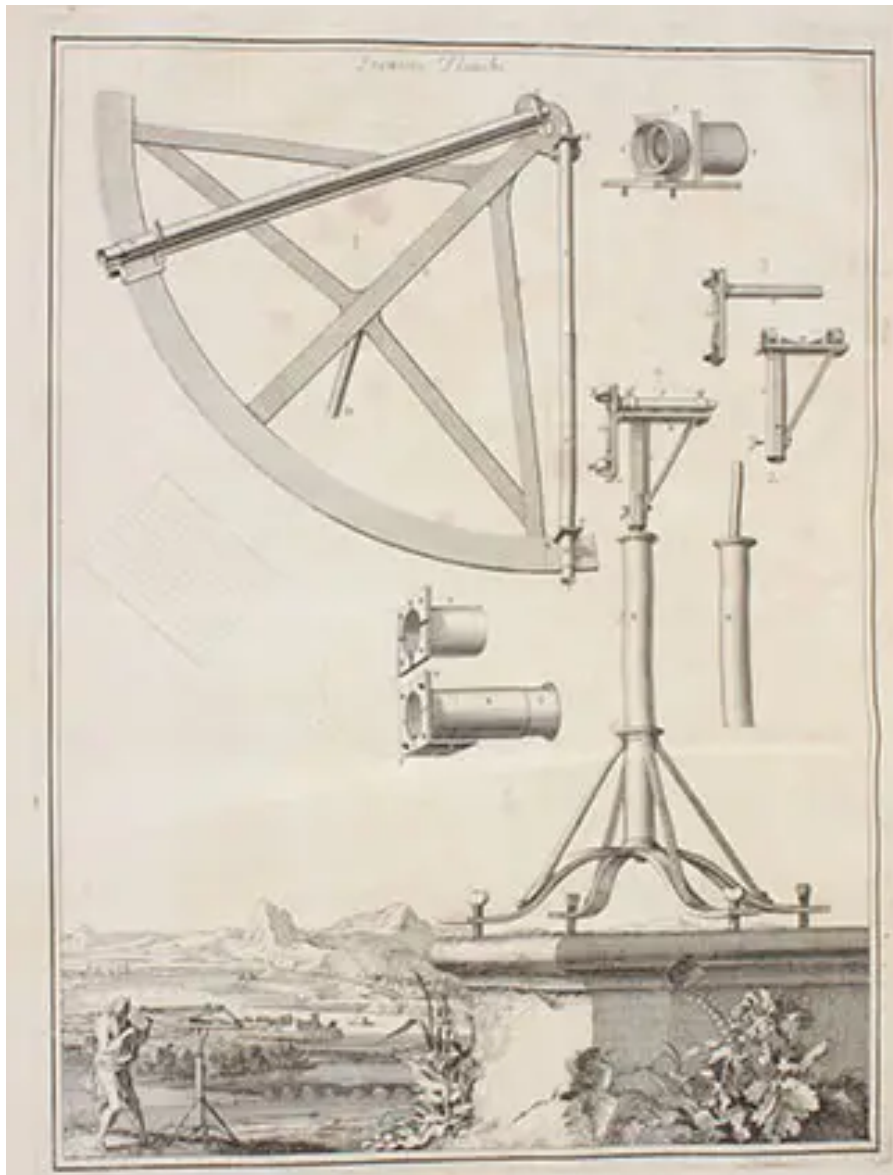
On June 21, 1667, the day of the summer solstice, Adrien Auzout, Jacques Buot, Bernard Frénicle de Bessy, Jean Picard and Jean Richer, mathematicians and astronomers of the Académie Royale des Sciences, fixed the meridian of Paris by a mark on a stone over which the Paris Observatory was subsequently built. In 1668, Colbert informed the members of the Academy that he wanted more accurate maps of France than those in use until then and asked the Academy to prepare the necessary measures for this purpose. The first degree measurements of modern times were the ones made by Jean François Fernel in 1525 from the wheel revolutions of his carriage and the ones calculated for the first time in 1615 by Willebrord van Roijen Snell (Snellius) on the basis of a triangulation. Picard was able to achieve this by measuring one degree of latitude along the Paris Meridian using triangulation along thirteen triangles stretching from Paris to the clock tower of Sourdun, near Amiens. His measurements produced a result of 110.46 km for one degree of latitude, which gives a corresponding terrestrial radius of 6328.9 km. The polar radius has now been measured at just over 6357 km. This was an error only 0.44% less than the modern value. This was another example of advances in astronomy and its tools making possible advances in cartography.



