Dear Fellow Collectors,

As you know much of my research on the subject of plumb bobs is powered by the internet. GOOGLE in particular is an incredible tool for uncovering references to plumb bobs, in many types of written matter, some found where you would least expect them. Specifically, www.books.google.com, is the source of much of this month’s newsletter, and a resource that I would recommend you explore.

In the course of working at composing a series of newsletters, and organizing my files by subject, I frequently find newsworthy tidbits that are either so singular that they defy assignment by subject, or are interesting but not newsworthy enough, perhaps, to devote an entire newsletter to the subject.

This month’s WOLF’S PLUMB BOB NEWS accumulates 19 items from my miscellaneous file for your entertainment. Their sources are widespread and include tidbits from Germany, Switzerland, England, Australia, and the United States. Note in particular some previously unknown shapes that have come to my attention, and some very interesting but unusual uses for the plumb bob are suggested in these pages.

WARNING: The use of plumb bobs as weapons is not condoned by the author!
2. Tools for masons and carpenters

These tool shapes, are often derived from the oldest stone instruments, moreover, they are surprisingly similar to those still in use today. In the early examples, we find elegance and utility combined with a notable trend toward utility in the last century.

1118. Bronze plumb bob shaped like a child’s toy, a “top”; the cap has one or two horizontal holes in the neck that intersect a vertical hole aligned with the center of gravity of the body.

Height 4 cm = 1 5/8 inch; Diameter 5 cm = 2 inch.

The other items 1119, 1120 and 1121 are very similar described.
CARPENTERS LEVEL.

Fig. 1110.

Carpenter's Level.

That shown in the figure has a pointed swinging arm, and also a curved scale and pointed index, so that the instrument may serve the purposes of a level, square, and bevel, any angle of inclination being noted by the pointer upon said scale.

**Carpenter's Square.** An L-shaped steel rule having two arms meeting at a right angle, and graduated to feet, inches, and fractions. It is used by carpenters and other mechanics for laying off perpendiculars to a line or surface, and setting off the distances thereon at the same time. See Try-square.

**Carpenter's Tools.** In the reign of Henry II. of England, the whole stock of a carpenter's tools was valued at one shilling, and consisted of a broadaxe, an adze, a square, and a spoke-shave. The number has largely increased since. See Specific Index. Woodworking.

Fig. 1122 shows a variety of old Roman implements of this kind, as represented on existing monuments.

1 1, compasses and calipers.
2 2, plumb-bobs.
3 3 5, templet and square.
4 4, single and jointed rules.
5 6, matlats.
7 7, adze.
8 8, scriber and soldering-tool.
9 9, chisels.
10 10, hatchet.

**Carpenter's Vice.** A device with a stationary jaw attached to the bench, and a movable jaw operated by a screw used for clamping a board or timber while being operated upon by the plane or chisel.

**Carpenter's Try.** See under the following heads:

- Abat-jour.
- Abat-voix.
- Abatement.
- Accomplishment.
- Ahambe.
- Angle-bar.
- Angle-tier.
- Angle-tense.
- Apron.
- Apron-piece.
- Arch-chamfer.
- Arch-beam roof.
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ANCIENT PLUMB BOBS FROM POMPEII/ GREECE

Different shapes found in Pompeii / Greece

Found in Rheinzabern / South West Germany from a Roman pottery-trade colony.
B 4  PLUMB BOB as an EXCUSE

A legal appeal from the County Court, KYNETON (north of MELBOURNE, AUSTRALIA) from 1883.

The evidence for the plaintiff was that he had been in the defendant’s employment till March, 1880; that on Sunday, 27th November, 1881, some one called him up at 5 a.m. and sent him to the defendant’s office, where the defendant asked him what he had been doing there that morning, that another person present had seen him inside the office and coming out of it; that the plaintiff denied this, and told the defendant to come to his house and see if any of his property was there; that, at 5 p.m., a constable came with a warrant, and arrested him; that the charge was afterwards dismissed.

