ANATOLIA "THE LAND WHERE SCIENCE WAS BORN AND FLOURISHED"

APOLLONIUS of PERGA

Born & Died: C. 240 – C. 190 BC
Main Interest: Geometry,Mathematics,Astronomy
Notable Ideas: The Elips ,The Parabolia , The Hiperbolia

LIFE

Apollonius of Perga was known as 'The Great Geometer'. Little is known of his life but his works have had a very great influence on the development of mathematics, in particular his famous book Conics introduced terms which are familiar to us today such as parabola, ellipse and hyperbola.

The mathematician Apollonius was born in Perga, Pamphylia which today is known as Murtina, or Murtana and is now in Antalya, Turkey. Perga was a centre of culture at this time and it was the place of worship of Queen Artemis, a nature goddess. When he was a young man Apollonius went to Alexandria where he studied under the followers of Euclid and later he taught there. Apollonius visited Pergamum where a university and library similar to Alexandria had been built. Pergamum, today the town of Bergama in the province of Izmir in Turkey, was an ancient Greek city in Mysia. It was situated 25 km from the Aegean Sea on a hill on the northern side of the wide valley of the Caicus River (called the Bakir river today). While Apollonius was at Pergamum he met Eudemus of Pergamum (not to be confused with Eudemus of Rhodes who wrote the History of Geometry) and also Attalus, who many think must be King Attalus I of Pergamum. In the preface to the second edition of Conics Apollonius addressed Eudemus :

If you are in good health and things are in other respects as you wish, it is well; with me too things are moderately well. During the time I spent with you at Pergamum I observed your eagerness to become aquatinted with my work in conics.

WORKS

The only other pieces of information about Apollonius's life is to be found in the prefaces of various books of Conics. We learn that he had a son, also called Apollonius, and in fact his son took the second edition of book two of Conics from Alexandria to Eudemus in Pergamum. We also learn from the preface to this book that Apollonius introduced the geometer Philonides to Eudemus while they were at Ephesus.

We are in a somewhat better state of knowledge concerning the books which Apollonius wrote. Conics was written in eight books but only the first four have survived in Greek. In Arabic, however, the first seven of the eight books of Conics survive.

First we should note that conic sections to Apollonius are by definition the curves formed when a plane intersects the surface of a cone. Apollonius explains in his preface how he came to write his famous work Conics :

... I undertook the investigation of this subject at the request of Naucrates the geometer, at the time when he came to Alexandria and stayed with me, and, when I had worked it out in eight books, I gave them to him at once, too hurriedly, because he was on the point of sailing; they had therefore not been thoroughly revised, indeed I had put down everything just as it occurred to me, postponing revision until the end.

Books 1 and 2 of the Conics began to circulate in the form of their first draft, in fact there is some evidence that certain translations which have come down to us have come from these first drafts. Apollonius writes :

... it happened that some persons also, among those who I have met, have got the first and second books before they were corrected....

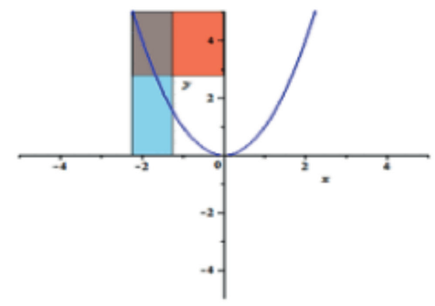
Conics consisted of 8 books. Books one to four form an elementary introduction to the basic properties of conics. Most of the results in these books were known to Euclid, Aristaeus and others but some are, in Apollonius's own words:-

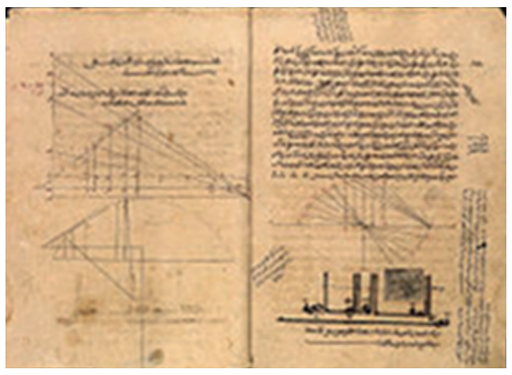
... worked out more fully and generally than in the writings of others.

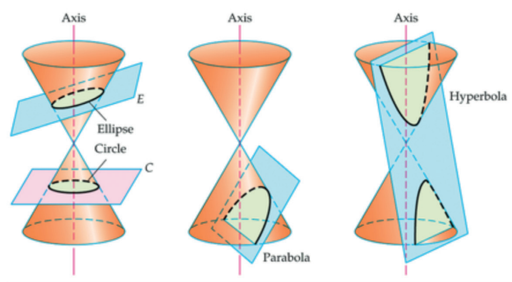
In book one the relations satisfied by the diameters and tangents of conics are studied while in book two Apollonius investigates how hyperbolas are related to their asymptotes, and he also studies how to draw tangents to given conics. There are, however, new results in these books in particular in book three. Apollonius writes of book three :

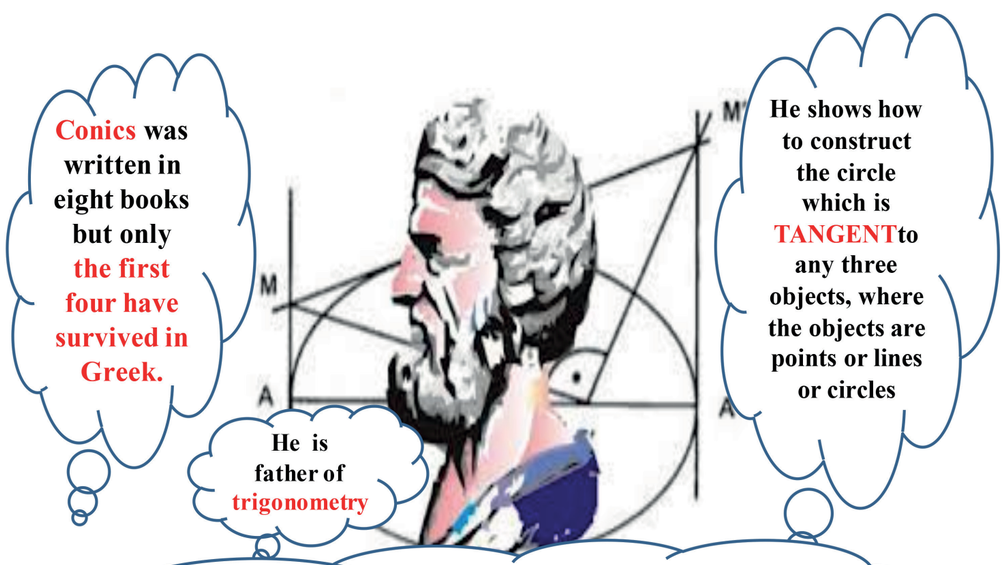
... the most and prettiest of these theorems are new, and it was their discovery which made me aware that Euclid did not work out the syntheses of the locus with respect to three and four lines, but only a chance portion of it, and that not successfully; for it was not possible for the said synthesis to be completed without the aid of the additional theorems discovered by me.

In Hogendijk reports that two works of Apollonius, not previously thought to have been translated into Arabic, were in fact known to Muslim geometers of the 10th century. These are the works Plane loci and On verging constructions. In some results from these works which were not previously known to have been proved by Apollonius are described.









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