

WOLF'S PLUMB BOB NEWS 2009

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Washington Monument Plummet

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www.plumbbob.de

The PLUMB BOB / PLUMMET of WASHINGTON MONUMENT in Washington D.C. U.S.A.

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A INTRODUCTION:

One day with some time on my hands, in my never ending vigil to uncover information on plumb bobs, I happened across a number of references on www.books.google.com to a **plummet** that was at one time installed in the **Washington Monument in Washington D. C.** This seemed of particular interest due to the fact that this monument, one of the most visited of national shrines, dedicated to the most famous of the American Founding Fathers, George Washington. Furthermore, at its time of construction, it was a monumental feat of engineering, for many principals of construction that had never been tried before.

The immediate question came to mind: **What role did the plumb bob play in this most amazingly vertical shape, the obelisk?**

For those not familiar with this monument, I would refer you to some basic data, most not referring to the plummet, at one time installed there.

Google "Washington Monument" or go to:

http://www.nps.gov/history/history/park_histories/index.htm

<http://www.nps.gov/wamo>

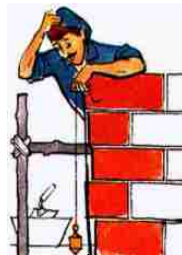
http://en.wikipedia.org/wiki/Washington_Monument



Helpful to your understanding of this topic, would be to review last month's newsletter, WOLF'S PLUMB BOB NEWS 2009-03 MINING PLUMMETS. In that issue, I described how in the mining industry, surveyors and engineers were able to transfer a map grid from the surface of the earth to the tunnels and working faces, hundreds of not thousands of feet below ground.

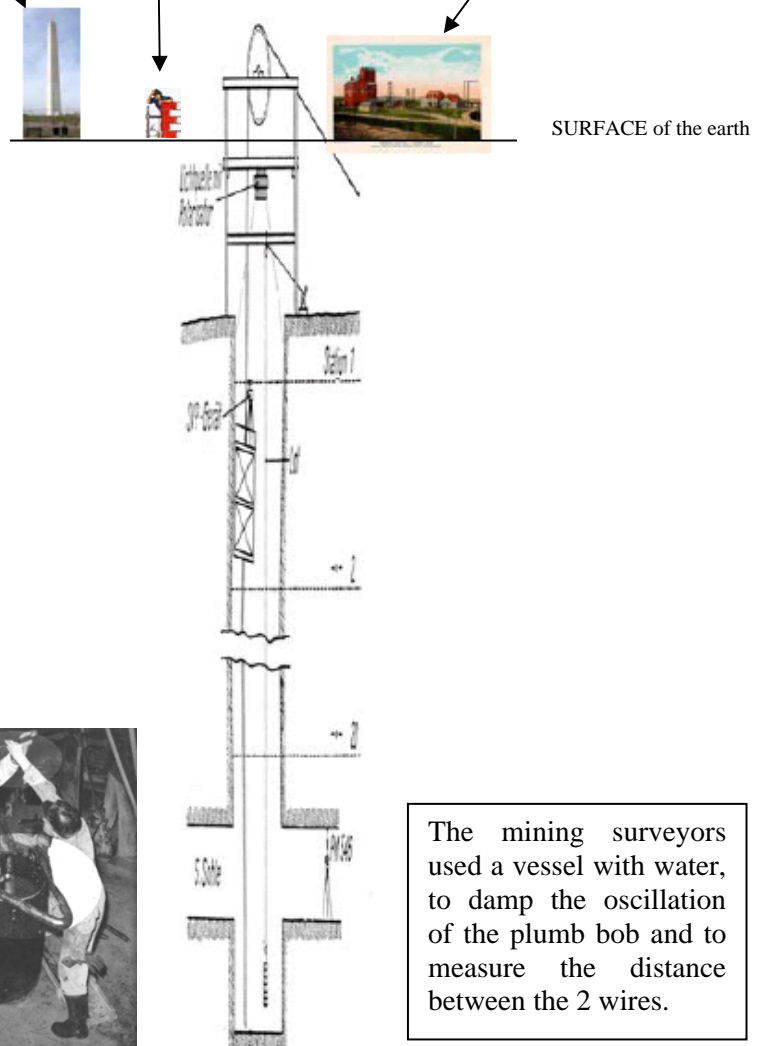
I also referred you to "THE TAMARACK MINE MYSTERY". In the Tamarack mines they used the longest known **plumb line** beneath the earth with a length of **4,250 feet**. In this reference, measurements showed that the plumb lines dropped down distant separate shafts at this extreme depth were farther apart at the bottom at the top, contrary to their expectations. Thus arose one of the long-standing mysteries of science. Refer to <http://www.lhup.edu/~dsimanek/hollow/tamarack.htm>

Relatively speaking, the height of the Washington Monument above ground, is a mere fraction of the depth of the deepest mines, yet it ranked in its time the tallest structure in the United States. Three plummets were used to keep the obelisk as perfectly vertical as possible. As this structure arose, first a 150 foot plumb line was used, then a 176 foot line and finally a 500 foot line.



From left to right:

- Washington Monument
- a mason with plumb bob
- Tamarack Mine shaft #5



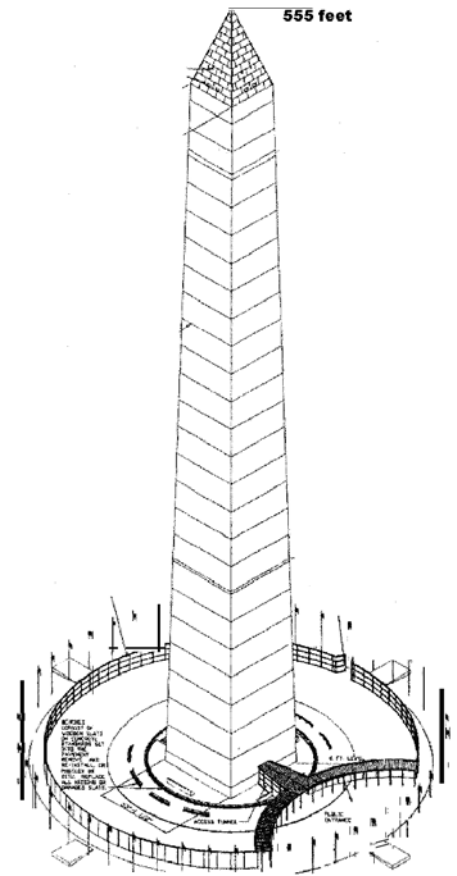
B INFORMATION FROM OLD BOOKS

B 1 DATA RELATIVE TO WASHINGTON MONUMENT

From the WAR DEPARTMENT REPORT 1898¹ :