The evidence for the defendant was that, before 5 a.m. on that morning, a workman called him up and told him that he had seen the plaintiff, at 4.20 a.m., coming out of the defendant’s office, through a window, had spoken to him, and received the excuse that he was looking for his plumb-bob which the defendant had taken from him, to which the workman replied that it was not likely to be among the papers, and the plaintiff then entreated him not to tell; that the defendant and this workman went into the office and found the papers disturbed, and thereupon the plaintiff was sent for; that in the evening of that day the defendant obtained a warrant.

B 5  PLUMB BOB, RULE AND SPACER COMBINED

From ENGLISH MECHANIC AND WORLD OF SCIENCE
No. 1420 JUNE 10, 1892 page 361

“The length of the piece A is equal to the diameter of the bob, and the line passing through the hole in the centre of A to a hole in the centre of the bob, it follows that if the bob is allowed to drop gradually down the angle or other part of a building or other object, while A is held to a fixed point, in the position shown, it will indicate all hollows or projections on the vertical line, and show whether or not the object is plumb from any one point to another.

It is very handy for a clerk of works or building inspector to carry in his pocket.

Baku, April 28.  Peotre Petrovitch”
I hope none of the plumb bobs from my collection was used in an “assault and battery” Although there are no patent claims as a weapon, VAJEN’S patent from Nov. 14, 1888 with 1750 grams —62 oz, was designed for “DROPPING”. One certainly could have been a formidable assault weapon!
Consider using a plumb bob as a paperweight on the desk in your office, intimidating, at least, in delicate negotiations your clients? ☺
this freedom from fault may be shown prima
facie by proof of an imperious necessity for
the defendant's assault upon the plaintiff;
yet this shifting of the burden of going for-
ward with the evidence does not change the
general burden of proof which requires the
defendant to establish every element of his
plea of justification.

[2] Plaintiff was allowed to show that
about three months before the assault de-
defendant had in his hand a plumb bob, a pear-
shaped metal piece attached to a chain, and
used in his office as a paper weight, with
which he then struck his own hand, remark-
ing "that he could make a nice round hole in
a man's head with it." The evidence showed
that defendant actually assaulted, beat, and
seriously injured plaintiff about the head
with this instrument; and some of the testi-
mony tended to show that prior to the begin-
ing of the difficulty defendant had the bob
in his pocket, from which he drew it for the
attack. Conceding that this declaration by
defendant was not, under the evidence, ad-
missible as a threat against this plaintiff, we
nevertheless think it was admissible to show
defendant's consciousness of the character
and efficiency of the bob as a weapon of at-
tack, and so to illustrate defendant's animus
in its use, and the extent to which he inten-
ded to injure plaintiff. There was no error in
its admission under the circumstances of this
case.

Other assignments of error, being waived
by noninsistence in brief, will not be con-
sidered.

Let the judgment be affirmed.
Affirmed.

ANDERSON, C. J., and MAYFIELD and
THOMAS, JJ., concur.
What is the duty of the master builder to his worker if he falls down while using a PLUMB BOB?

**Attention:** Using a plumb bob may be dangerous!

---

**B 8 MECHANICAL PLUMB BOB**

I could not find other information (patent, catalogue etc.) **WHO knows more about it?**
Below you learn how to make an EGG SHAPED PLUMB BOB for your plumb level (Chicken egg size).

**HOW TO MAKE A PLUMB-BOB MOLD**

Make a small hole in the center of the large end of an egg, and another in the side, and blow out the contents. Dry the empty shell in an oven, and then fasten a small screw eye, A, in the end hole, by means of a piece of clay, B. Place another piece of clay, C, over the side of the egg, leaving an opening, D, to pour in the melted lead later.

Place the egg, with the clay on it, in a box, E, and pack with sand, having the opening, D, on top, as shown.

Having thus prepared the mold, melt about a pound and a half or two pounds of lead and pour in the opening. Allow plenty of time to cool, and then break away the egg shell, and you will have a good plumb bob.—Contributed by W. J. Slattery, Emsworth, Pa.

This one (right) could perhaps be made with such a mold.

Perhaps BRIDGE BUILDERS in AFRICA use Ostrich eggs (picture left). An Ostrich egg could yield a 50 lb plummet compared to the 2 lbs or so product of a lead filled chicken or duck egg. ☺ ☺

An Ostrich egg is 25 to 30 times as big as a chicken egg.

