

Weights and balances were major contributors to the human experience through out recorded history. They were not only an instrument of science and trade but also charged symbols of credence, rectitude, codependency, order, law, and justice. The Viking Age progressed largely undocumented by the Norse themselves. The role that weights and balances played in the economic practices of the Vikings must therefore be guided predominately by archaeological data and analysis. Through out this paper I will discuss/examine metrological studies, metallurgic ceramics, spatial and temporal analyses, and symbological possibilities of Viking Age weights and balances.

The transition from agriculture, to raiding, then to urbanism and trade reflect an economic determinist's attitude that was apparent in Norse culture. During the 8th century Scandinavian raids were conducted against urban centres for the interest of easily accessible wealth of vulnerable monastaries. Inevitably, during raiding excursions the Vikings would come into contact with such empires as the Carolingians and the Caliphates that would sooner than later have a significant influence upon personal and international economic sustainability (Barrett 2008: 677). The earliest evidence of eastern expansion is a hoard of oriental coins dating from the mid to the late 8th century near Staraja Ladoga (Barrett 2008: 678). The Vikings quickly acknowledged the advantage of transactions based on the weight of silver as this could include any material item that contained such an alloy be it ingot, jewelry, coin, or hacksilver. This demarcation in economic shift was also due to the social and political construction exercised at the time. As there was no central authority, the Norse, especially on Gotland, maintained a metal-weight economy well into the 12th century (Kruse 2002:286). Weights found in Viking Age sites are notably highly varied. They exhibit several different features that invite archaeologists to speculate how the Norse

utilized these artifacts. Additionally, due the argentiferous nature of the weights, the materials often have undergone heavy corrosion, thus adding speculation to their exact weight and their original features.



Scandinavian weights are established by type: oblate spheroid, cubo-octahedral, cylindrical, segment-shaped, conical, rectangular prism, biconical, and miscellaneous for those that are rendered too obscure by corrosion to distinguish (Pedersen 2009: 123). Types of weights may reflect the character of the site at which it was deposited. At the site of Kaupang, Norway 82% of the weights recovered within the settlement are lead while 18% are copper alloy and copper alloy/iron. In the Kaupang graves lead weights are entirely absent as copper alloy/iron weights make up 70% of the finds, and copper alloy types 30%. Similarly, 68% in the settlement location at Birka were lead weights, whereas 24% were copper alloy and 8% copper alloy/iron. The graves at the Birka site reflect the ongoing pattern* with 65% of the total recovered weights made of copper alloy/iron and 24% copper alloy (Pedersen 2009: 135). Additionally, the distribution of weight types reflect a similar pattern. At Kaupang and Birka the majority of copper-alloy weights are cubo-octahedral while the copper-alloy/iron weights are of the oblate spheroid shape.

Heiko Steuer a Dutch archaeologist who has done extensive metrological analysis on Viking Age weights, stresses that the lead weights are less advanced than the copper-alloy

weights. The latter are crafted with more precision and detail that are deemed more advanced than their counterparts and are thus postulated to have been more regulated. An extensive analysis of 420 weights at the site of Kaupang, Norway were carried out from 1998-2003. It is vital to note that Kaupang is an urban settlement surrounded by multiple large cemeteries. Ten weights and two balances were found in the burials, whereas 410 weights were identified in the settlement. The weights within the graves are notably homogeneous. All of the weights are either copper alloy or copper alloy/iron.

Susan E. Kruse in her article *Ingots and Weight Units in Viking Age Silver Hoards* states that “post-Viking Age sources note that the standard weight unit of Scandinavia was the mark” which was divided into “8 ore, each of which consisted of 3 ortugar.” These documentary sources include a Swedish runestone Stora Ek in Vastergotland dated to the 11th century. Brogger speculates that the Viking Period weight-unit was based on the ore, a contemporary measurement of 24.49g which may have been divided into three ertog of 8.19g. Historian August Steinnes critically evaluated this supposition when his study concluded that the ore standard was likely to have been divided into 20 units. The collective measured weight of the five smallest weights found at the Jatten site were used as a common denominator of ~1.334g which could be produced in a series of 1½, 2, 3, 4½, 5¾, 10, 20, and 30 “pennings”, the speculated moniker for smaller weighted units. These studies are subject to much criticism as lack of representative samples and corrosion are persistently problematic to concrete results. However, given the multiple metrological analysis conducted, it is persistently seen that Viking Age weights, even when considering deviations from statistically significant values, were highly advanced systems of measurement. Both large and small quantities could have been measured with high accuracy the technology at

the time could reproduce. Among the weight and silver hoard found at the Jatten site was Steuer's type 2 balance, a type of balance that are overwhelmingly found in Viking Age sites. The type 2 balances are collapsible and are of a distinctly Islamic influence.

Weights and balances played a role beyond the practical. They were powerful, prominently charged symbols in many pre-Viking cultures. In ancient Egypt Maat, the goddess of truth, weighed the souls of the dead; her feather the measure and their spirit the weight (Budge 1985: 418). The scientific endeavor of the balance and the weight in Islamic



communities was nurtured by the conviction that these were pillars of right society and tools of good governance given to man by God (Abattouy 2006: 2). It is certainly plausible that Vikings were also influenced by this mode of thinking given that their day-to-day life experiences depended on trade. Dirhams and styccas and elaborate designs of birds, horses, and appliques can be seen to have been mounted on weights at Aust-Agder, Torksey, Croft-On-Tees, Kaupang, and Birka respectively (Pedersen

2008: 170).

These additions imply that they were heavier in symbolic meaning than functional use.

Torksey has also produced another interesting weight – lead with glass inlay. Among the decorated weights, these, along with those that are inlaid with gold, are common (Pedersen



Concerning Paviken directly - a natural harbor site essential to the trade industry during the Viking Age - the evidence of manufacturing would more likely be elucidated by discarded ceramics not necessarily by the existence of multiple hoards of hacksilver and weights (Soderberg 2004: 115). The presence of copper-alloy weights indicates that

production was likely to be incredibly specialized and therefore most likely reflect permanent chieftain operated workshops located at places ideal for trade such as Birka and Paviken. Crucibles, heating trays, and melting bowls are characteristic of the type of metallurgic manufacturing required for weights. Melting bowls specifically are made of packed clay, charcoal, and highly fragmented bone materials. Melting bowls Such melting bowls are found at the sites of Sigtuna, Hedeby, and Birka. I posit that this is what the archaeological excavation of Paviken I



Figure 1. A melting bowl fragment from the Sigtuna mint (after Söderberg 1996).

Ashley Atwood
Viking Age Balances and Weights
2013

2013 trench 3 provided evidence for, or perhaps at the least indications of manufacturing of some other variety of goods. Trench 3 recovered large quantities of packed clay, with layers of heated rock and charcoal, gold, lead, and glass, all ideal materials for vitrified technologies. Viking Age weights are found to have gold inlays which may explain the presence of gold at the Paviken I site.

The Vikings were not only highly influential, but were also highly influenced. I postulate that, due to the weights and balances high level of accuracy, their longevity of usage, their prominence in settlement and burial sites, and their highly ornate character, that the Vikings retained a metal-weight economy for an extended period of time in order to allow them to readily trade with diverse civilizations. In this way they would have had access to new innovations in science, new cultural ideas, and, most importantly, and dependable influx of wealth that could not be supported purely by raiding techniques.

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