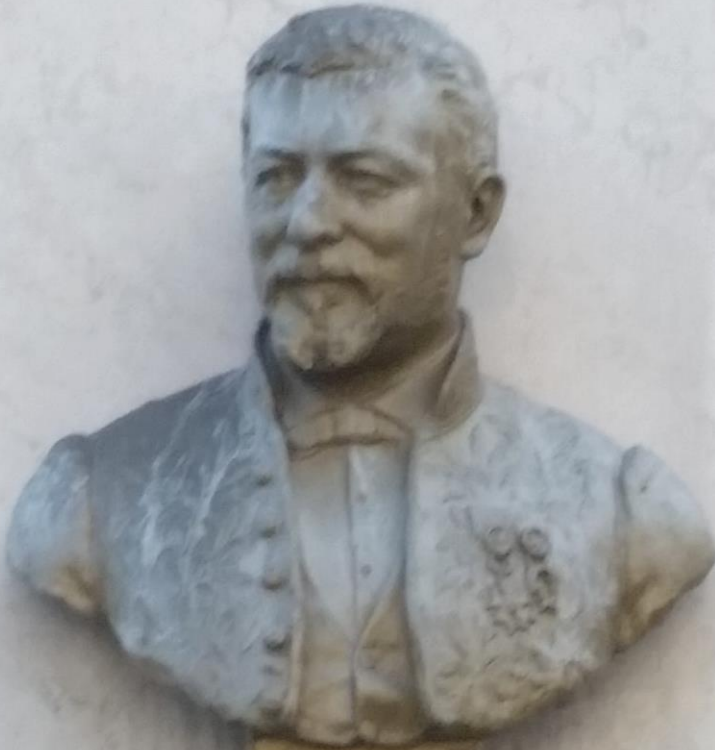


# **François Félix Tisserand**



## **Forgotten Genius of Celestial Mechanics**

**Janet Hyde & Neil Taylor**

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Front Cover photo taken by the author, August 2016  
in Nuits-Saint-Georges on the square opposite the Hôtel de Ville

## *Preface.*

I first became aware of the life and works of Félix Tisserand through my partner's work on gravitational dynamics. It soon became clear to me that this fascinating person had been overlooked by most historians and astronomers. Even today, few astronomers, let alone members of the public, will ever have heard of Tisserand or have any awareness of the immense contribution to astronomy he made.

It is my hope that in writing this small booklet that more people will recognise Tisserand's work and character and, like myself be inspired by this forgotten genius.

## Key Events in the Life of Félix Tisserand



Figure 1 Félix Tisserand – Directeur de l’Observatoire Paris  
(from Bulletin Astronomique 1896 )

- 1845 Born in Nuits-Saint-Georges (January 13<sup>th</sup>)
- 1863 Death of Félix's father, Claude Tisserand
- 1863 Starts university education at École Normale Supérieure
- 1866 Achieved *agrégation* in Mathematics at the École Normale
- 1866 Appointed as assistant astronomer at the Paris Observatory
- 1868 Expedition to observe the solar eclipse at Malacca
- 1873 Appointed as director of the Toulouse Observatory
- 1874 Expedition to observe the transit of Venus in Japan
- 1878 Marriage to Jeanne Marie Seignouret
- 1878 Appointed as Professor, and subsequently (1883)  
Chair of Astronomy at the Sorbonne, Paris
- 1878 Appointed as member of the Bureau of Longitudes
- 1878 Elected as a member of the Academy of Sciences

- 1879 Birth of first child Jeanne Marie Tisserand
- 1880 Death of Tisserand's first wife Jeanne Marie
- 1882 Expedition to observe Transit of Venus at Martinique
- 1885 Married Louise Desplechin
- 1885 Birth of second child, Emma
- 1888 Birth of third child, Marthe
- 1889 *Traité de mécanique céleste* first volume published
- 1892 Appointed Director of the Paris Observatory
- 1892 Elected member of the Royal Swedish Academy of Sciences
- 1893 Appointed president of the Société Astronomique de France
- 1894 Elected as foreign member of the Royal Netherlands  
Academy of Arts and Sciences
- 1896 *Traité de mécanique céleste* completed  
(volume IV published)
- 1896 Died in Paris (October 20<sup>th</sup>)

## **1. François Félix Tisserand of Nuits-Saint-Georges**

François Félix Tisserand was a French astronomer and mathematician who lived in a century renowned for the emergence of very talented physicists and astronomers in France, such as Henri Becquerel, Marie and Pierre Curie, Léon Foucault, Louis Pasteur and Henri Poincaré. He was born into a family of modest means in Nuits-Saint-Georges, a small town situated halfway between Dijon and Beaune in the Côte d'Or department of the region now known as Burgundy-Franche-Comté.

If we study the life and character of Tisserand several things stand out; he was a mathematical genius from childhood and passionate about this subject; he had an outstanding capacity for hard work; he was modest and friendly and is portrayed by all those who knew him or came into contact with him as a genuinely good person. He also had a talent for spotting ability in others which is evident from his choice of assistants at work. He was one of the most famous astronomers of his own time, yet today he is much less well-known.

In the nineteenth century (1849) the railway station was built in the town of Nuits-Saint-Georges and this helped the local wine trade to flourish. Until 1849 the town was called Nuits, then Nuits-sous-Beaune, and finally in 1892 Nuits-Saint-Georges, *Saint Georges* being the name of one of its most prestigious wines. The railway station is still thriving (2016) with regular services to Dijon, Beaune and Paris, and today this town still owes much of its reputation to the prestige of its high quality wines which are famous all over the world.

