

STRANGE WEIGHERS

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Abstract

The balance is an instrument very often depicted as a symbol and operated by gods and saints and at the end by a monkey. This extraordinary group of weighers is reviewed.

Keywords: balance, gravimetry, history, symbol

Introduction

The first chemical measuring instruments were cups and balances, instruments which were already known from daily life. The operation of a cup is clear. In contrast a balance is sophisticated and its working mode can hardly be understood without knowledge of the natural forces. It was assumed that the balance was a divine invention. It is not surprising that soon after its invention the instrument was mystified and thought to be used in symbolic procedures by gods and saints [1, 2]. This idea was developed in the Mediterranean area but hardly spread to the East. Though the original inhabitants of South America used balances its symbolic use is not verifiable.

For that symbolic weighings always a real instrument is depicted and constructional features and developments of ancient times can be detected. Besides findings such pictures are a valuable source in the study of the history of instruments [3–5].

Egypt

Already in the Old Kingdom in Egypt divine qualities were attributed to the Pharaoh and it was believed that he enjoyed eternal life after his death. During the Middle Kingdom the idea of a future life was transferred to all members of the society, resulting in lavish funeral rites. The corpse was embalmed and prepared for a voyage on the underground Nile. At the end of which the soul was weighed in order to decide whether the dead is worth to achieve eternity or should be annihilated by the devourer [6]. The heart weighing ceremony may be explained by a short form representation in Fig. 1. The dead wife

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stands before the balance. Her heart is placed on the balance pan and its mass is compared with an ostrich feather representing Maat, the goddess of truth, justice and harmony [7]. The jackal-headed Anubis, tutelary god of the embalmers calms the balance by grasping the suspension cords and touching the plummet. On top of the stand a baboon (identical with Thot) is sitting as a symbol of measure. He controls the operation. (Sometimes his penis is part of the indicator system [8].) The balance beam must come to equilibrium in horizontal position, thus showing that the life of the dead person has been in harmony with the world. If this was not the case, the Devourer, a combination of hippopotamus and crocodile pounces upon the deceased. If the ibis-headed Thot, lord of the moon, god of learning and inventor of writing, reports a favourable result, Osiris, the emperor of the West, decides to enter eternity. Behind Osiris his sister and wife Isis. This scenery is depicted very often from the middle of the 18th Egyptian dynasty (1567–1320 B. C.) onwards till the end of the Empire in several modifications in tombs, on coffins or shrouds.



Fig. 1 Papyrus Kairo 40007 (21th Dynasty)

The man's height balance used is of special equal armed type, characterised by a plummet as part of the indicator system [9]. Furthermore four cords are bedded within both ends of the wooden tubular balance beam, fed latterly and dragged down by the balance pans. Thus, the ends of the beam serve as knife edges. This type of balance (without or with modified indicator system) was used until modern age in Mediterranean countries.

Israel

Isaiah reported that Godfather used the balance during the creation of the world to weigh the mountains [10, 11]. The metaphor of weighing up of bad and good deeds by god [12] probably is taken over from Egypt. Proverbial has become the 'Mene tekel' in the Book of Daniel, the prophecy with symbolic weighing of deeds [13]. Several times correct measurements are demanded. However, because only few illustrations were allowed in the Bible we have no pictures of such scenes.

Greece

The balance lost some of its obscenity when Archimede (B.C. 285–B.C. 212) explained its mode of operation [14], though still the knowledge of the basic natural laws was lacking. Indeed until now we do not understand gravity! In Greece the idea of the balance of fate was developed. (Also a Tibetanian fate balance in the hand of a Buddha is known.) In the Greek mythology goddess Moira or godfather Zeus itself operated the fate balance deciding about victory or death (Fig. 2). Also Kairos, the opportune moment, sometimes is personalised as a young man, with wings and equipped with a balance. Always symmetric beam balances are shown in the pictures.



Fig. 2 Encaustic painting on a Greek vase: Gods weighing the heroes in order to decide which one will win and which will be killed

Rome

The Romans modified the symbolism to legislative significance: The balance now was placed in the hand of goddess Juno Moneta which was responsible on the governmental mint and on the correctness of the money. She is often depicted on coins (Fig. 3). Moneta is often mistaken for Justitia but Justitia in addition holds a sword as symbol of the tribunal (Fig. 4). In general hand-balances of symmetric beam type were used. Several types of balances are depicted on a frieze in the Vettier house, Pompeii, Italy, showing putti (erotes) manufacturing and applying balances.



Fig. 3 Roman coins with Moneta as protector of the governmental mint



Fig. 4 Representation of the zodiacal sign Libra as Justitia combined with Pax. Therefore Justitia holds a balance and a palm frond instead of a sword [15]

Islamic civilisation

Mohamed believed that the balance was Allah's gift, brought to Noah by the archangel Gabriel [16] (p. 441). In the Koran, at Allah's behest he admonishes several times to weigh correctly (Sura 11, 17, 55, 57, 83). Furthermore the balance is used at the Last Judgement to compare good and bad deeds and to decide for heaven or hell (Sura 7, 23, 99, 101). Because in Islam illustrations are disapproved we have no pictures.

Christian civilisation

Sometimes saints are depicted with a balance with reference to their profession. So we have pictures of the apostle Matthew as customs officer with coin balance and of the physician San Pantaleone with drug balance. The double significance as measuring instrument of good deeds and as a judicial symbol was adopted later from the Christian culture. Since the 11th century, first in Byzantium, Michael archangel escorts the deceased to the



Fig. 5 Meditation picture of the Last Judgement with Michael archangel weighing the soul [19]

throne of God and acts as a weigher of the soul (Fig. 5) [17, 18]. Occasionally we see Jesus operating a balance and sometimes Mary assisting in weighing at the Last Judgement (and falsifying the result in favour of the poor wretch). Money in the balance pan (as an invitation for the collection) should rescue the sinner from purgatory. Sometimes one of the apocalyptic riders is equipped with a balance. With Jesus as a pharmacist degenerated the symbolism of the balance into an advertising icon. Most of that balances depicted are symmetric hand balances made of metal.

India

In Hindu (Indian) philosophy and as notified in holy books weighing up of good deeds with evil will decide on a place heaven or hell after our death.



Fig. 6 The parable of the monkey with the balance. Courtesy: Aggarwal Book Depot, Delhi

At the end the abridged version of an old Indian parable (Fig. 6): Two cats got one piece of bread and started quarrelling with each other. A monkey saw them and very clever offered to divide it equally. He divided the bread in two pieces and compared it on a balance. The cats patiently waited for the justice by an impartial balance while the monkey misused it. He bit off a small piece from the heavier sample and he repeated weighing and eating until the bread was removed ultimately and the cats did not get any share [20].

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