A reward will be given for the first picture of an ostrich egg plummet!
B 10  DO IT YOURSELF PLUMB BOB HOLDER

As early 1904 (100+ years ago) Hartford, Ct., USA was the center of plumb bob collectors. That tradition is carried on today by noted collector, Nelson Denny, from his ranch on the outskirts that fair capitol city 😊

The plumb bob on the drawing looks like a “china hat” (No. 212 weight 8 or 11 oz) from a Berger catalogue 1908 and earlier. (Berger was from Boston Mass. U.S.A.)

A PLUMB-BOB POCKET.

By Elijah H. Owen, Hartford.

The accompanying sketch shows a pocket for plumb-bob, to be worn on a belt. I first saw one of these devices in Mr. Minor’s office at Greenwich. He got the idea from Mr. Kirby of Portchester, N. Y., who conceived it. As it is inexpensive and decidedly useful, I herewith, with consent of the “inventor,” bring it to the attention of the members of this association. As seen in the sketch, it is simple of construction. Any harness-maker can make one from two pieces of scrap leather.

No. 1, the back, should be fairly stiff, and is provided with two slits near the top, through which the belt passes. No. 2 should be cut so as to make a close fit for the bob, its entire length. Under the point enough room should be left to prevent the bob from resting on the point, in order to lessen its liability to be thrown out by a sudden jolt. For the same reason, the pocket should be deep enough to slightly overlap the widest part of the bob. The top, A'C', is an arc of a circle whose center is near B'.

When sewed together, the line A'B'C' coincides with abc, thus forming the pocket desired. The sizes and shapes of these pieces will, of course, vary with those of the bob, but patterns may be cut out of paper, and altered, until the desired fit is obtained.

In work requiring frequent use of the plumb-bob, the saving of one’s pocket caused by the use of this little holder may repay the user, and it is certainly advantageous to have the bob always right-side up and easily withdrawn.

B 11  THE DEVICE THAT WOULD PUT AN END TO PLUMB BOBS

(or so he thought)

Don’t obey this advice: from an ad 1921:

“… So do not hold yourself down by clinging to the old fashioned plumb bob and stationary level. THROW AWAY YOUR PLUMB BOB and be up to date by using an O. T. D. level ....”

The O.T.D. LEVEL you can find in the patent US 1,393,328 Oct. 11, 1921 and US 1,281,096 Oct. 8, 1917 given to Christopher F. Thullen Chicago.

plumbbobwolf@t-online.de
B 12      NEW SHAPES OF MINING PLUMMETS

In THE JOURNAL OF THE IRON AND STEEL INSTITUTE LONDON and NEW YORK 1891 I found a shape of a mining plummet that was unknown for me:

Plummet for Deep Shafts.—In surveying the mines of the Lehigh Valley Coal Company a new form of plummet is used. It consists of a vertical core 12 inches long, with eight radiating flanges 9 inches high by 3 inches wide of 3/8-inch metal. At the bottom there is a circular disc acting as a web. This plumb-bob weighs 20 lbs., and has a surface area of about 630 square inches. An ordinary bob of equal weight would have a surface of 90 square inches. In a dry shaft, 500 feet deep, this form of plumb-bob will settle, under ordinary conditions, in about one hour instead of in five or six hours, as is the case with the older form.‡

‡ Ibid., 1890, p. 157.

A similar shape was described in:

THE PRINCIPLES AND PRACTICE OF SURVEYING

BY CHARLES B. BREED AND GEORGE L. HOSMER
INSTRUCTORS IN CIVIL ENGINEERING, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

NEW YORK JOHN WILEY & SONS
LONDON : CHAPMAN & HALL, LIMITED 1907

327. PLUMBING THE MERIDIAN DOWN A SHAFT.—To the mine surveyor the plumb-line is an instrument of precision, excelling even the transit, and under most conditions, the work of transferring the meridian down a mine can be accomplished more accurately by means of the plumb-line than by any other method accessible to the surveyor.

