

Separation between London's and Manhattan's Cleopatra's Needles

There are two well known obelisks now called Cleopatra's Needles. These originally were once located in Egypt but were transferred to the Thames embankment in London (1878) and to the Central Park in Manhattan (1881). As the separation in years between their new re-erections was short, one might consider if there was a collaboration in the undertakings. Below the authors will show there was indeed collaboration and furthermore, the locations of the two sites were chosen one with the other. To do that, the architects and the builders, had to have formed precise concepts of where they were to be located relative to one another in the world.

Let us start with the London Cleopatra Needle first, as the site is fairly straight forward for us to comprehend its considered location during the late 1800s. The Airy Transit Circle at Greenwich was taken as the prime meridian and distances east or west of this meridian and north or south of its parallel within the London area were easily obtainable through local surveys. Based on the Thames embankment geodetic coordinates of today, one can fairly determine that in 1878 the site of the Thames Obelisk was considered to be at: 51.508286° N ; 0.118868° W

(i.e. west from the Airy Transit Circle meridian¹), see Fig 1.

Although the coordinates of Manhattan's Cleopatra's Needle are also easily obtainable today, it is not an easy task to determine what the late 1800s knowledgable fraternity considered its coordinates to have been. This was at a time when the distances across the Atlantic were based on the interval timings of star transits on either side of the ocean; then converting those knowledgable fraternity considered its coordinates to have been. This was at a time when the distances across the Atlantic were based on the interval timings of star transits on either side of the ocean; then converting those timing intervals to longitude separations, based on that one earth day = 24 hours and the world-wide width of longitude is 360° .

The US created and used its own "Datum", i.e the responsible body chose as their reference site, a location in central continental US and determined first its locations coordinates (the documents however describing the methods used to determine them seem difficult to find), and from the site, the coordinates of other US sites were calculated. The latter procedure was mainly by using triangulation (of distances and their azimuths) across the

country from the Meades Ranch site in Kansas. Meades Ranch's early coordinates varied by small amounts, but they were fixed in 1901. Following