- "Height above mean low water. 597 feet 3 inches;
- Height above doorsill, 555 feet
- Side of base, outside, 55 feet 11/2 inches; inside 25 feet.
- Top, side of Monument, outside, 34 feet 6 inches; inside, 31 feet 6 inches
- Walls, thickness, base, 15 feet 1/4 inches; top, 18 inches.
- Weight of capstone, 3,300 pounds; weight of the whole Monument, 81,120 tons.
- Taper of monument, one-fourth inch to 1 foot.
- Memorial stones, beginning at 30 feet, ending at 280 feet, 179
- Steps, 898; landings, 50
- Time to ascend in elevator, 9 minutes; time to descend in elevator, 8 minutes. (Remark: Electric elevator was planned)
- Costs, \$1,300,00
- Corner stone laid, July 4, 1848
- Remark: Halted from 1854 – 1879 (funds ran out)
- Capstone set, December 6, 1884
- Dedicated, February 21, 1885"

Remark: and officially opened to the public on October 9, 1888



B 2 BENT BY THE SUN

My interest was heightened by this short article in a 1913 journal²

"BENT BY THE SUN

The towering Washington monument, solid as it is, cannot resist the heat of the sun, poured on its southern side on a midsummer's day, without a slight bending of the gigantic shaft, which is rendered perceptible by means of a copper wire, 174 feet long, hanging in the center of the structure, and carrying a plummet suspended in a vessel of water. At noon in summer the apex of the monument, 550 feet above the ground, is shifted, by expansion of the stone, a few hundredths of an inch toward the north. High winds cause perceptible motions of the plummet, and in still weather delicate vibrations of the crust of the earth, otherwise unperceived, are registered by it"

B 3 THREE PLUMMET WIRES during construction³

December 1885: "...The introduction of the iron treads and platform coverings necessitated the removal of the three plummet wires suspended respectively from points 150, 176, and 500 feet above the floor, and which furnished a daily record of motions in the shaft. Now that the interior parts have been finished, a plummet will be suspended from the level of the center of gravity of the shaft. Proper instruments for reading any motions at that level have already been produced and will be placed upon the floor. ."

"...On the 31st of August (1885), the city was visited by a sharp shock of earthquake, which must have caused considerable motion in the shaft, especially its upper portions, but no ill effects to the masonry or the level of the base could be discovered upon the most careful examinations..."

¹ ANNUAL REPORTS OF THE WAR DEPARTMENT FOR THE FISCAL YEAR ENDED JUNE 30, 1898 Report of the CHIEF OF ENGINEERS

² ST. NICHOLAS FOR YOUNG FOLKS 1913

³ THE MISCELLANEOUS DOCUMENTS OF THE HOUSE OF REPRESENTATIVES 1886

B 4 THE LONGEST WIRE PENDULUM OF THE WORLD?

In an article⁴ about the **4,250 feet long “pendulum” of the TAMARACK MINE** (fall 1901) was a footnote: *“Mr. C. Francis Jenkins believed that the 510 feet wire-pendulum suspended in the Washington Monument, June 12th, 1887, was the longest in the world. “The Telltale Plummet in the Washington Monument,” by Mr. C. Francis Jenkins, Scientific American, 1899, vol. IXXX, page 122. This shaft, rising 555 feet above the surrounding country, is indeed a very remarkable one, but not of the kind here dealt with, and the Tamarack survey had not then been suggested.”*

(Remark WR: It was not a 510 feet, but a 176 feet long wire)

B 5 THE PLUMMET OF THE WASHINGTON MONUMENT

The best description of the (single) plummet of the WM I found in a WAR DEPARTMENT REPORT of 1898⁵. (Unfortunately I could not read the drawings at the last pages of this report.)

On page 3672 we find a full description of the plummet and its housing:

“...The plummet was set to a point on the floor of the Monument on the 12th of June, 1887, with the following as result of the reading: 0.926’’ north (instrument);0,9795’’ east (instrument)...”

Exactly 122 years before this article of the WOLF’S PLUMB BOB NEWS 2009-06 ©

“It consists of a copper wire 3/64 inch in diameter suspended from the horizontal plane containing the center of gravity of the Monument, which is at a height of 174 feet 10 ½ inches above the door sill of the Monument.

The top of the wire is attached to an adjustable brass screw fastened into the underside of a north and south I-beam at a point about 10 feet from the west wall of the Monument.

At the bottom the wire is attached to another adjustable screw fastened to a 25-pound brass plumb bob. The “bob” is suspended in a bucket of water to prevent movement from ordinary vibration.

The wire itself is protected from top to bottom by a casing of galvanized iron pipe, fastened at top to the underside of the I-beam above referred to, and secured to the diagonal braces of the stairway by circular bands of iron. Near the floor this pipe expands into a hood and is connected to the plummet house (which is also of galvanized iron) by riveting and soldering.

In the interior of the plummet house is a hollow iron pedestal bolted to the floor, with a 2-inch circular opening on top for the free passage of the plumb wire. On the east side of the pedestal is a door which gives access to the interior, in which stands the bucket of water containing the plumb “bob”.

On the top of the pedestal are two telescopes, one on the north side facing south and one on the east side facing west. These telescopes are moved by micrometer screws which cause them to travel, the north one along an east and west graduated scale, the east one along a north and south graduated scale. The readings of the north instrument increase to the west; of the east instrument, to the south.

The scales are graduated to inches and twentieths of an inch, and by means of a micrometer (graduated into 50 sections, 20 threads to 1 inch) may be read to thousandths of an inch.

Variations in the positions of the plummet line are determined by variations in the readings of the scales when the plummet line coincides with the center vertical wires of both telescopes.

In a letter to Col. J.M. Wilson, Corps of Engineers, dated April 7, 1888, and written by Mr. G. M. Thomas, clerk, is said: The plummet was set to a point on the floor of the Monument on the 12th of June, 1887, with the following as result of the reading: 0.926’’ north (instrument);0,9795 east (instrument)”....The extreme positions of the center of gravity during the three years 1888, 1889, 1890 were in one direction March 19, 1888, and in the other August 2, 1890, the distance between these two positions being one-fourth of an inch (0.25’’)

The top of the Monument moves about three times as far as the center of gravity.”

