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ESSAY

As Long as There Is Something to Measure

The history of measures reflects everyday work, trade, conquest and language, from body-based lengths to weights, money and the metric system.

Mansur Gilmullin · 21.08.2023 · EN

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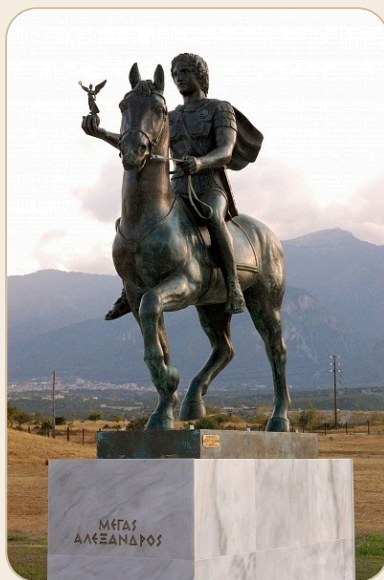
A. A. Mironov as Ostap Bender in the comedy *The Twelve Chairs*. · [Source](#)

"It measures by itself," said the great schemer Ostap Bender, selling an astrolabe to a locksmith for three roubles, "as long as there is something to measure." People have always had something to measure. As soon as they learned to speak, count, obtain things and exchange them, they needed to measure their possessions. Questions then arose: how should they measure, with what, and what should they call it?

Several thousand years passed before the familiar units of measurement emerged. We routinely measure distance in kilometres, time in hours and purchases in roubles, without asking when and how these measures arose or what they originally meant. Yet the history of many measures is instructive, and they played an important part in society.

Tens of thousands of units of measurement are used in the world today. We shall not list them all. We want to tell the story of the origins and use of some, especially those once current in Russia.

The history of measures reflects the history of relations between peoples. Each people initially adopted its own measures. In the course of historical development, these spread to others, chiefly through wars. The conquered adopted the victors' culture, while the victors themselves borrowed much from those they conquered, including their various systems of measurement.



Monument to Alexander the Great riding Bucephalus and holding a statuette of Nike, at the foot of Mount Olympus. · [Source](#)

A striking example is the merging of ancient Greek culture with that of the Eastern lands conquered by Alexander the Great in the fourth century BCE. Hellenistic culture, drawing fruitfully on and developing the achievements of all the empire's peoples, rose to a higher level. It influenced Roman culture and then that of all European peoples. Its influence reached Rus' through Byzantium. Measures borrowed from ancient Greece, such as the **carat** and **drachma**, are still used in some countries. Traces of the Roman system survive in names such as **mile** and **acre**.

A second source of common measures is a shared language. Countries whose languages developed from Latin have common Latin names such as **grain**, **yard** and **bushel**. Many countries, including Rus', used Arabic measures such as the **arshin** and **charka**. The reasons lie in the Arab conquests in Europe, Asia and Africa between the eighth and sixteenth centuries.

A third, perhaps the most important, factor in the mutual transformation of measurement systems was trade.

Length was the first thing people measured. Even in ancient Egypt, they practised geometry: "measuring the earth". They used whatever was at hand — or foot — to measure. Different peoples gave these measures different names, but the essence of the process remained the same.

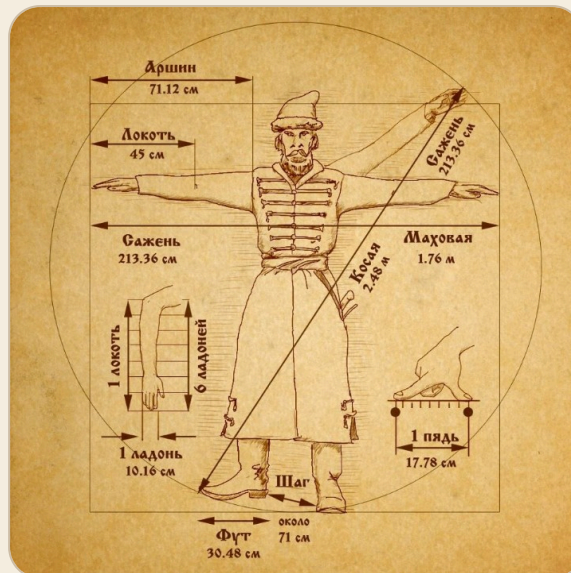


Diagram of old Russian measures of length. · [Source](#)

Russians measured in persts, vershoks, spans, arshins and cubits.