The method usually followed is to suspend two bobs from the staging above the mine so that a horizontal line in their plane can be sighted both from above and from below. The transit is set up both above and below on this line and thus an azimuth connection is established between the surface and the workings. Sometimes a much longer base-line than can be directly sighted can be obtained by plumbing down at the corners of a shaft as shown in Fig. 134. Points A and B have been plumbed down and, by the triangulation method there indicated, a connection with the underground traverse can be established. In this triangle the angles should be chosen so as to give good intersections.

All kinds of drafts in the shaft should be avoided during the alignment at the bottom. No cages or skips should be run and the passages leading to the shaft may have to be damped with sheets of canvas. No lateral streams of water should impinge on the plumb-lines; in fact it is desirable that no water at all should drop in their vicinity.

The best plumb-line for this work is one made of wire. Annealed copper wire is most flexible, but soft steel or piano wire being thinner will be less affected by drafts and will also stretch less. The plumb-bob should not weigh less than five pounds and should be heavier for a deep shaft. A good working weight is one-third of the load at which the wire will break.

The plumb-bob is hung in a bucket or a barrel of viscous liquid so as to bring it to a standstill in the shortest possible time. The shape of the plumb-bob is of importance in this respect.
and the form shown in Fig. 135 is a good one, since it prevents rotary as well as lateral oscillations. It should hang near the top of the vessel as the wire will be in a high state of tension and will stretch considerably. A mark should also be made on the wire showing how far the bob is above the bottom of the vessel.

The liquid must be a true one (not a mud or slime) and it must be neither too limpid nor too viscous; for in the former case it will not stop the oscillations within a reasonable period, and in the latter the bob may not reach the central position quickly enough. The amplitude of the vibrations of the plumb-bob decreases in a fixed ratio with equal increments of time, and the viscosity of the fluid should be such as to make each oscillation, say, about one-quarter of the preceding. The ratio of decrease during equal increments of time is independent of the length of the plumb-line and of the amplitude of the oscillations if the resistance is purely viscous. This law makes it possible to select the fluid above ground, with the aid of a short length of wire attached to the bob; it applies only when the bob swings through a very small arc so that the resistance is wholly viscous. It may be noted that the period of oscillation varies approximately as the square root of the length of the plumb-line, the same as for a pendulum swinging in air.

If the shaft is wet the vessel should be covered with a sloping lid having a hole in it of an inch or so in diameter so that the wire can swing freely. In order to obtain as long a base-line as possible the wire should be hung as near to the casing of the shaft as is consistent with the precaution that it shall be perfectly plumb. It should be carefully examined along all its length to make sure that there are no obstacles to interfere with it. In some cases it may be sufficient to pass a lighted candle around the wire at the bottom and observe any obstacles by sighting from the top. The distance between the wires at the bottom and top of the shaft should always be measured and compared,
This is another shape for a mining plummet:

**Winged Mining Plumb Bob**

The modification could only be used in liquids; in the air you get extremely bad results! It is contrary to a Mercury-filled plumb bob.
In “COAL MINING KINKS” New York 1916 I found:

Plumb-Bob Holder for Transit Leg

In making the plumb-bob holder illustrated, cut two pieces of thin spring brass as shown in the accompanying sketch. Bend as shown, and fasten in the split leg with $\frac{3}{8}$-in. round-head brass screws. Cut from the same material an oval plate, and tack it on the block below with brass brads before boring the $\frac{3}{16}$-in. hole for bob point. A very light grip will hold the bob, even up to a jolt which would put the instrument out of business. No parts project. And no “trigger work.”

From “MINING” 1895 I got the article below about a wood level:

To keep a tunnel at a given inclination, the instrument shown by fig. 104 is often used. To the centre vertical piece is attached a plumb-bob, and the lower foot-piece is set at the angle or inclination which it is required the tunnel should be driven at. The illustration represents the proper dimensions and angle for an inclination of one in six, the length of the main horizontal piece being 6 feet, and the distance from the bottom of this piece to the bottom of the inclined piece being one foot.
THE
ENGINEERING MAGAZINE
DEVOTED TO
INDUSTRIAL PROGRESS

VOLUME X
October, 1895, to March, 1896

NEW YORK
THE ENGINEERING MAGAZINE CO.
1896

A Word About Plumb Bob.

