

GIRARD DESARGUES (February 21, 1591 – October 1661)

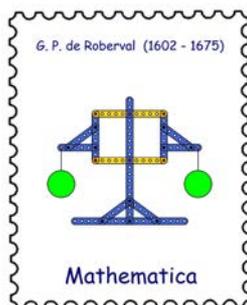
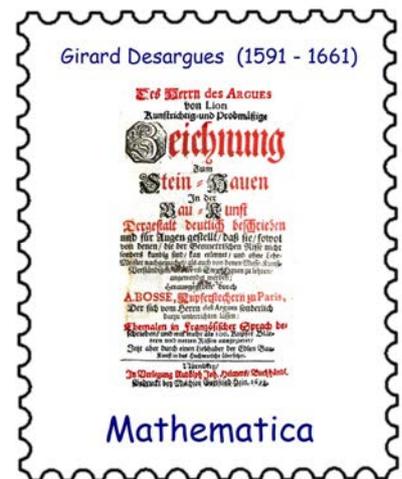
by HEINZ KLAUS STRICK, Germany

GIRARD DESARGUES came from very wealthy families of lawyers and judges who worked at the *Parlement*, the highest appellate courts of France in Paris and Lyon. Nothing is known about GIRARD'S youth, but it is safe to assume that he and his five siblings received the best possible education.

While his two older brothers were admitted to the Parisian *Parlement*, he was involved in the silk trade in Lyon, as can be seen from a document dating from 1621. In 1626, after a journey through Flanders, he applied to the Paris city council for a licence to drill a well and use the water from the well.

His idea was to construct an effective hydraulic pump to supply water to entire districts, but this project did not seem to be successful.

After the death of his two older brothers in 1628, he took over the family inheritance and settled in Paris. There he met MARIN MERSENNE and soon became a member of his *Academia Parisiensis*, a discussion group of scientists including RENÉ DESCARTES, GILLES PERSONNE DE ROBERVAL, ÉTIENNE PASCAL and his son BLAISE.



(drawing: © Andreas Strick)

The first publication by DESARGUES to attract attention was *Une méthode aisée pour apprendre et enseigner à lire et écrire la musique* (An easy way to learn and teach to read and write music). In 1634 MERSENNE mentioned in a letter to his acquaintances that DESARGUES was working on a paper on perspective (*projection from a point*). But it was not until two years later that the work was published: only 12 pages long and in a small edition.

In the 15th century, the Italian painters FILIPPO BRUNELLESCHI, LEON BATTISTA ALBERTI and PIERO DELLA FRANCESCA had investigated how a geometric method could be used to achieve a perspective effect in a painting.



In 1525 ALBRECHT DÜRER created the first textbook on descriptive geometry with the title *Underweysung der messung mit dem Zirckel un richtscheyt* (Instruction how to construct with compass and straight edge).



In 1636 DESARGUES' *Exemple de l'une des manières universelles du S.G.D.L. touchant la pratique de la perspective* (Example of M. Desargues' universal method of applying perspective) was published. (S.G.D.L. stands for *Sieur Girard Desargues Lyonnais* and would be used by him from then on.)

DESARGUES recognised the analogy between straight lines passing through a point (a *pencil* of lines) and a set of parallel lines intersecting at a point at infinity.

In 1639, he wrote a 30-page treatise, *Brouillon project d'une atteinte aux evenemens des rencontres du cone avec un plan* (First draft of the description of what happens when a cone meets a plane). Among other things, he showed that the properties of the conic sections: ellipses, parabolas and hyperbolas, could be derived from the central projection of circles.

The work was printed in 50 copies. For a long time they were considered lost. It was not until 1951 that a copy was found. Until then, the content of the work could only be deduced from the correspondence of various contemporaries and from the transcripts of his student PHILIPPE DE LA HIRE, which were discovered in 1845.

DESCARTES praised the unified concept of the work, but was himself convinced that the mere application of geometric methods was not as viable as the use of the algebraic methods that he had developed and which prevailed in the following years.



The fact that DESCARTES' famous writings on geometry were published at the same time as DESARGUES' ideas certainly contributed to the fact that DESARGUES' writings received little attention. However, the young BLAISE PASCAL was so impressed that he wrote his own contribution to the geometry of conic sections (*Essay pour les coniques*), taking up the suggestions of DESARGUES.