Perst is an old name for the index finger, whose width is about 2 cm. This gave rise to the Russian anatomical term for the duodenum, the “twelve-finger intestine”, 24 cm long. The vershok, known since the sixteenth century, equals the length of the two upper joints of the index finger, about 4.4 cm.

Pyad, or span, from the Old Russian *pyast*, meaning a fist or hand, is one of the oldest measures of length. The small span is the distance between the tips of the outstretched thumb and index finger, about 18 cm. The great span is the distance from the outstretched little finger to the thumb, 22 cm. It appears in Rus’ from the tenth century.

Lokot, or cubit, is an ancient measure of length used by many peoples. It is the distance from the tip of the outstretched middle finger to the bend of the elbow. It was used in Russia from the eleventh to sixteenth centuries, then displaced by the arshin.

Arshin is a measure of length from Eastern countries. Its name comes from the Persian *arsh*, “elbow”. It measures the whole outstretched arm from the shoulder joint to the final phalanx of the middle finger. According to Karamzin, it came into use in Russia with Persian cloth merchants. In different provinces, merchants measured their goods with their own arshin, deceiving buyers. To prevent confusion, a state arshin of about 71 cm was introduced: a standard wooden ruler with metal tips riveted to its ends and bearing the state stamp.

Sazhen appears from the eleventh century. Its name comes from *syagat*, “to reach something”, also the root of the Russian word for “unattainable”. There were two kinds: the arm-span sazhen and the oblique sazhen. The arm-span sazhen measured the distance between the fingertips of outstretched arms: 3 arshins, or 213 cm. The oblique sazhen ran from the heel of the left foot to the fingertips of the raised right hand, about 248 cm.

Shag, or pace, is the average length of a human step, 71 cm. Distances between cities were measured in paces as far back as ancient Egypt.

Verst comes from the word *vertet*, “to turn”. Originally, it was the distance from one turn of the plough to the next during ploughing, 1067 m. Under Peter the Great, a verst of 500 sazhen, or 1.07 km, was introduced. Early in the nineteenth century, black-and-white striped posts appeared along the Russian state’s main roads, marking distances in versts. Recall Pushkin’s line: “Only the striped verst-posts come into view.”



Henry I, an illustration from Cassell's History of England, 1902. · [Source](#)

Royal personages also had a hand in measures of length. In England in 1101, the distance from the tip of King Henry I’s nose to the end of the middle finger of his outstretched hand was adopted as a unit of length. It is called the **yard**.

In the fourteenth century, King Edward II introduced the **inch**, equal to the length of three barley grains taken from the middle of an ear and placed end to end.

The **foot** equalled the arithmetic mean of the feet of 16 people leaving Sunday matins. Apparently different peoples had feet of different lengths, so their units differed: the English foot was 30.48 cm, the French *pied* 32.48 cm, and the Turkish *ayak* 30.5 cm.



The Russian three-line rifle, model 1891, designed by S. I. Mosin (14 April 1849 – 8 February 1902). · [Source](#)

The choice of linear measures could be linked with weapons. The Chinese **yin**, for example, was the distance travelled by an arrow shot from a bow, 32 m. In the eighteenth century, the nautical **league** meant the range of a cannon shot against an enemy ship. This was adopted as the width of territorial waters and measured 5560 m. The **line**, from the Latin *linea*, “thread”, was based on the width of a wheat grain, about 2.54 mm, yet was internationally used for firearm calibres. The Mosin “three-line rifle”, with a calibre of 7.62 mm, served in the Russian army.

From the sixteenth century, state and privately owned lands were measured in **desyatinas** and **chets**, the latter equal to half a desyatina. Originally, a desyatina was a square with sides of 50 sazhen, one-tenth of a verst. The *Book of Land Assessment* of 1629 mentions a desyatina as a rectangle measuring 80 by 30 sazhen.

Area units often depended on how much land could be worked in a day. In Iceland, a **dagslátt** was an area from which grass could be mown in one day, 32 ares. In Persia, a **joft** was an area that a pair of oxen could plough, 40 ares.

A weight unit might equal a load that could be carried. In China, a **dan** was the load a person could carry on their shoulders, 60 kg; in Persia, a **kharvar** was the corresponding load for a donkey, 300 kg.

