ALLEGATO N. 3

PRIMA TRADUZIONE

The birth of a “Mediterranean” transport system is an important and significant expression of trade in antiquity. The shapes and materials do not depend on the place and the time of production, and on the type of content delivered, either. Amphoras play the main function to contain those materials that require a container to be transported, for example liquid and incoherent materials. They are comparable to modern packaging tools, the production of which is completely determined by the nature of the transported item. Amphorae are important indicators of the movement of what they contain, but that only if the way to make them, their delivery, their use and their waste don't change. So only when we can have a constant from the sum of every moment in the life of an amphora, from production to waste:

PRODUCTION+DELIVERY+USE+WASTE=CONSTANT

The handmade amphora should be a bin with a production cost which is lower than the value of the content carried. It should be made with cheap raw material and easy processing techniques. Qualification of constructors and cost are necessary before amphorae are used for transport . Moreover, the artifact should be made in a way which makes the object suitable for all the phases of transport
However, it is also important to consider that the shapes of amphorae in the different production areas were also determined by other important factors like the intrinsic qualities of the substances available , the technical ability of the people in the workshops and, last but not least, the local traditions of pottery. Amphoras, independently from their different forms, are designed for lots of types of transport from the place of realization to the place of use; for example human transport, with simple suspension tools, with animals, on wagons, fluvial transport (with rafts or boats) and naval transport. These containers were used especially for naval transport, because their particular form allowed amphoras to be wedged one into the other ; in this way the Romans formed overlapping rows that allowed a uniform load, with well distributed weight and a low barycenter to assure stability during navigation. Fusiform amphoras were the ideal load for large cargo Roman ships, for their property of concentrating on pushing the mass on the keel, contributing significantly to the stability of the whole. For an optimization of ship transport we should also refer to the presence of two loops that make it easy to handle the amphoras in the various operations of loading and unloading. The traditional Roman amphoras have different purposes, probably due to a high rate of re-use: in fact it is evident that the less a container is specialized, the more it will retain its potential function after the original using and the more it will be possible to re-use it, both with different functions (for example as a container for

food supplies) and with its own functions, such as a transport container which is emptied and reused several times for the transport of the same or of another commodity.

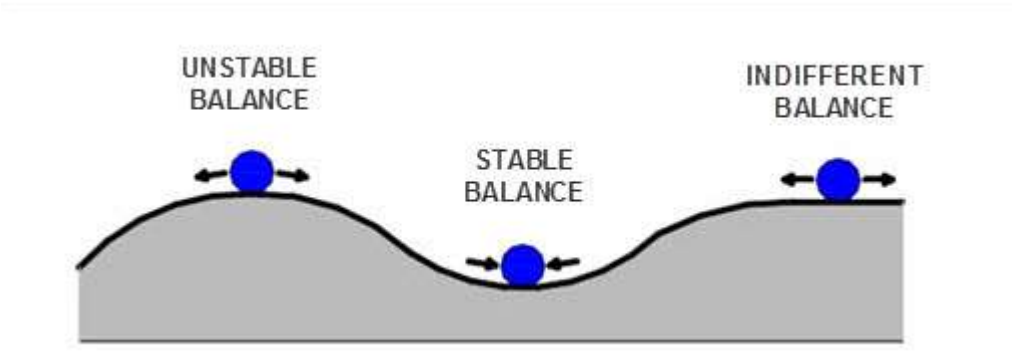
SECONDA TRADUZIONE

A body is in stable balance if, after a small movement from its position of balance, it tends to return there; a little variation of the starting conditions causes a restoration of the system to the point of balance. So, a position of stable balance isn't affected by small disturbances.

A body is in unstable balance when, if moved a little from its position of balance , it tends to go further away from there. So a very small disturbance is enough to make the system go away from its starting position and search for a new condition of balance.

A body is in indifferent balance when, in spite of small movements from its position of balance, it remains stably in its new position, without returning to the starting one and without going away any more.

The clearest example, which is explained in the picture below , is the one of a ball placed:



-inside a concavity: if we move it a little from the bottom, it can roll and oscillate, but it tends to regain its stable balance point;

-on the top of a convexity: every small movement distances it irremediably from its unstable balance point;

-on a horizontal plane: every position near the starting one is maintained stably.

For recumbent rigid bodies stability is related to their shape, which defines the position of their barycentre. The rule is the following: their position is stable where the barycentre occupies the lowest position.

From the energetic point of view it can be said that a stable balance is characterized by the lowest potential gravitational energy.

On the contrary the unstable balance position is equivalent to the maximum potential energy and the highest position of the barycentre.

A rigid body recumbent on a surface or on more points is in stable balance if the vertical line that passes through the barycentre falls into the support base or into the polygon having its footholds as vertices.