

LEAD AS MATERIAL FOR PLUMB BOBS

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Dear Reader and Fellow Collector,

The subject of lead plumb bobs may not seem the most interesting of subjects; the common use of brass and steel for several hundred years are more lustrous materials and for that reason more eye catching in an aesthetic way to the collector. The harder materials have allowed a range of shape and detail simply not achievable in lead if durability of the tool is considered. In the history of plumb bobs, especially before the 17th century, the use of lead dominated the field; its low melting point and ease of molding made it an obvious choice for shaping plumb bobs.

Advances in metallurgical technology and specialization of metal working trades, no doubt, tipped the balance toward the harder but less dense materials. Simultaneously, the development of the plumb bobs as pointing devices necessitated that lead had to be combined in some mechanical way with harder to achieve a durable and symmetrical tip.

A INTRODUCTION:

Our „little darling“ the plumb bob can be made of different material.

The most important attribute: It has to be HEAVY.

Bruce Cynar wrote in his "THE PLUMB LINE" in 1991 about THE METALLURGY OF BRASS. (more see www.plumbbob.de)

As you know a lot of heavy materials were used for plumb bobs, as

- STONE
- LEAD
- BRASS, COPPER, BRONZE
- IRON
- STEEL
- CAST IRON
- IVORY
- ALUMINIUM
- GLASS
- WOOD (Lignum Vitae, Hard Maple..)
- COMBINATION OF THESE MATERIALS
- MERCURY, LEAD (SHOT), WATER or SAND as filling components

In the history of plumb bobs, LEAD is after STONE the next common material used to make plumb bobs since 3000 BC.

Why the makers of plumb bobs used LEAD?

It has some good characteristics for making a good plumb bob:

- It is heavy It is easy to find It is easy to melt and cast

The only disadvantage is its weakness in the sense that it does not take much in the way of force to alter the shape of a lead object, even when it is in its solid form.

B WHAT IS LEAD?

From Wikipedia: **Characteristics**

Lead is bright and silvery when freshly cut but the surface rapidly tarnishes in air to produce the more commonly observed dull luster normally associated with lead. It is a [dense](#), [ductile](#), very soft, highly malleable, bluish-white metal that has poor [electrical conductivity](#). This true metal is highly resistant to [corrosion](#), and because of this property, it is used to contain corrosive liquids (e.g., [sulfuric acid](#)). Because lead is very malleable and resistant to corrosion it is extensively used in building construction, e.g., external coverings of roofing joints.

Physical properties

Density (near r.t.)	11.34 g·cm⁻³
Melting point	600.61 K , 327.46 °C , 621.43 °F

Etymology

The "plumb" in "plumb-bob" comes from the fact that such tools were originally made of [lead](#) ([Latin: plumbum](#)). The adjective "plumb" developed by extension.

C HISTORY of LEAD

(from WIKIPEDIA): *Lead has been commonly used for thousands of years because it is widespread, easy to extract and easy to work with. It is highly malleable and ductile as well as easy to [smelt](#). Metallic lead beads dating back to 6400 B.C. have been found in [Çatalhöyük](#) in modern-day Turkey.^[7] In the early [Bronze Age](#), lead was used with [antimony](#) and [arsenic](#).*

*In [alchemy](#), lead was thought to be the oldest metal and was associated with the planet [Saturn](#). Lead pipes that bear the insignia of Roman emperors are still in service and many Roman "pigs" (ingots) of lead figure in [Derbyshire lead mining history](#) and in the history of the industry in other English centers. The Romans also used lead in molten form to secure iron pins that held together large [limestone](#) blocks in certain monumental buildings. **Lead's symbol Pb is an abbreviation of its [Latin](#) name plumbum for soft metals**; originally it was plumbum nigrum (literally, "black plumbum"), where plumbum candidum (literally, "bright plumbum") was [tin](#).*

The English words "[plumbing](#)", "[plumber](#)", "plumb", and "[plumb-bob](#)" also derive from this Latin root.

For more information see: <http://en.wikipedia.org/wiki/Lead>

D The RELATION between the word "LEAD" and "PLUMB" BOB.

The latin word PLUMBUM means LEAD. In nearly every country and language the Latin base survives in some form in the naming of this tool.

USA: PLUMB BOB Bob of LEAD

GERMANY: BLEILOTT = showing a vertical by using a lead piece

FRANCE: fil à plomb A piece of lead hanging on a string/line

ITALY: filo a piombo A line with a piece of lead

ENGLAND: PLUMB LINE A line with a piece of lead

SPAIN: PLOMADA piece made of lead

Only in **Turkey** I could not find a real connection between name and material. There it is called after its function: Sakül

E USE OF LEAD IN PLUMB BOBS

BODY FROM LEAD:

After the STONE, the LEAD was the next material used for plumb bobs. The shape was

- **un- defined yet symmetrical**
- **or, spherical or ovoid in shape**

In the most primitive forms, the lead weight is predominantly to hold the string taught; being symmetrical in shape is not of significance nor is the shape important.