⁴ TRANSACTIONS Mining Engineers 1906 England

⁵ ANNUAL REPORTS OF THE WAR DEPARTMENT FOR THE FISCAL YEAR ENDED JUNE 30, 1898 Report of the CHIEF OF ENGINEERS PART 6

The letter mentioned above (Thomas to Wilson)⁶ was uncovered by John Lockwood, Washington D. C., in the U. S. National Archives. It was mailed to me in response to my inquiry to the National Park Service NPS for pictures of the plummet. Here are two parts of this document:

Found by JOHN LOCKWOOD, Washington

FROM THE NATIONAL ARCHIVES,

499

Washington Monument,

CORNER 17th AND F STREETS,

Washington, D. C., April 7th, 1888.

Colonel John M. Wilson U. S. A.

Asst. Col., Corps of Engineers,
 Engineer in charge of the
 Washington Monument.

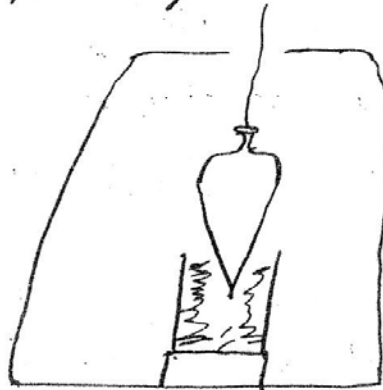
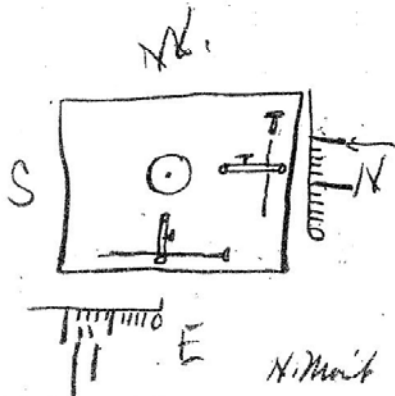
Sir:

The "Plummet" (so called) in the interior of the Monument is held by a copper wire $\frac{3}{16}$ " thick running into an adjustable screw, said screw being screwed into an I Beam, ^{the bottom of} which is suspended in the horizontal plane of the centre of gravity of the structure, namely: $174' - 10\frac{1}{2}"$

(A drawing and model of the complete installation appears on the last pages, using the description from this document.)

The House is ~~at~~ 70 high by 8 ft. square.

The Micrometer Insts. are riveted to a pedestal ^{cast iron} about 3 ft. high ~~as per~~ as per diagram.



From the U.S. National Archives, found by John Lockwood

⁶ Letter G. M. Thomas, clerk to Colonel John. M. Wilson, Engineer in charge of the Washington monument (From the U.S. National Archives, found by John Lockwood)

Similar, different and totally new information on the Washington Monument plummet appears in this “WASHINGTON STAR” article from 1888⁷ :

“MOVEMENTS OF THE WASHINGTON MONUMENT.

... This movement (extension by heat and cold) has never been calculated, but is undoubtedly very slight. The wind, too, has an effect upon the structure. From the centre of gravity of the shaft, located 174 feet and 19 inches from the floor, is a cross-beam, from which is suspended a fine steel wire, protected by a galvanized tube about four inches in diameter. This hangs to the floor of the northwest corner of the elevator well. At the bottom is a plumb-bob, weighing twenty-five pounds, suspended by means of a wire, and hanging in water. An iron cylinder protects the instrument from injury, and a little iron house, about four feet high, keeps off the draught. Through the cylinder is a telescopic eyepiece, in one end of which are two vertical wires about one-quarter of an inch apart. When a candle is held at an opening in the side of the box and the eye is applied to the outside to the outside end of the tube, the plumb line can be seen – a fine line between the vertical marks.

Any movement in the shaft is recorded by a corresponding movement in the line. When the structure is at rest, and in its normal position, the line hangs still, midway between the others, but when the shaft is disturbed by the action of the wind it sways back and forth like the pendulum of a clock, always coming to rest in the center.

This is **observed every day**, and if the custodian should ever notice the line hanging still at any point **outside of the two cross-lines he will then know that the monument has been permanently moved from its level position.** Until then, however, no one need be alarmed by the oscillations of the shaft from the action of the wind or the influence of the sun.

–WASHINGTON STAR.”

From the HISTORIC STRUCTURE REPORT June 2004 Vol. 1 prepared by “John Milner Associates, Inc Architects” available on [Washington Monument and Associated Structures, Historic Structure Report, Vol. 1, Washington Monument](#) .(prepared for the National Park Service), I found information on a “**geodetic control mark access cover at corner of monument.** This could be the point where the wire came through, but perhaps it is there for another reason. (another benchmark perhaps of a later time)

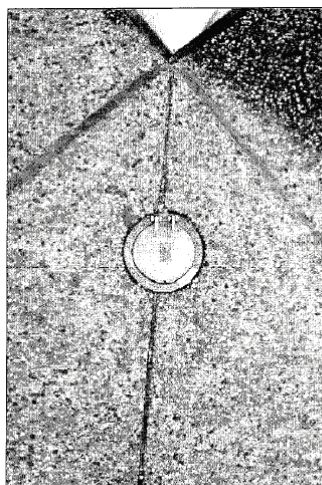
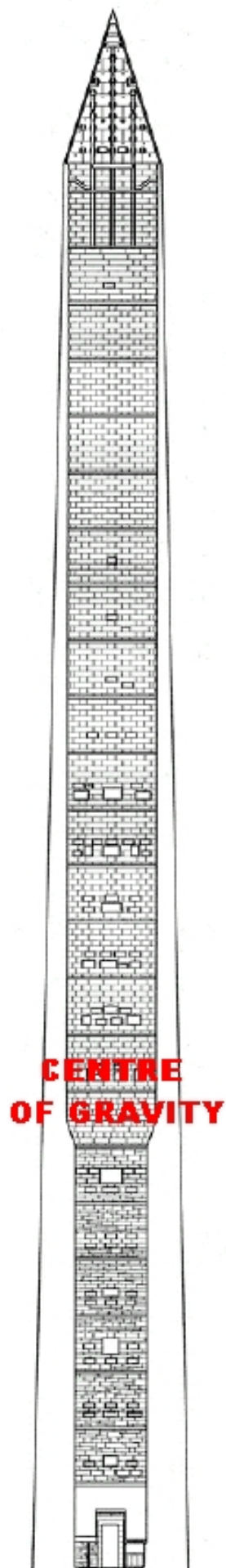


Figure 4.4: Monument Plaza, geodetic control mark access cover corner of monument.



