



Augustin Jean Fresnel

1788 - 1827

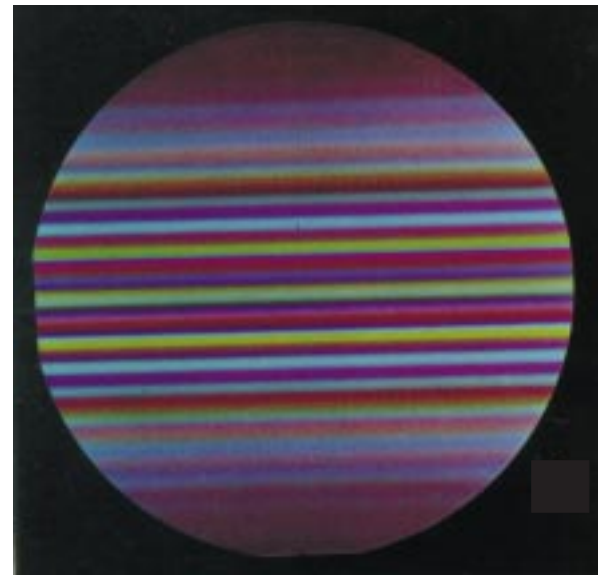
The reader may have already heard the words: '*Fresnel lens*', and know that it means a lens with a stepped surface. Such a lens is used particularly in lighthouses and searchlights to concentrate the light into a relatively narrow beam. It would be almost impossible to make a large lighthouse lens of the usual solid disc of glass, because of its big thickness and thereby great weight. A '*Fresnel lens*' can be constructed of small elements and then assembled to make up the complete lens. Such a lens was first designed by the famous French physicist Augustin Jean Fresnel who studied the properties of light, and developed its wave theory.

Fresnel was born in 1788, in Broglie, Normandy. His father, Jacques Fresnel, was a successful architect. His mother, Augustine Mérimée, a well educated woman, was the daughter of a nobleman. Fresnel spent his childhood at Mathieu, North Caen. It is said that at an early age he was slow at learning languages and his parents decided to provide his education themselves until he was 12, when he entered the École Centrale in Caen. ***While at the École, it became clear that Augustin had the makings of an engineer.*** In 1804 he attended the École Polytechnique in Paris and two years later the École des Ponts et Chaussées. After two years studying there and one more year of practical engineering experience, he began his career as a civil engineer.



The Fresnel lens is used in lighthouses

He worked on the interference of light



When Napoleon returned, Fresnel lost his job...



In 1812, Fresnel was sent to Nyon, France, to assist with the imperial highway which was to connect Spain with Italy. In 1814, ***Fresnel turned to optics*** and started to consider the wave hypothesis of light. He worked on the interference and diffraction of light and produced a number of devices, which gave interference effects; an example was the 'Fresnel biprism', a single prism formed of two identical prisms, base-to-base. If one puts this construction in front of a source of light it splits the beam into two parts, which can produce interference fringes. Nowadays, the '*Fresnel prism*' is used in lighthouses, car headlights, and projectors.

Fresnel grew up at the time of the French Revolution but, by the time he became an engineer, Napoleon had been exiled and Louis XVIII was on the throne. When Napoleon unexpectedly returned to France from Elba, in 1815, Fresnel lost his job as a supporter of the royalists. He was arrested and confined to his home in Normandy, where he devoted himself to optics experiments and the wave theory of light.

Napoleon's return did not last long and Fresnel soon came back into government service.

For his scientific achievement Fresnel received important honours. In 1823 he was elected to the Academie des Sciences and, in 1825, he was awarded the Rumford Medal of The Royal Society.

Fresnel had poor health. After 1824 his health started to decline further. ***Feeling that death was not far off he turned to religion*** and withdrew into an austere life, shunning pleasures and amusements, and 'working to the point of exhaustion'.

Fresnel was considered by his friends as a reserved, gentle and charitable person. He never married, and died of tuberculosis at Ville D'Avray, near Paris, in 1827 at the early age of 39.

S.E.