In the novel *De la Terre à la Lune* (From the Earth to the Moon) the author Jules Verne wrote in 1867 that the first lunar travellers would celebrate landing on the moon with a '*fine bottle of Nuits*'. So on 31 May 1971 to commemorate this forecast one of the Apollo XV astronauts, David Scott, placed a label from a bottle of Nuits-Saint-Georges wine (a special cuvée of 1969 called *Terre Lune*) in a lunar crater named 'Saint George'. There is also a crater on the Moon named after Félix Tisserand.

In the town centre of Nuits-Saint-Georges you can find a memorial statue of Félix Tisserand which stands on the square opposite the town hall. See figure 15. A first monument was placed there on Sunday 15 October 1899, three years after Tisserand's untimely death when he was just 51 years old. The present statue was inaugurated on Saturday 7 October 1961 by André Danjo and the then 79 year old André Léauté, Tisserand's son-in-law who had travelled all the way from Toulouse for the ceremony.

This substantial monument has a bust of Félix Tisserand facing outward, and there are superb engravings of intricate designs on each side. The pillar was made by Félix Viennois, a nineteenth century Dijon architect. There is also a *rue Félix Tisserand* in the town, a couple of hundred metres north-west from the centre. Here you can find the house where Tisserand was born. So if you are interested in astronomy and you would like to trace the origins of a famous and gifted astronomer you should certainly visit Nuits-Saint-Georges.

## **2. Tisserand the person**

### **2.1 Early life (1845 – 63)**

François Félix Tisserand was born on 13 January 1845 at what is now *31 rue Félix Tisserand* in the historic centre of Nuits-Saint-Georges. His father Claude was a cooper, an important but not highly paid profession, in the wine producing region of Burgundy. He was not especially ambitious for his two sons Louis and Félix, but merely wanted them to grow up and earn an honest living like himself. We do not know a lot about his parents, but Claude Tisserand (b.28.8.1811 d.2.2.1863) married Anne-Marie Perreau from Gerland (b.26.10.1814) on 19 September 1837 in her home village which is just 7km from Nuits-Saint-Georges. Figure 16 shows the church at Gerland (as at August 2016). Claude Tisserand soon came to realise that Félix was highly intelligent and especially gifted at mathematics from an early age; so he worked hard to afford to send his sons to school. Despite his humble background Claude firmly believed that the sciences were worthy and useful subjects of study and encouraged his sons to pursue them.

From a very young age Tisserand adored mathematics and the sciences, and even his primary school teachers soon recognised he was academically very advanced. At eleven years old he moved from his primary school in Nuits-Saint-Georges to the secondary school at Beaune (a bigger town 15km from Nuits-Saint-Georges) and it is here that the teachers gave him the nickname: *puer aureus* or *merveilleux enfant* (golden child). He continued his studies in more advanced mathematics and sciences at the lycée ( $\approx$ sixth form) in Dijon where he won several prizes; however, his favourite subjects were geometry and algebra.

Tragically, Claude Tisserand never saw his son's greatest achievements for he died at the age of 51 just as Félix was coming to the end of his secondary school education in 1863. Below is an extract from the speech by André Léauté in 1961 at the inauguration of Tisserand's statue, which gives us a glimpse into the young astronomer's early life:

*'A Beaune et à Dijon, il forge sa personnalité en contact intime avec ses parents qui, pauvres, font pour son instruction des sacrifices qu'il n'oubliera jamais. On a souvent rappelé que son père était tonnelier et qu'à ses heures de repos il observait le ciel.'*

'In Beaune and in Dijon his personality was forged while in close contact with his parents who, although poor, made great sacrifices for his education which he never forgot. We often recall that his father was a cooper who liked to observe the skies in his hours of leisure.'

## **2.2 Studies and initial appointment at the Paris Observatory**

Tisserand moved away from the home of fine vineyards in 1863 as he was accepted to study at two prestigious university institutions in Paris after taking an entrance examination for both of them at 18 years old. These were the École Normale Supérieure (ENS) and the École Polytechnique. He chose to study at the École Normale rather than the more military focused École Polytechnique as the former



specialised in the training of secondary school teachers; and as he had greatly admired his own teachers he saw this as a worthy profession to pursue. Although he had entered the university placed only fifteenth out of the seventeen students admitted that year, he graduated the top of his class. During this time Désiré Nisard (b.20.3.1806 d.27.3.1888), a French author and literary critic, was the head of the École Normale (1857-1867) and he very much admired Tisserand. The famous Louis Pasteur was the director of scientific studies there (from 1857 to 1867) and he too was most impressed by Tisserand's talents; so much so that he recommended the young graduate to Urbain le Verrier (b.18.3.1811 d.23.9.1877), the then director of the Paris Observatory.



Figure 2 Paris Observatory, 1855

During his years at the École Normale Tisserand found a further passion for astronomy, the movement of the Moon, and magnetic forces. He left this institution in 1866 with the *agrégation de mathématiques*. (The *agrégation* is a civil service competitive examination open to those aiming for a senior position in the public

# François Felix Tisserand - Forgotten genius of celestial mechanics.



The intended audience for this short biography is the general reader with an interest in astronomy.

It will particularly appeal to those interested in asteroids, comets and celestial mechanics.

Tisserand was one of the great 19th century astronomers and rose from a humble background to become Director of the Paris Observatory after the tumultuous governance of Urbain Le Verrier.

He determined a method, still used today, of how to uniquely identify the faint and nebulous comets and asteroids from their orbits.



No prior knowledge of astronomy is required to enjoy this book. We focus on Tisserand the person, not technical detail on gravitational dynamics.



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