INTERIOR EAST ELEVATION

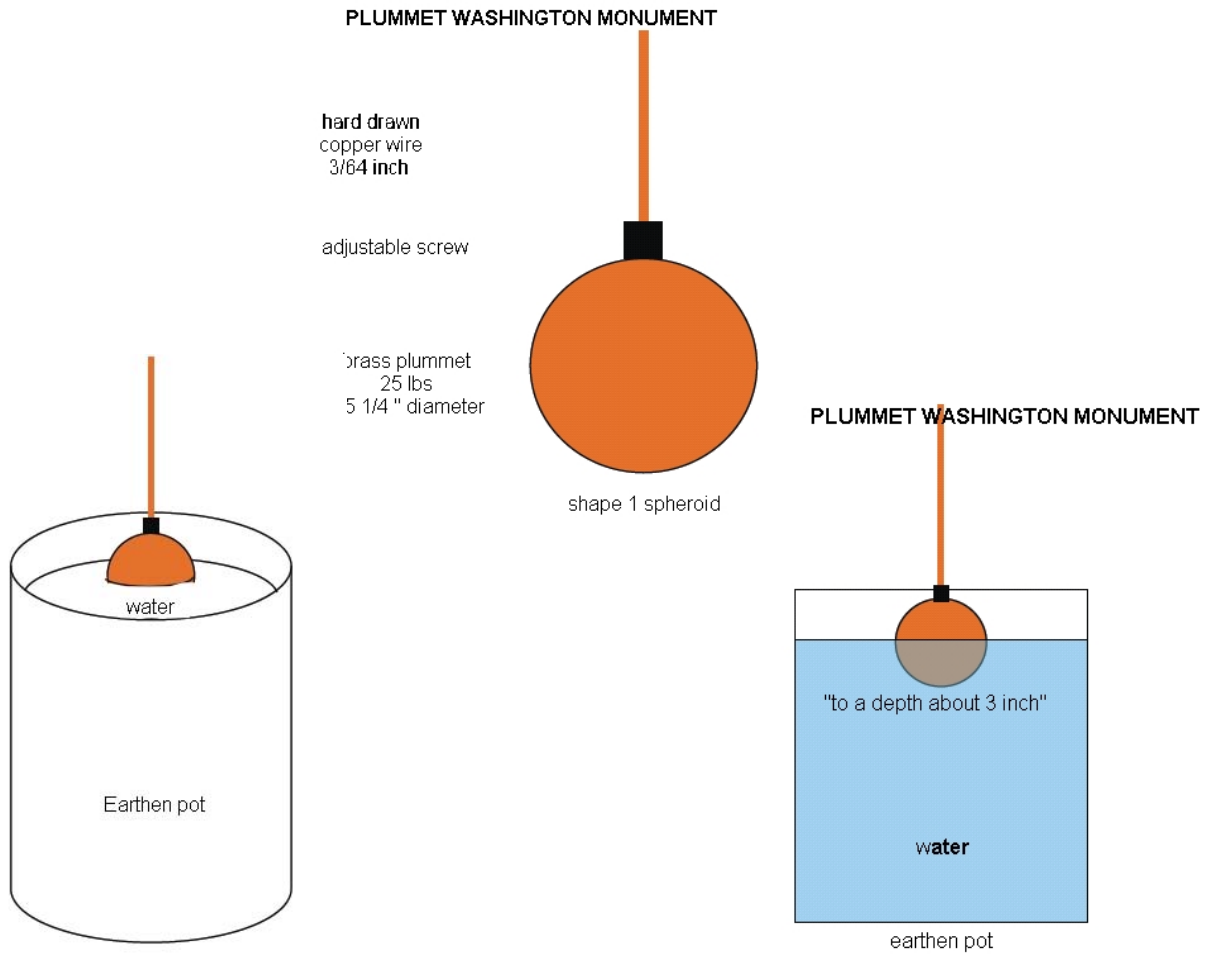
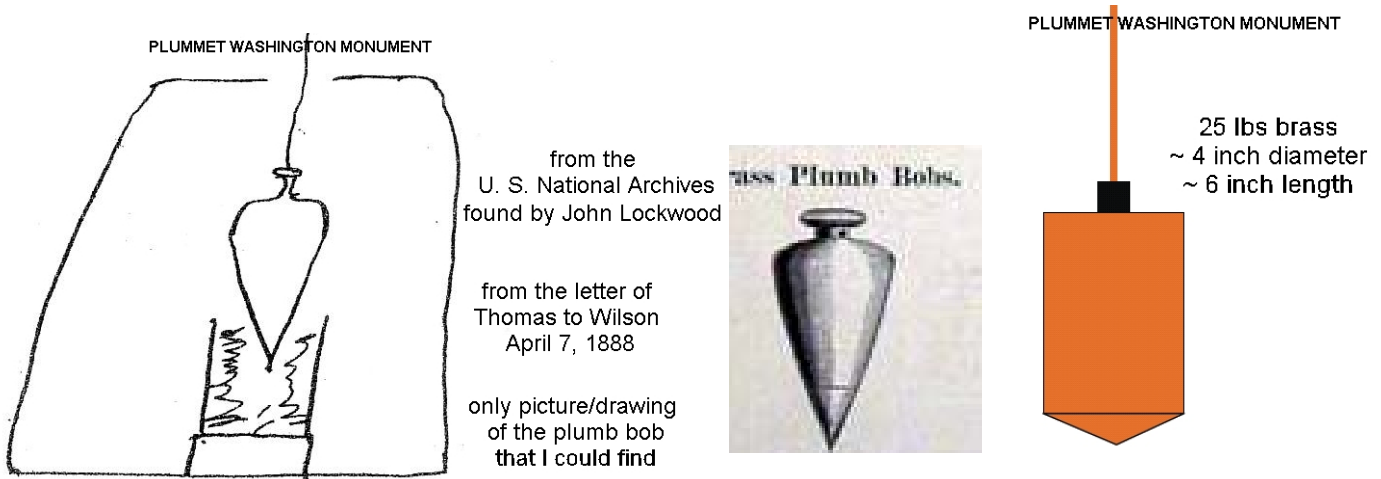
⁷ FRIENDS' INTELLIGENCER AND JOURNAL 1888 Philadelphia

In the articles I found **2 different shapes for the plummet:**

- The **turnip shape plumb bob** (pictured in the letter to Wilson 1888).
(the other picture is from a catalogue 1869)
Because my “drawing experience” is limited, I used for my drawings simple shapes. Similar to the common plumb bob, but easier to calculate and draw for me. ☺
- **Spheroid / ball** (Boston Daily Globe Apr. 30 1899) “... where stands a bucket of water in which the ‘bob’, a 25-pound brass **spheroid**, swings”

Remark WR: perhaps he only saw the upper side looking out of the water and ‘thought’ it was a spheroid. ??????
See picture below.

