

Heron from Alexandria and his "magic"

Michal Zajacek

August 23, 2010

Heron from Alexandria (10-70 AD) lived and worked in Alexandria, which was strongly influenced by Greek culture. In other words, it was Hellenized.

At that time Alexandria was the center of education in the ancient world. After Alexander's the Great death the territory he conquered was divided between his generals. The Egyptian part was controlled by the Ptolemy rulers. Ptolemy I. Soter (Soter means redeemer), who reigned from 305 to 283 B.C, founded a so-called *museion* - the seat of Muses, which was practically the second established university in the world (after Plato's Academy) and it also attracted scholars of antiquity. The famous Library of Alexandria was its part.

Ptolemy's followores continuously enlarged book collections. The final extension of this institution¹ was overwhelming and it was of a great importance. It is significant to remark that in this case we use the word *book* to denote one or two longer pages of text called scrolls. The library of Alexandria was not only important in that it contained all important works of antiquity. There were specialized workers who rewrote them and ,thus, helped to preserve and distribute them to a broader part of population.

All important scholars of antiquity visited Alexandria for o shorter or longer time. For example, you may know *Eratosthenes*, who determined the diameter of the Earth for the first time, mathematicians *Euclid* and *Diophantus*, and astronomer and astrologer *Claudius Ptolemaios*. Our "magician" Heron is not an exception.

Heron constructed the first steam engine. Although it seems to be very simple, it required a lot of intelect. It consists of a cylindrical or spherical pot filled with water and a couple of jets.

Like Euclid he also summarized the mathematical knowledge of that time. It is also rumoured that while describing the Egyptian way of computing the volume and surface of cut pyramide, he almost discovered complex numbers in one task and he managed to avoid them. Present pupils study *Heron's formula* for determining the plain of triangle:

$$S_{\Delta} = \sqrt{s(s-a)(s-b)(s-c)} \quad (1)$$

where a , b , and c are triangle sides. The variable s is defined by the relation:

$$s = \frac{a+b+c}{2} \quad (2)$$

Heron is also known as an inventor of new mechanisms. Let's have a closer look at some of them.

¹It is reported that during Caesar's occupation of Alexandria in 48 B.C, which was partially burned down then, the library contained 700000 pieces of scroll exemplars.

The impressive staircase leads to almost every ancient temple. There was also located a salesman with water blessed by priests. Heron invented a mechanism substituting for this man. The mechanism worked like this: a coin thrown into the funnel opened a small valve due to its weight and a small amount of water was poured into a bowl.

Heron also invented a mechanism for the automatic closure of temple doors. Don't you believe? It was not so difficult as it may seem. After a sacrificial fire was lit, doors closed by itself and after the fire went out, the doors opened automatically. There was a container with water under the altar, which was pushed by the pressure of warm air to another container. This container was pulled down due to its higher weight and it moved with chain to which it was attached. Through a system of pulleys this motion was carried forward to underground hinges of temple doors.

In future we will add more information about this interesting man and many others who managed to make life more beautiful and a little easier. Just visit this website!