Map of France corrected by Order of the King on the Observations of Gentlemen of the Academy of Sciences

Scientific Instruments

In 1667 and 1668, he worked together with Adrien Auzout to equip the previous quadrants, which were equipped with simple sights, with measuring telescopes and to install crosshair eyepieces and micrometers in these telescopes. For nighttime observations, the fine filaments suspended in the eyepiece could be made visible by a lateral light source. Even if others already had these ideas, it is to the credit of Auzout and Picard to have developed the devices in persevering work to ready-to-use precision instruments. The quadrant he used to determine the size of the Earth had a radius of 38 inches and was graduated to quarter-minutes. The sextant he used to find the meridian had a radius of six feet, and was equipped with a micrometer to enable minute adjustments. These equipment improvements made the margin of error only ten seconds, as opposed to Tycho Brahe's four minutes of error. This made his measurements 24 times as accurate. It is believed that Isaac Newton used this value in his theory of universal gravitation. Picard's method and measurements were the topic of his *Mesure de la terre*, published in 1671. At this time, he also used his influence with Colbert to appoint Cassini as director of the observatory in Paris.



Picard's quarter circle with two glasses, second edition, 1671

Further Achievements

He was also an important member of the team that began to compile a map of France based on scientific principles and he became a major figure in the development of scientific cartography. In 1673 he was at the Paris observatory collaborating with Cassini, Rømer, and La Hire [8] on the institute's regular project of observations. Picard directed his attention to other projects of the Académie such as the surveying operations at Marly and Versailles. For example he became active in the problem of supplying Versailles with water. He also performed barometric experiments and became generally more and more active in the field of physics. Picard published scientific papers on hydraulics and optics. He made several suggestions to improve the telescope and left behind manuscripts on dioptrics. When Picard examined the air pressure at different altitudes with a mercury barometer in 1675, he observed glow discharges on the barometer. However, static electricity as a phenomenon was already known in antiquity. Picard was the founder of the first astronomical yearbook, the *Connaissance des temps*, in 1679, which he published until his death.

References and Further Reading:

- [1] [Jean Picard at Britannica](#)
- [2] [Star Trek Inspiration? Meet the Real Jean Picard](#)
- [3] John J. O'Connor, Edmund F. Robertson: [Jean Picard](#). In: MacTutor History of Mathematics archive
- [3] [Histoire céleste ou recueil de toutes les observations astronomiques faites par ordre du roy, Pierre Charles Le Monnier](#)
- [4] [A History of Science, Technology, and Philosophy in the 16th and 17th Centuries](#), Abraham Wolf
- [5] [Ole Rømer and the Speed of Light](#)
- [6] [Giovanni Cassini and Saturn Moon Rhea](#)
- [7] [Christiaan Huygens and the Discovery of Saturn Moon Titan](#)
- [8] [The Life and Work of Philippe de La Hire](#), SciHi Blog
- [9] Herbermann, Charles, ed. (1913). ["Jean Picard"](#). *Catholic Encyclopedia*. New York: Robert Appleton Company.
- [10] [Jean Picard](#) at Wikidata
- [11] [The Mathematics of Navigation | The Sextant](#), [Bob the Science Guy](#) @ youtube
- [12] [Timeline of French Astronomers](#) via Wikidata