The dimensions are estimated but still give us a pretty close approximation of the scale of the plummet.



B 6 WHY DID THEY INSTALL THE PLUMMET?

In the “WAR DEPARTMENT REPORT of 1898” was one explanation for the single plummet being installed:

“... Owing to the unique character of this structure many inquiries are received asking for information of various kinds regarding it. Most of these inquiries could be answered by sending copies of **the level and plummet records**. As these records will undoubtedly become of greater interest as years go by they have been collated and are forwarded herewith in order that they may not be lost and may be available for study. These records, as will be seen, are quite rough and not of scientific accuracy.

This fact has led to the following project:

In order to know what is taking place in the Monument the record of the plummet should be continuous. It is of little value to know what these readings are at the same hour of each day (except as a gauge of stability). But if the travel of the plummet were known during the hours of sunlight and also during the hours of darkness the record would at once become of high scientific value. The readings now taken each day are plotted for each month on a scale one hundred times greater than reality, but owing to their lack of continuity are still merely tests of stability.

It would be quite possible to construct a pantograph, enlarging a hundred times, attached to the plummet wire and resting on a horizontal table covered with paper, which would give a continuous record of the movements of the plummet – this paper to be moved along the table by means of rollers at each end, actuated by clockwork...”

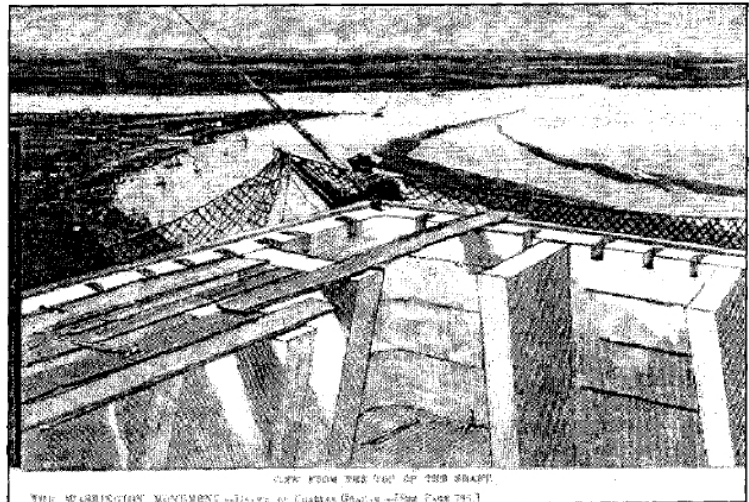


Figure 2.10: Charles Graham drawing of start of pyramidion construction. (Charles Graham. “View from the Top of the Shaft!” *Harper's Weekly*, v. XXVIII, no. 1458, 20 November 1884, p. 790.)

Picture right: Construction inside of the monument (top of the shaft). This is the relative location where the longest 500 foot wire plumb line was installed.

Unfortunately this drawing lacks detail ☹

B 7 WHERE WAS THE SYSTEM LOCATED?

Addition information **locating the plumb bob, why it was placed** and some other details appear in this newspaper article dated 1914⁸:

From the extreme top (Remark:???????) Centre of gravity) of the monument inside a long pipe line runs perpendicularly to the bottom, leading to a small closet behind the elevator. This contains a long pendulum, whose bob hangs in a vessel of mercury, (Remark:???????), which prevents its oscillation.

Two stationary transits with highly magnifying lenses are focused directly upon the suspended wire, and through these each quiver of the monument is detected, being magnified on a fine scale graduated to thousandths of an inch. Every morning at 10 o'clock a statement of this plummet is taken and reported to the war department...

This plumb bob of course was placed in the monument for the purpose of detecting any settling it might undergo, and, although the great weight of its mass has pressed the ground for many decades, it has settled only a slight fraction of an inch in one corner..”

⁸ RICHFIELD SPRINGS NY DAILY 1910-1914

Another good impression of the plummet appears in this article from “THE EVENING STAR” 1894⁹:

Headlined:

**“ SWAYS IN THE WIND, DELICATE TESTING DEVICES,
FIRMNESS OF THE FOUNDATION OF THE MAMMOTH OBESLISK:**

*... Although it is strictly against the rules of the monument to put one’s nose into anything behind closed doors, the writer was shown the secret workings of the devices used for testing the various turns which the edifice makes in the face of the wind. **Behind the elevator, in a small closet, tunneled but of the stone,, whose dampness and darkness, until the electric light was turned on, might set one’s teeth chattering, at the resemblance it bore to the sepulchers of the pyramids, is a very simple contrivance which shows every swaying of the great granite pile in any direction.***

A small copper wire, which has been stretched and straightened to its utmost, protected by a tin pipe, hangs from the extreme tip of the shaft, and suspends heavy plummet, which hangs in a vessel of oil. Two small transits are placed at right angles to one another in a horizontal plane and to the wire, vertically, are focused on the wire, and magnify it so that the hair lines on the lenses coincide with it on either side when in normal position. By a scale inside the deviations from the normal are reckoned to the thousandth of an inch in any direction. A report of these observations is submitted to the War Department daily by Mr. Hawkins, and there a record has been kept of every twitch and tremble the monument has made since its opening.....”

In other sources we read¹⁰:

*“ **this hangs to the floor of the northwest corner of the elevator well...**”*

Or: “ ..., leading to a small closet behind the elevator.”

Or: “ at a point 10 feet from the west wall of the Monument.”

B 8 MR. GREEN INSTALLED THE PLUMMET APPARATUS

In an article ¹¹ about **BERNARD RICHARDSON GREEN** who came to the Washington Monument, in 1877, we read: “*As assistant to Colonel Casey, Mr. Green devised the main scheme for strengthening the old foundation of the Washington monument by under-pinning it with concrete;..... he also devised and installed (10 years later) **the plummet apparatus by which the slightest movement of the center of gravity of the structure may be observed to the one-thousandth of an inch...***”

In another publication “STONE”¹² in 1897, written about **Captain Green**:

“... The Washington Monument is taller in summer than in winter, and in the latter season its width on the south side is about an inch greater than on the north, east or west side. This is due to expansion under the heat of the sun’s rays.