The oldest Russian weight unit is the **grivna**, or grivenka, amounting to 410 g. Its name is thought to come from a large silver coin used in Russia from the twelfth century. It was later replaced by **funt**, or pound, from the Latin *pondus*, “weight” or “heaviness”. A funt equalled 96 zolotniks, each about 4.3 g. Until 1927, Russia used the zolotnik system to specify precious-metal content, or fineness, per pound of alloy. The **pud**, a weight of 40 pounds, approximately 16 kg, appears from the twelfth century.

Naturally, vessels often supplied measures for liquids: Italy’s **caraffa**, a carafe, was 5.45 litres; Spain’s **copa**, a glass, 0.13 litres; and Germany’s **Kanne**, a jug, 2 litres. Now is a fitting time to meet Russian liquid measures too: 1 shtof = 2 bottles = 10 charkas = 1.23 litres.



A shtof, half-shtof and small shtof for vodka, eighteenth century. Water Museum, Saint Petersburg. · [Source](#)

The **shtof**, from German *Stof*, is a four-sided glass vessel with a short neck, a “drinking measure” used since the eighteenth century. The **bottle**, from French *bouteille*, also came into Russian use in the eighteenth century. The **charka**, from Turkic *cara*, “large bowl”, has been used since the twelfth century. The **shkalik**, from Dutch *schaal*, “bowl”, was the smallest permitted measure for selling wine and vodka, used since the twelfth century and equal to 0.06 litres. It also had other names: **kosushka** and **merzavchik**.

Let us meet Monsieur Litre. Many know that a **litre** is a measure of volume equal to the volume of a kilogram of water at 4°C. Almost no one knows, however, that it was named in honour of the Frenchman Claude Litre. He lived in the eighteenth century and made wine bottles. In 1763, Litre proposed measuring liquids with a unit later named the litre.

Few measures have retained their size across different countries from antiquity to today. Among them are the **foot** as a length and the **ounce** as a weight. More often, the same measure has different values in different countries. One example is the **barrel**, widely used in trade for liquids and dry goods. Depending on the country and commodity, it ranges from 35 to 300 litres. Oil and petroleum products are measured in barrels on today’s world market. In England and the USA, one oil barrel is about 160 litres.



A silver altyn of 1711, a coin minted from 1704 to 1718 during Peter I's reign. · [Source](#)

Among many peoples, weight units shared names with monetary units: the **French livre**, **English pound** and **Russian grivna**. The word **denga** first appears in chronicles relating to 1381 and was then used for centuries as a coin denomination. Six dengas made one altyn, worth three kopecks. **Altyn** comes from the Tatar *alty*, “six”, so a denга equalled half a kopeck. The first use of **rouble** dates to the thirteenth century. The word comes from the verb “to chop”. In later centuries, the rouble as a state-wide coin contained varying amounts of silver.

Before minted money in Rus', the Slavic tribes used furs in exchange: **vekshas**, squirrel skins; **kunas**, sable and marten skins; and **nogatas**, fox, wolf and bear furs. For large purchases, however, they used **grivnas**, necklaces of silver or gold. Later, metal ingots of about half a pound were cast in their place. Thus a grivna was about 200 grams of silver, a nogata one-twentieth of it, and a kuna one-fiftieth, or 4 g of silver.

The economic importance of accurate trade measures and weights has always been understood. In Rus', the church initially supervised them, from the tenth century. With the formation of the Muscovite state in the fifteenth century, supervision passed to the civil authorities.



Russian nested weights, 1787. The weights' masses are indicated by dots on their bases. · [Source](#)

In 1550, “stamped copper buckets” were distributed. For inaccurate scales and weights, merchants’ goods were “irrevocably confiscated for the great sovereign”, and the merchants and their families were exiled. By the late seventeenth century, using measures without the eagle stamp was prohibited on pain of death. Equally strict measures were observed in all countries.

Measures once varied enormously between countries and even between regions of the same country. This diversity chiefly complicated trade. In 1801, France introduced the metric system. It became international in 1875 and was adopted in Russia in 1918. Almost all old measures were converted into it.

A familiar song says, “Do not look down on seconds.” The same can be said of every measure. Each has a venerable history deserving respect and study.