Nearly all plumb bobs where the body was from lead, were only used to hold the line tight.

Later we found also **cone shaped** plumb bobs. (ROMAN PERIOD)

Most of the lead plumb bobs were used in connection with INSTRUMENTS like PLUMB LEVEL, PLUMB BOARD or the GROMA, (the principal Roman surveying instrument. More see: http://en.wikipedia.org/wiki/Groma_surveying.)

A nice exception of this rule I got from Australia were lead has been “combined with steel parts to make an excellent “pointing plumb bob. (see pictures right)



Most plumb bob collectors overlook lead bobs because:

- they are part of other instruments and are recognized as plumb bobs
- they can be irregular in shape and thus not recognized as being like more contemporary plumb bobs
- the older ones (Roman) are rare and expensive, especially if they have the conical shape
- a lot of the “plumb bobs” offered as Roman, are actually spinning weights
- most of the small lead items for sale as plumb bobs are “fishing sinkers” and not plumb bobs at all
- they don’t look as nice as shiny brass tools (some are white, some grey)
- they have a lot of dings from use and storage in tool boxes with other heavy implements
- lead is an easily recycled resource; many artifacts starting as plumb bobs may have been melted down to make other implements.

FILLED WITH LEAD

From the USA I got a 1600 grams / 56 oz heavy brass plumb bob filled with different parts of lead. Looks like a crown.



Very often hollow bodies from brass are filled with lead or lead shot as the following sample shows:
 A very nice lead shot filled plumb bob was sold in 2005 by Bruce Cynar (the first editor of THE PLUMB LINE; see www.plumbbob.de) with his typical “trade mark”, the “diet PEPSI”.



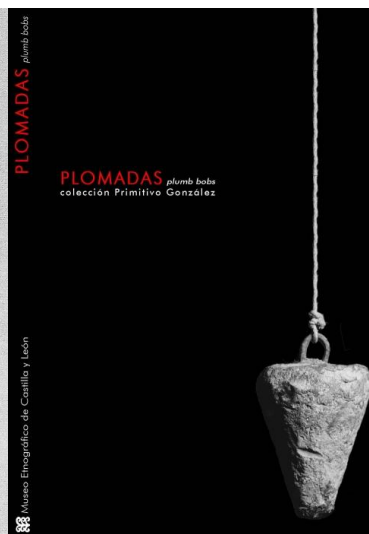
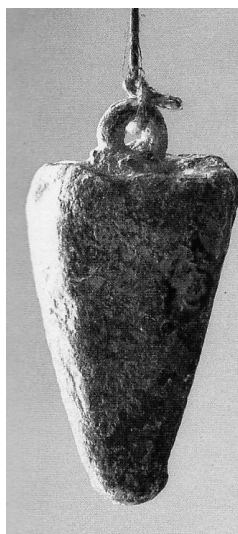
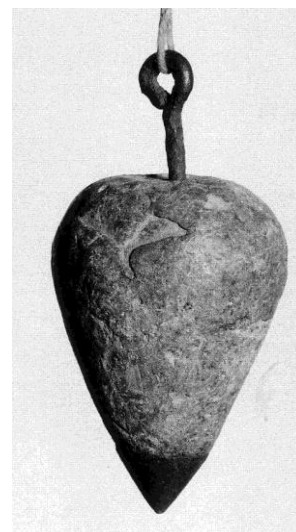
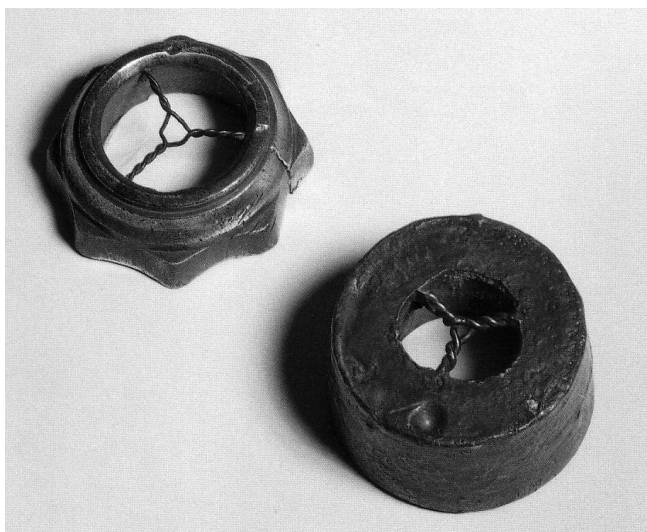
F PICTURES OF LEAD PLUMB BOBS

Over the years, many collectors have contributed pictures of lead bobs.