This phenomenon was determined by Captain Green, during the erection of the shaft. Plumb lines were hung at each corner of the marble walls and the plumb “bobs”, or plummets, were suspended in pots of glycerine or molasses. Across the top of each pot was laid a finely graduated steel bar, and three times a day an army engineer “took off” the registration thus made of the expansion of the walls.

It was held that the plummets moved precisely with the points at which the plumb lines were attached to the top of the shaft, and the glycerine held them firmly without vibration or oscillation, so that the officers could note any change of position.

All these registrations, twice a day every day in the year, were recorded in a book during the seven years that were occupied in finishing the monument.”

(Unfortunately, no reference is made to how many plumb lines were installed.)

⁹ THE EVENING STAR Washington D.C. March 17, 1894

¹⁰ FRIENDS’ INTELLIGENCER AND JOURNAL 1888

¹¹ MEN OF MARK IN AMERICA 1905

¹² STONE An Illustrated Magazin Volume 14 December 1896, to May, 1897

B 9 PLUMMET IN VESSELS CONTAINING LIQUID

In an article from 1888 about MINE SURVEYING¹³ one method to stop the motion of the plumb bob is described:

“... The measurement down deep boring of shafts is best made by special flat steel wire, **with suitable plummet heavy enough to insure its making the wire line taut.** The transfer of points down a shaft, as of two to determine a bias line for connecting surveys below with those on the surface of the ground, is made by very heavy plummet attached to ordinary wire run off of reels. ... **The suspended plummets are to be received below each in a bucket of water, or, if hanging from considerable height, in some thicker liquid to settle the wire to a steady position for ranged observation by the instrument below.** And the observation will be easier upon wire that is whitened there by chalk or paint after being placed.

The plummets in the shaft of the Washington Monument, for showing changes in the verticality of the structure, are steadied in vessels containing a mixture of glycerin and molasses).*”

*) Remark WR: With these plummets he meant the THREE plummets during erection of the building. The single one later was put in a vessel with water.

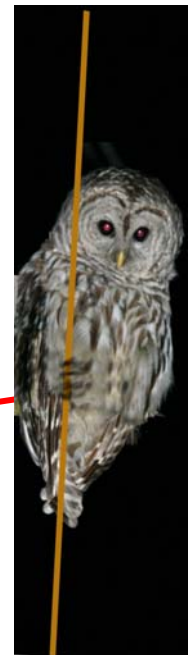
B 10 AN OWL ON A CLOCK OF PRESIDENT HAYES and THE PLUMMET

For a long time I couldn't understand the following article from 1911¹⁴ about the life of President Rutherford Birchard Hayes (October 4, 1822 – January 17, 1893) the 19th President of the United States (1877–1881)

served as arranged by President Hayes after her death.

One of the most beautiful rooms of the house is the large dining-room with great windows at each end overlooking the lawns. The shelved chimney-piece over the large fireplace is devoted to fine examples of old Chinese porcelain and marred samples of the china used at the White House during the Hayes Administration. The chimney-piece is topped with elk horns and the skull and jaws of a huge grizzly bear shot by Colonel Hayes. The two mahogany sideboards are family heirlooms, descended from the Birchard and Cook sides of the house respectively. The two mahogany serving-tables from the White House, purchased during Madison's Administration, were bought at a public sale of discarded furniture in 1881.

An antique clock which ticks circumspectly near the dining-room door, was bequeathed to the President by his grandmother, Chloe Smith Hayes, and brought from the ancestral Hayes homestead in Brattleboro, Vermont. On this clock stands the owl which by dangling on the plumb-bob of the Washington Monument nearly caused the despair of the engineer in charge who thought that his foundation had proved insufficient and that the monument was “wobbling.”



...until John Lockwood from Washington D.C. mailed me an article from 1885¹⁵:

Remark Wolf: By chance I received from the Security Service a picture (right) taken by the WEB CAM inside the iron pipe. You can see the copper wire thrown off plumb by this nocturnal intruder, an owl. ☺ ☺

¹³ A TREATISE ON PLANE SURVEYING BY DANIEL CARHART 1888

¹⁴ THE LIFE OF RUTHERFORD RICHARD HAYES NINETEENTH PRESIDENT OF THE UNITED STATES

¹⁵ THE EVENING STAR Washington D.C. 2/21/1885

“CONSTERNATION CAUSED BY SPIDERS

One morning, at about the time when those in charge of the work were most anxious about its success, *the plummet*, which measured deflections in the monument, *was found swung far to one side*. Consternation among the workmen followed, and the monument was thought to be doomed. When Col. Casey arrived on the ground he made inquiries about the other line, and learning that it showed no unusual movement he knew that everything was all right. An examination was at once made to find out the cause of the unaccountable movement of the plummet, and it was found that during the night *spiders had built their web from the line to the box-casing, and thus drawn the line out of a perpendicular*.

At another time the other plummet showed a similar irregularity, and at the top an owl was found quietly perching upon the line. It was captured and kept alive for some time. After its death it was stuffed and presented to Mrs. Hayes, and it now probably adorns the Hayes home at Fremont, Ohio.”

THE WONDER OF UNCOVERING ASSOCIATIONS LIKE THIS, NEVER FAIL TO ASTOUND ME!

B 11 HIGHEST BUILDINGS IN 1884

The **second highest building** at this time was the cathedral of KÖLN (Cologne) in Germany. On the picture **next page** you only see the top of this building.

