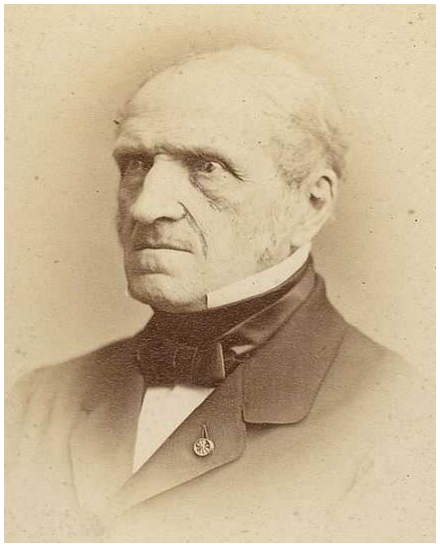
Michel Chasles



It is difficult to reconcile the fact that today's subject is one who could see so deeply into the mysteries and subtleties of mathematics and yet not have the gumption to recognize that something too good to be true isn't true. First we lay out the evidence of the former. One of the leading French geometers of the 19th century was **Michel Chasles** (November 15, 1793 – December 18, 1880), who wrote a number of treatises on geometrical theory, prisms and conic sections. He developed analytical geometry independent of the calculus, and his treatment of the displacement of solids is a mathematical classic. Gerard Desargues wrote a remarkably original book on conics, which was soon forgotten and disappeared. Two hundred years later when Chasles wrote his history of geometry, he had no way to judge the value of Desargues' lost treatise. Six years later, Chasles found a manuscript copy of the work, made by Desargues' student Philippe de la Hire. From that time on Desargues' forgotten book has been recognized as a classic in the development of projective geometry.

Chasles was the son of a well-to-do lumber merchant and contractor. He received his early education at the Lycée Impérial; then in 1812 he entered the École Polytechnique in Paris. At about this time Napoleon sought men from all over France to replace his dwindling number of troops. Chasles was conscripted to take part in the defense of Paris. After Paris fell, he returned to the Polytechnic and was accepted into the engineering corps, but gave up the appointment in favor of a poor fellow student. Chasles spent some time at home and to please his father joined a stockbrokerage in Paris. He was neither successful nor happy in his work, so he returned home once again to pursue his interests in history and mathematics. In 1837 Chasles published his first major work, the *Aperçu sur l'origine et le développement des méthodes en géométrie* (*Historical view of the origin and development of methods in geometry*). This very readable text on Greek and modern geometry, established him as both a first rate geometer and a mathematical historian. Chasles conjectured that Euclid's lost work *Porisms* contained propositions belonging to the modern theory of transversals and to projective geometry. He decided that of all the new projective geometry ideas that were being studied in the 19th century, the two most important were invariance under transformation and duality. When a geometrical figure is projected onto another plane, lengths, angles and areas change, but some things do not change. A line is still a line, a triangle remains a triangle, and a quadrilateral is mapped into a quadrilateral. Investigations should not be made of what changed but what did not, that is, the invariants. In projective

geometry, but not in Euclidean geometry, with certain restrictions, it is possible to interchange concepts such as “point”, “line” and “plane” in a theorem and have it remain true. This is the principle of duality.

In 1841 Chasles was appointed to a position at the École Polytechnique, where he taught geodesy, astronomy, and applied mechanics. In 1846, a chair of higher geometry was created for him at the Sorbonne, where he remained until his death. Chasles was very interested in the ancient question of the enumeration of conics. One such problem was known as the “problem of five conics,” in which one is to calculate the number of conics tangent to five given conics. Chasles solved the problem, giving the answer to be 3,264 conics. The Royal Society of London awarded Chasles the Copley Medal by for his original researches in pure geometry and he became the first foreign member of the London Mathematical Society. He urged his compatriots to follow the British example to form a society specifically for mathematicians, rather than in one in which mathematics was only one of the scientific disciplines represented, as was the case with the Académie des Sciences. Chasles was a member of the latter association, meaning he was recognized as one of the 66 best scientific minds in all France. As a result of Chasles’ influence, the Société Mathématique de France and its *Bulletin* were formed in 1872.

In 1867 Chasles announced to the that Isaac Newton was not the first to discover the laws of universal gravitation. In fact that honor went to Blaise Pascal. To support his claim, Chasles produced correspondence between Pascal and Newton, in which the Frenchman shared his observations on the matter with the Englishman. The news created a sensation, until someone observed that at the time of the purported correspondence, Newton was only eleven years old. This might have been enough to daunt the conviction of a lesser man, but Chasles’ enthusiasm for the cause of French pride was not blunted. He had support among some scientists of the . What they weren’t then aware of was the extent of his gullibility.

In 1861, an enterprising young intellectual, Denis Vrain-Lucas, who claimed to be a specialist in locating old, lost documents, particularly autographs, offered to sell Chasles letters, purportedly written by Blaise Pascal, in which the laws of gravitational attraction were set out. Bibliophile and ardent French patriot Chasles, seeing this as an opportunity to prove that Pascal had priority over Newton, snapped them up. Further, he made Vrain-Lucas promise to bring him all his sensational finds. This was no problem for Vrain-Lucas, who began bringing Chasles, one or two documents at a time, then dozens, and eventually scores. Over the next nine years, Chasles paid from 140,000 to 150,000 francs for about 27,000 letters, manuscripts, and documents, freshly minted by the hand of Vrain-Lucas. Chasles naiveté is beyond belief. Not only did the collection include 175 letters from Pascal to Newton, 139 from Pascal to Galileo, and a large number written by

Galileo, there were love letters between Cleopatra and Julius Caesar, epistles of Judas Iscariot, Mary Magdalene, Joan of Arc, Attila the Hun, Alexander the Great, Herod, Cicero, Sappho, and Dante. At first Vrain-Lucas used quills, inks, papers, and the styles of writing of historical French authors. Later, when many of his forgeries were accepted as authentic, he became strangely careless. He wrote many of the letters on paper, some with nineteenth-century watermarks, in modern French. When Chasles disclosed the existence of the Pascal letters to the French Academy of Sciences, it was noted that the handwriting was not the same as in letters known to be from Pascal. Despite Chasles' arguments that the Pascal letters were genuine, Vrain-Lucas' crude fabrications were exposed. Brought to trial on a charge of forgery, he was convicted and sent to prison for two years. Chasles was forced to testify and admit that the letters were fakes, written by a not-so-clever forger, but at least in the case of Chasles, a very successful con man. Chasles seems to have been fooled because of his vanity and collector's greed. When he finally called for Vrain-Lucas' arrest it wasn't because of the forgeries, but because his supplier had not turned over some 3,000 documents that Chasles had requested, and feared that Vrain-Lucas intended to sell them to others, perhaps, horrors of horrors, even to foreigners.

Quotation of the Day: "The doctrines of pure geometry often, and in many questions, give a simple and natural way to penetrate t the origin of truths, to lay bare the mysterious chain which unites them, and to make them known individually, luminously, and completely." – Michel Chasles