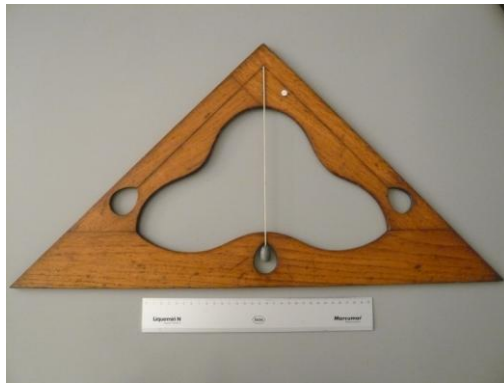
Let's start with some b/w pictures from the catalogue of Primitivo Gonzales, Valladolid, Spain from his exhibition in Zamora 2007:

Clockwise:

- France: carpenter
- China: with iron rod and tip
- Cover of the catalogue
- Roman culture, found in Spain
- USA: with iron rod
- Roman culture, found in Spain (unknown Museum)



From the Dogan Basak, Istanbul, Turkey collection some lead plumb bobs used in instruments:



...and as single bobs.
Picture left: from Austria, Roman culture



Riccardo Chetoni, Pisa, Italy showed some lead samples in his presentation about French Plumb bobs on the meeting in Paris 2008:



Al Cronk from Oregon sent me pictures of two very interesting items. Here is his description:

*Hello Wolfgang; ... -didn't think I had any lead plumb bobs but I do have two. ...the round one has been turned on a lathe and is of **oak wood** -it is 1.75 inches in Diameter and 4.8 inches long - the eye bolt is hand made and runs through the length of the bob to create the point - it appears that a hole was drilled through the wooden body, the shaft driven through and **then a lead plug was placed around the top and bottom to seal it tight**. Four holes have been drilled in the sides and filled with a lead plug about .6 inches in diameter. it weighs 16oz.*



Remark WR: I think the lead was used to get a higher weight and for decoration.

*The other **bob's body is solid lead** and is 2.25 inches in diameter and 4.5 inches long. The top of the bob and shaft down through the center along with the tip are steel - and are of one piece - I have tried to determine if the tip unscrew with no luck. There is no indication would. there appears to be no seam in the lead body. Look inside where the top doesn't quite fit it looks like the lead was poured in a form. How it was put together I haven't figured out. There is about an 1/8 gap where the lead body can move. This may be just from age. This bob weighs 64 oz. If you have further questions please let me know. Have a good day - Al Cronk*



Remark WR: A very interesting tool. It seems to be a common American iron plumb bob, turned on a lathe and then filled in a mould with lead. The gap between iron and lead is usual, if you put these different materials together. When the lead gets cold, it becomes smaller....

The special type of **French carpenter's plumb bobs** was often made of lead. It was easy to work and to make in a mould by the carpenter itself.

Pictures from left to right: 3 lead bobs from my collection, 1 from Jean Marc Tranchant, France



2 from Alain Grondeau, France and one offered on ebay recently.



The pictures below from Dick Jones in England and my collection show that this “pear-shape” of lead plumb bobs was used for (English) plumb boards.



The line passed through a hole. The plumb boards were sold without a plumb bob, because everybody had such a tool at home.

THE COLOR OF LEAD

The color of lead usually is GREY (picture right), but there are offered very old lead plumb bobs or weights, that are WHITE. (picture below)



This are lead items, that rest since long time in the ground. It depends of the chemistry of the ground, what color the item has.

If you cut the “white lead”, you can see very good the shiny surface of the lead.



From the collection of Eric Klimp, Holland

English (with hole through) and American bobs (with ring for the line) from the collection of Riccardo Chetoni, Italy.

Finally some pictures from American Fellow Collectors:



From the collection of Dale Riedesel,, Idaho USA



From the collection of Norm Nilsson, Pennsylvania,USA

and Rick Haynes, USA

G CONCLUSION

The lead was one of the first materials used for plumb bobs.

The use of this material was very easy, so the workers could make their plumb bobs themselves and had no need to buy it in the store.

Collectors like more the brass items, because lead is “too simple”.

Lead plumb bobs were often used as “weight” to hold the line tight in instruments or plumb levels.

The shape is very simple. Tips are very fast rounded by the use.

The material is heavier than iron (+45%) or brass (+25%), so it was used to add weight in combination with other materials.

This is an article of the monthly published WOLF’S PLUMB BOB NEWS that is sent on demand as PDF-file attachment by email.

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