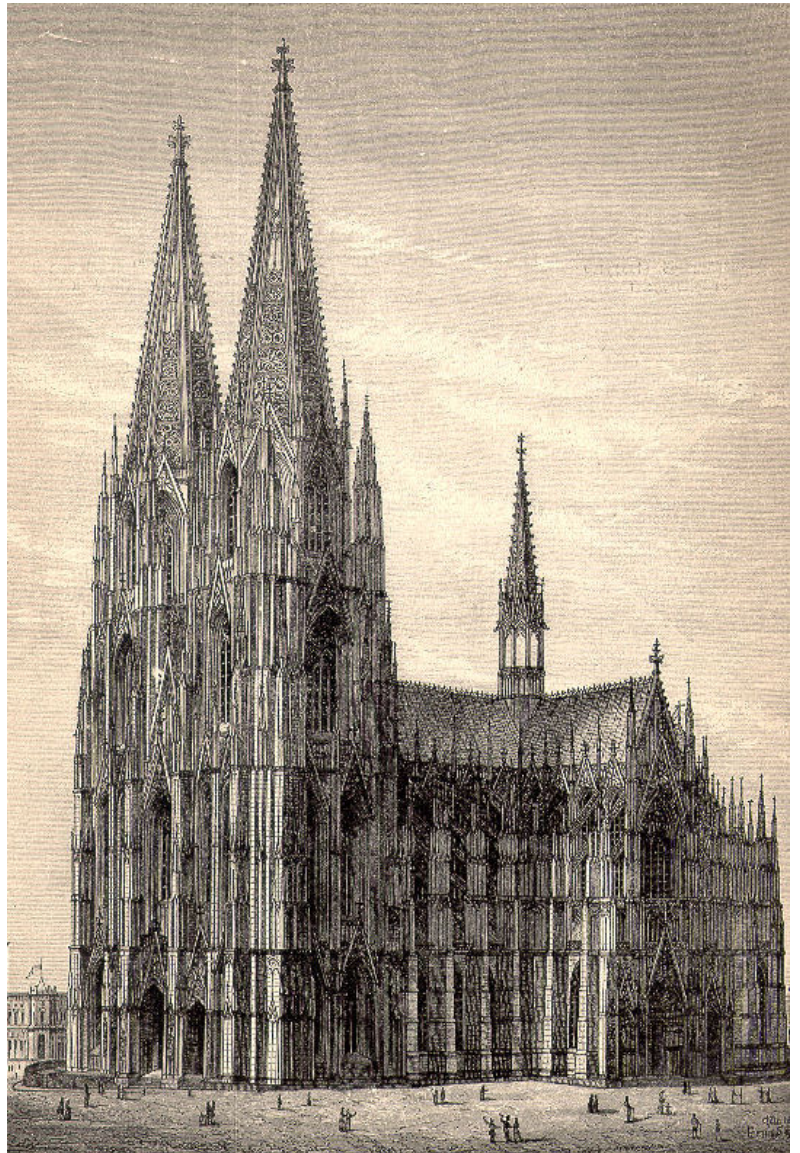
(Picture right from WIKIPEDIA: Cathedral Cologne 1891¹⁶)

FYI: In Cologne we plan our next International PLUMB BOB COLLECTORS MEETING 2010.

A reporter of the “Washington Star” wrote **1884** July 26,¹⁷ an article about his visit of the monument:

**“THE TALLEST IN THE WORLD.
PROGRESS OF WORK ON THE GREAT
WASHINGTON MONUMENT
THE GREAT COLUMN ALMOST COMPLETED –
BIGGER THAN ANY STRUCTURE SINCE THE TOWER
OF BABEL.**

... As the work has now reached an interesting stage a STAR MAN called at Col. Casey’s office last Monday, and asked permission to go to the top of the monument.....The Colonel next called attention to a plumb line in one angles suspended from the top of the monument, hanging free through a graduated metal circle near the floor. ‘By applying a straight edge across this circle two ways, in directions parallel with the walls, and touching this plumb line,’ said he, ‘the most minute deflection of the column from the perpendicular line can be measured at a glance.’ “



¹⁶ *Source: from the German [1891](#) encyclopedia [Joseph Kürschner](#) (editor): ““Pierers Konversationslexikon”” Pierers Konversationslexikon. Siebente Auflage.

¹⁷ WASHINGTON STAR July 26, 1884

On WIKIPEDIA http://en.wikipedia.org/wiki/Washington_Monument I found this picture.

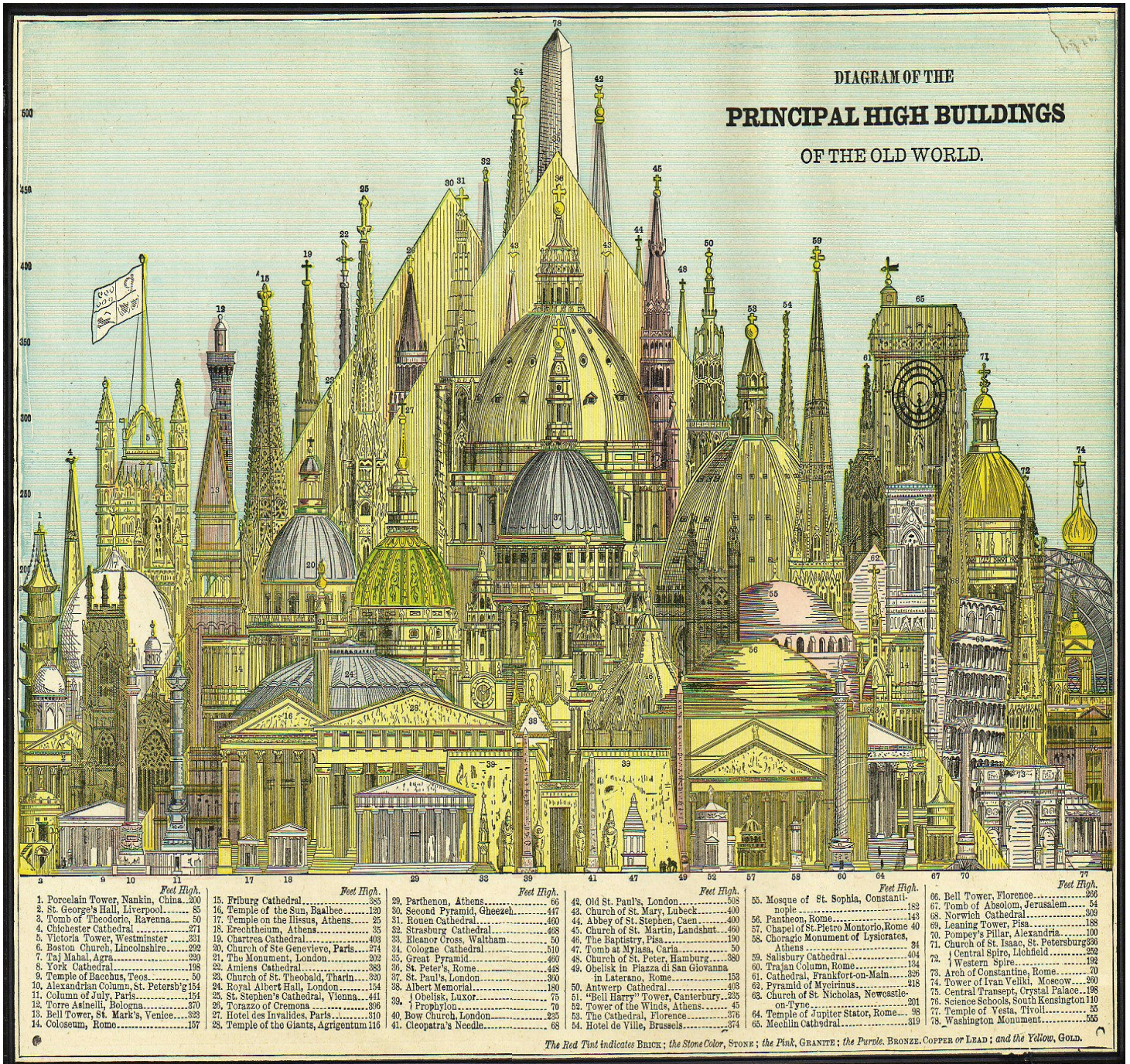
It shows that the Washington Monument is higher than the COLOGNE CATHEDRAL 510 feet (see picture above) and all high buildings of the Old World.