In an article on erecting and starting steam engines, by "Spike" in Machinery (New York, Oct.), some useful hints regarding the plumb-line and plumb-bob are given. This implement, when well-made, ought to be classed among tools and instruments of accuracy; but "Spike" shows that, as ordinarily made and kept on sale in the hardware and tool stores, it is an instrument of inaccuracy. He says:

"The first plumb-bob that I used was the regulation hardware store arrangement familiar to all (see Fig. 1), and it got me into lots of trouble. It was brass, cast hollow, and filled with lead, and the brass was about \( \frac{3}{4} \) in. thick on one side, or \( \frac{1}{6} \) in. on the other. The lead, being heavier than the brass, brought the center of gravity to one side, or on a line \( a \) (Fig. 1), and the shape kept it well up; consequently the error was magnified considerably at the point. That plumb-bob met with an accident, or I probably should have never known how it was constructed or why its point would scribe a circle if it got to whirl- ing. Then I made one like that shown in

MECHANICAL ENGINEERING.

Fig. 2, of a piece of steel \( \frac{1}{4} \) in. diameter by 4 in. long, which I considered all right, and used it for a long time, with lots of good chances to give it away, which I named, only 9 in. long, while that shown in Fig. 3 is only 5 in. long. The new one will have a long, slim neck of \( \frac{3}{4} \) in. diameter, and will be of tool steel instead of soft steel. For lines use braided silk, and in the long run you will find it much cheaper, and better satisfaction will offset the extra cost."

finally did, and then made one like that shown in Fig. 3, which I thought couldn't be improved upon; but I am going to make one more, and it will be like the last.
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AND

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Figs. 163 to 165.—Forms of Plumb-Bobs.

**Plumb-Bobs are seldom if ever made of the right shape to insure their coming to rest soon.** They are usually made of pear shape with the string where the stem would be; or when they are intended to indicate a point underneath them, instead of a line alongside of the line, they are top-shaped with a sharp spike. In the former case the swinging is stopped in the least possible time permissible with such a bob, by letting it hang in a pail of water or very thin mud, or some other liquid.

But both of these forms are all wrong. Any body tends to rotate about its shorter axis; and if not hung in this line it will not make any difference, but will wabble about and try to assume that line. That this is a fact, any school-boy who has attended lectures on physics, and seen a whirling-machine cause a chain ring hung by one edge to flatten out and revolve about an imaginary axis, can attest. Now the plumb-bob should be turnip-shaped, so that it can be hung on its shortest axis; and then all the whirling that it can undertake will not make this axis swerve from a vertical line. If for ordinary use in plumbing columns, etc., it needs no points; but if it is to be hung so as to point to a particular spot on the ground it should have a spike as a prolongation of this shorter axis.

**Plumb-Bob Lines** may be readily reeled up by using the cheapest kind of fishing-rod reel on a short pine stick. It is just as good as though it cost forty dollars.

**Plumb-Bob Tips** screwed to the body of the bob may have a milled flange about half an inch from the butt end, and a thread cut on both sides of this flange, so that when the bob is not in use the point may be unscrewed and turned into the body of the bob, thus lessening the room required and diminishing the chance of injury to the point.
THE SHAPE DEBATE 2

MINUTES OF PROCEEDINGS

OF

THE INSTITUTION

OF

CIVIL ENGINEERS

WITH OTHER

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Fig. 5.

SELF-ADJUSTING CHAIN LEVEL.

Fig. 6.

PLUMB-BOB.

in diameter, to allow the string of a plumb-bob to pass through. STRAINING-BAR, LEADING END.
then sights the back end of the chain with a small self-adjusting plumb-level (Fig. 5), and gives the leading man the height to which he must slip the collar on the straining-bar. This fixed (and the temperature from the attached thermometer noted), the leading man puts his foot upon the shoe, and pulls the bar until 16 lbs. is registered on the balance, then, holding the bar with one hand, with the other he raises or lowers the plumb-bob until it just swings clear. An assistant now notes the approximate position of the point of the plumb-bob, and drives into the ground either a small wooden peg about 1 inch by 1 inch, or else a clout-headed nail, according to the nature of the soil (if rock, a scratch is made); a piece of gummed paper is then affixed to the nail or peg, on which, when the plumb-bob is allowed to swing again, the point directly under its centre is marked. A special plumb-bob with a low centre of gravity, and a long, fine steel point, is used for this purpose (Fig. 6).