The more comprehensive treatise *Traité des coniques*, written by PASCAL a few years later, was unfortunately lost, so that this helpful link to DESARGUES' ideas also disappeared from posterity.

The writings of DESARGUES on perspective from 1636, and also the adaptations of the following years, were very concise and made use of a vocabulary that was not well suited to convey the "universal method" he developed in an understandable way.

The response among craftsmen and artists to whom he actually dedicated the writing was modest. Most of them were not interested in learning about a different method of spatial representation from the one they were accustomed to using, and certainly not in placing it in a larger context.

With his instructions for carving stones and building sundials, published in 1640, he even took on craftsmen's guilds because he criticised the methods they used.

In 1642 he became aware of an anonymously published paper, *La perspective pratique*, in which his suggestions were taken up but not correctly presented, leading to a public dispute in which his various publications were discredited by pamphlets written anonymously.

DESARGUES was so badly affected by these disputes that he himself no longer wished to publish anything, and he asked one of his loyal students, the engraver ABRAHAM BOSSE, to ensure that his ideas were disseminated.

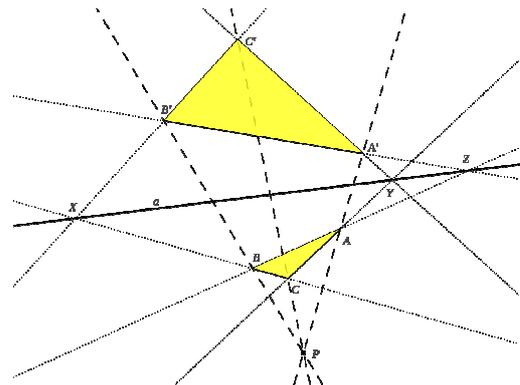
In 1643, BOSSE wrote – in simple language – two works on carving stones (*La pratique du trait à preuve de M. des Argues Lyonnois pour la coupe des pierres en Architecture*) and on the construction of sundials (*La manière universelle de M. des Argues Lyonnois pour poser l'essieu & placer les heures & autres choses aux cadrans au Soleil* – The universal method of M. des Argues Lyonnois to set the axis & place the hours & other things on sun dials). These works were reprinted several times and even translated into other languages (see the "stamp" above).

In 1648 *Manière universelle de M. des Argues pour pratiquer la perspective par petit-pied comme le géométral* (Manual on perspective) followed, in whose writing DESARGUES probably contributed himself. The work contained a phrase which indicated the condition when two triangles have a *perspective position* in relation to each other.

It is of fundamental importance for JEAN-VICTOR PONCELET'S *Projective Geometry*, which was further developed in the 19th century, and is now known as DESARGUES' theorem:

- The points of intersection of corresponding sides (AB and $A'B'$, BC and $B'C'$, CA and $C'A'$) of two triangles lie on an axis a exactly when the connecting lines of the corresponding vertices (AA' , BB' , CC') intersect at one point, the centre P . The centre or the points of intersection of the sides can also lie at infinity.

(graphics: Wikipedia)



From 1648 onwards BOSSE taught at the *Académie Royale de Peinture et de Sculpture* until he was dismissed from the academy in 1661 after fierce disputes and in the process he was banned from teaching, which he did not comply with. Another of Bosse's writings (*Moyen universel de pratiquer la perspective sur les tableaux ou surfaces irrégulières* – Universal method of practicing perspective on tables or irregular surfaces) appeared in 1653.

After 1645 DESARGUES worked only as an architect and engineer, planning public buildings and villas in Lyon and Paris, and above all spectacular staircases where he could prove his abilities. He developed a pump with a novel epicyclic drive for the water supply of the *Château de Beaulieu*.

After that, traces of his activities disappear. In November 1660, he once again took part in a public debate in Paris, reported by CHRISTIAAN HUYGENS.

From the details of the reading of his will in Lyon on 8 October 1661, it seems that DESARGUES had died a few days earlier. It has not yet been established exactly when he died, nor where this occurred.



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<https://www.spektrum.de/wissen/girard-desargues-1591-1661/1397704>

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