Remark:

This image contains some errors, i.e.: the item 31 and 32 are inverted. The 31 item is "Strasburg Cathedral".

Full size picture see:

http://upload.wikimedia.org/wikipedia/commons/6/6f/Worlds_tallest_buildings_1884.jpg



B 12 WHERE IS THE PLUMB BOB NOW?

John Lockwood from the National Park Service NPS wrote me:

"The plumb bob is no longer at the Washington Monument- I don't know what happened to it."

WHO KNOWS, WHERE IT IS NOW? In a museum, in a private collection,????

C CONCLUSION

In the construction of the Washington Monument until 1884/85 *three plummet wires suspended respectively from points 150, 176, and 500 feet above the floor* and were hung in pots of glycerin or molasses. (weight and shape of the plumb bobs unknown)

1885, after the building was completed, one **25 lbs brass plumb bob** suspended on a **176 feet hard drawn copper wire (3/64 inch diameter)** was left hanging from the **centre of gravity** in a **earthen pot of water** (to dampen and reduce the motion/oscillation of the plumb bob).

These plumb lines were used to show the movement of the building.

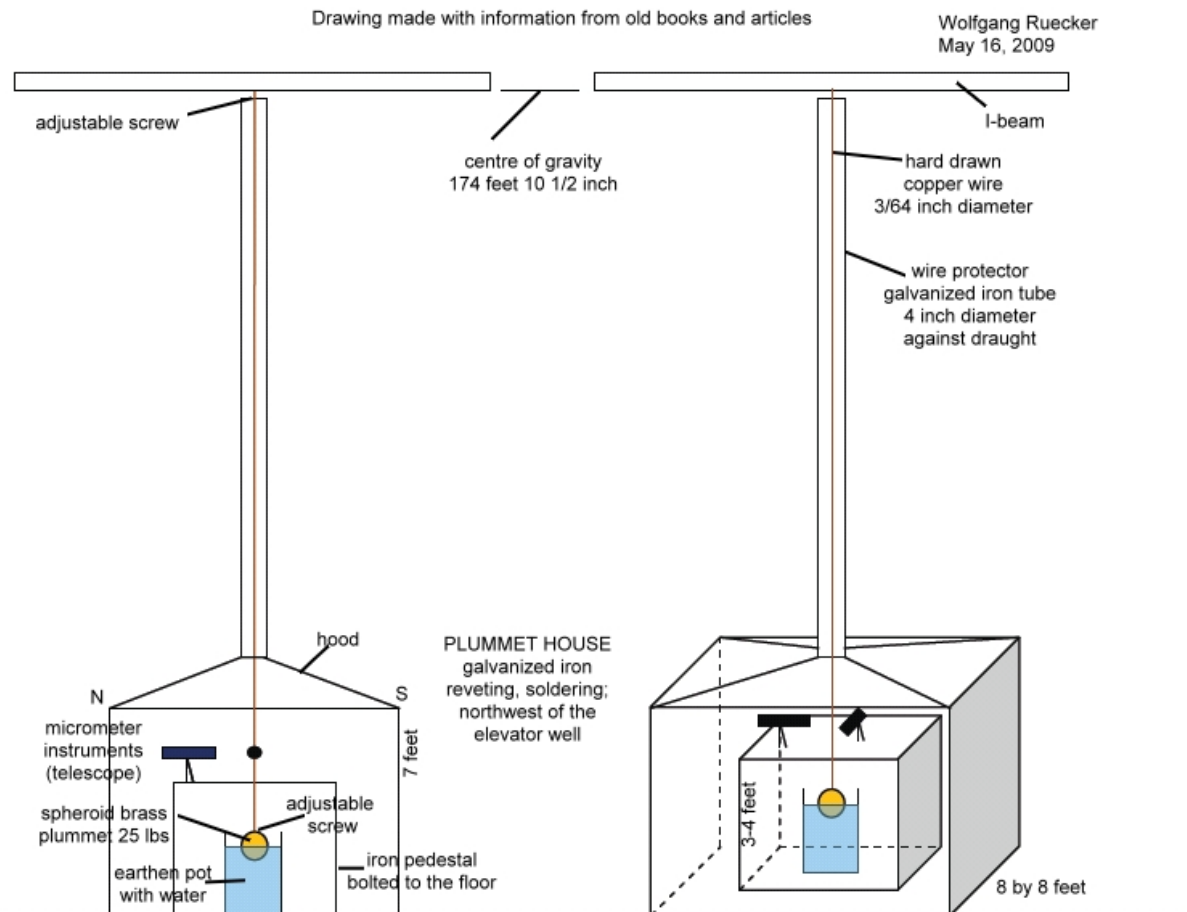
Records of the measurements were made over 7 years.

The **shape** of the plumb bob is **not clear**: spheroid with 5 ¼ inch diameter or cylindrical 6 inch long and 4 inch diameter, or turnip shaped.

When the last plumb bob was removed, is unknown.

Every plumb bob collector would be very happy to have one of these plumb bobs in his collection.

With all my collected information I made some drawings and a model (see last page), to know how the plummet house looked:



THE PLUMMET IN THE WASHINGTON MONUMENT



If you know more about these PLUMB BOBS, (pictures, articles, drawings etc.), please let me know.

Thanks
Wolf Ruecker

MORE INFORMATION : www.plumbbob.de