ARCHIMEDES IN ANCIENT ROMAN WORLD

Mario Geymonat
Professor of Latin Literature in University Ca' Foscari
Dorsoduro 3484/D, 30123 Venezia, Italy
e-mail: geym@unive.it

ABSTRACT   Cicero's rediscovery of Archimedes' tomb shows the interest for the Sicilian scientist in Rome, even if in Italy Archimedes' geometry was put into practice only by architects and by *Gromatici*, a sort of practical technicians who worked primarily in military and agricultural fields (we have some clear information about their work in a wonderful manuscript of the sixth century now in Wolfenbüttel). Some poets of the classical period were interested in the combination of numbers (like Catullus' 5 or 7 and Virgil's *Georgics* 2), but they never did open references to Archimedes, for metrical difficulties and embarrassed by his astonishing killing during the Roman occupation of Syracuse. Archimedes' life and death had an important part on the confluence of eastern and western culture in the third and second centuries B.C., but a good image of the scientist received serious obstacles by the difficulties of his theoretical works (Cicero also didn't read and understand the mathematical and physical ones) and by his strong and open struggle against the Romans.

1.   INTRODUCTION

Archimedes was the greatest mathematician of classical antiquity and among the greatest scientists of all time. Gifted with a prodigious and audacious intuition, he brought to completion his discoveries by subjecting them to a rigorous logic. He lived intensely bound to his people and to his time, so much that his involvement in civil life favored the growth and conservation of innumerable anecdotes about him. At more than two thousand years distance the stories are still enjoyable and full of fascination. The ancient Romans were upset for at least four or five hundred years by Archimedes' extraordinary and seemingly contradictory personality. But it was difficult for them to accept that Archimedes - the scientist who disclosed unsuspected correspondences in the geometric figures (e.g. spirals, curved planes, characterized by infinite rotations growing in an arithmetic progression around a point), the investigator of some deep secrets of the nature, able to build powerful civilian and

military machines – was so much harsh against the Roman supremacy in Sicily and the south Mediterranean sea. Bound by kinship and friendship with the tyrant Hiero II and his young nephew Hieronymus, who succeeded him at the age of fifteen in 215 BC, shortly after the terrible defeat of Rome at Cannes, Archimedes was convinced by the elders of Syracuse to turn his art somewhat from abstract notions to material things, and by applying his philosophy somehow to the needs which make themselves felt, to render it more evident to the common mind, to prepare offensive and defensive engines to be used in every kind of siege warfare.

In the most part of western Europe, two millennium later, similar conflicting attitudes were reserved to Galileo, by contemporaries and also by the general society of 18th and 19th century: in fact, the scientist born in Pisa was admired for the revolutionary significance he gave to the new astronomical and physical researches, but was feared for his conviction by the religious Catholic power and the isolation he lived during the last years in Arcetri (only nowadays Roman Church recognised that his process was for herself a terrible mistake). It can be said that the contradictory and difficult relationship between Galileo and his contemporaries was the core reason that drew a veil of silence over the admiration mixed with fear that the Roman world held on Archimedes, a really controversial chapter too in the world history of science.

Archimedes moved to Alexandria, then the intellectual capital of the world, around 243 BC, a little less than thirty years after Theocritus, Syracuse's greatest poet and founder of the bucolic genre. For his own part Archimedes refused to settle down in Egypt, but in Alexandria he became a friend of the scientists of the generation that immediately followed Euclid. In particular he befriended the geographer Eratosthenes of Cyrene, to whom he dedicated the *Method*, the astronomer Conon of Samos, for whom he showed great esteem, and Dositheus, to whom he dedicated the treatise *On the Sphere and the Cylinder* and even *Spirals* and *Conoids and Spheroids*. With these colleagues Archimedes exchanged letters from Sicily, subjecting his own works to their judgment before producing the final draft, so that they could discuss them and suggest to him further modifications and improvements. But in contrast to Euclid's works, those of Archimedes did not have a specific didactic intent: he omits the minutia and often trusts his reader to understand some passages of his reasoning that are anything but easy. It is not possible to find in geometry more profound and difficult questions treated in simpler and purer forms. Certainly the scientist from Syracuse was not content to give the ultimate refinement to subjects already known in whole or in part, rather he dedicated himself with passion to innovative discoveries and inventions. In the life and works of Archimedes science and technology are melded for