Lately it has been found better to dispense with the plumb-bob swinging from the riband to the ground, on account of the error caused by currents of air, and to use instead a small plumb-bob hung about \( \frac{1}{2} \) inch from the plate (Fig. 3). After setting a light theodolite up as near as possible at right-angles to the end of the chain to sight the string where it passes through the plate, the telescope is depressed and a sharp pointed pencil held vertically on the peg is put in line, which when in correct position is twisted, making a small dot sufficiently distinct for the back chainman to see. The chain is now carried onward and the process repeated for [THE INST. C.E. VOL. XCIIL]
From:
SHAFTING; PULLEYS, BELTING, ROPE
TRANSMISSION AND SHAFT GOVERNORS
Compiled and written by
HUBERT E. COLLINS
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TRUING UP LINE SHAFTING

It is assumed, for the purposes of this description, that the modern style of shafting, increasing in diameter by the \( \frac{1}{4} \) inch, is used, and that all pulleys and belts are in place. We will take a line composed of sizes ranging between 3\( \frac{3}{8} \) and 2\( \frac{7}{8} \) inches. This gives us four sizes, 3\( \frac{3}{8} \), 3\( \frac{3}{16} \), 2\( \frac{1}{8} \) and 2\( \frac{7}{16} \) inches in the line.

We will first consider the plumb-bob. The accompanying sketch, Fig. 47, illustrates a good one.

The ball is 1\( \frac{1}{2} \) inches diameter, and the large end of the tapered stem \( \frac{1}{2} \) inch in diameter, turned parallel for a short distance at the lower end. The two thin sheet-steel disks, 1 and 2 inches in diameter, are drilled to fit snugly when pushed on to the \( \frac{1}{2} \)-inch part of the stem, and stay there until pulled off. These disks are turned true. This arrangement of plumb-bob and disks enables us to deal with five sizes on one line, and there are not many lines that contain more.

Now having our plumb-bob ready, we will stretch the line. The stretchers should be set horizontally by nailing a strip of wood, say 1 \( \times \) 1\( \frac{1}{2} \) \( \times \) 12 inches, with a piece at each end to form a space between it and the wall, or place of location in line with the edge of the shaft, as in Fig. 48. The top of this stretcher should
B 19 PLUMB BOBS IN THE NEPEAN TUNNEL IN AUSTRALIA 1888

Dear Fellow Collector,
I will not overload this monthly issue.
That’s why you can get the chapter B 19 (9 pages), the story of “THE ALIGNMENT OF THE NEPEAN TUNNEL, NEW SOUTH WALES, Australia”, published in the book “MINUTES OF PROCEEDING … 1888.” on demand from plumbbobwolf@t-online.de as an email attachment (PDF-file).

Ask for: WOLF’S PLUMB BOB NEWS 2009-07 SUPPLEMENT

On these 9 pages you learn a lot about the USE OF PLUMB BOBS etc. during the construction of the over 4 miles long NEPEAN TUNNEL in Australia.
This tunnel was built for supplying SYDNEY with water. (1869 – 1888)
Really a very interesting paper for plumb bob collectors and surveyors.

I am waiting for your email
Wolf

C CONCLUSION

As you can see there is always a new twist in the story of the “PLUMB BOB, THE MOST UNIVERSAL OF ALL TOOLS.”
Some are technical, some are nonsense, some just to make you smile. I expect as previously un-scanned documents are added to the great computer in the sky, there will be many more tidbits of curious information on the subject of plumb bobs to be found!

I am forever diligent.

If YOU have any additional information or remarks to this issue, please let me know.
You can contact me by email: plumbbobwolf@t-online.de

Thanks.

Wolf Ruecker

This article is a part of the monthly edited WOLF’S PLUMB BOB NEWS.
More information you get on www.plumbbob.de