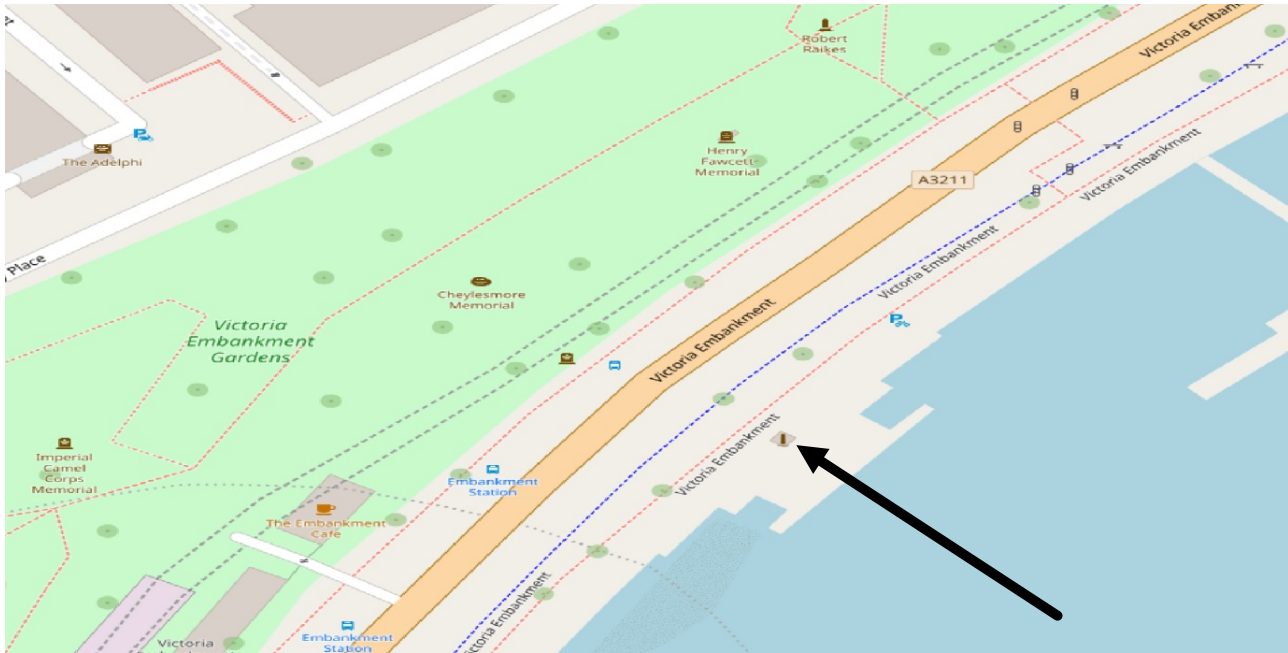


Fig. 1: Location of the Thames Cleopatras Needle (QGIS and OpenStreetMap Contributors)

this fixing, Meades Ranch became the reference location for the US accepted geographical coordinate reference system in 1927, known as NAD27.

The fixed coordinates of Meades Ranch were: $39^{\circ}13'26.686''\text{N}$; $98^{\circ}32'30.506''\text{W}$; in decimal degrees: 39.2240794° N ; 98.5418072° W, (geodetic coordinates: 39.22408884° N ; 98.542151906° W). The set of NAD27 coordinates throughout the US, would today, with our very precise geodetic system, be considered to be imprecise; the 1927 coordinates data would seem to have been coming from a more or less "rubber sheet". More recently with satellite derived data, they introduced an NAD83 Datum. There have been several revisions of the latter, which have improved its precision; the latest (but not a final version), is known as NAD83 (2011). Coordinates for US territories using the latter Datum, provide values which are so near to GPS (WGS84) coordinates, that for most purposes, they may be interchanged. The GPS is a world-wide "compromise system", which keeps its timings in synchrony with Greenwich Mean Time (Coordinated Universal Time), a timing originally based on stellar transits viewed using the Airy Transit Circle telescope. As other nations had set their national clocks based on the "Airy" timings, (the physical location of the meridian of the Airy transit with its so called "Displacement of the Vertical") was superseded and a new GPS meridian became the accepted norm; the important result was that



Fig. 2: Locations in Central Park (Mid Manhattan) of Cleopatras Needle (red circle/arrow) & the Emmet Obelisk in lower Manhattan (blue circle/ arrow) & the General Worth Monument (located between the other two (green circle/arrow)).
(Background map, dreamstime.com : dreamstime_xxl_56700920.jpeg).

timing intervals between other nations' clocks and the Greenwich Clock (the Greenwich Mean Time) remained unchanged.

To aid surveyors (and others) to access and correct from the "old" US NAD27, coordinates, the National Geodetic Survey has set up a web page the NGS Coordinate Conversion and Transformation Tool (NCAT) (or NCAT

for short) which will act as a calculator to convert the jumble of coordinates from the NAD27 Datum to the NAD83 (2011) Datum; (it also includes choices for other interim Datums published between 1986 and 2011; plus an estimate to an earlier 1901 Datum known as the US Standard Datum or USSD). Because the NAD27 and USSD Datum's coordinates are somewhat chaotic (their "rubber sheet" appearances), the NAD83 (2011) output coordinates are provided as the mean with a +/- range (probably +/- 1σ).

From the above preamble, **the authors speculate that the mean USSD coordinates for US sites and particularly the site of Cleopatras Needle in Central Park are representative of coordinates that were available to those responsible (Masons ?) for the positioning the Central Park's Cleopatras Needle.** Those USSD coordinates would be, $40^{\circ} 46' 46.828''$ N ; $73^{\circ} 57' 56.827''$ W (decimals 40.7796745° N ; 73.9657853° W). The authors rounded the coordinates to 5 decimal places and when used together with the Clarke 1866 ellipsoid earth model, those responsible for choosing the site, might calculate a separating distance (orthodrome) between London's Cleopatras Needle and the newly proposed site for the Manhattan's Cleopatras Needle, as being equal to 5578.6532 km (= D), (see Table 1).

Why might the distance D be of importance? To understand this, one has to recall that there are other obelisk-like structures located in Manhattan (and not all transferred from Egypt). One can go back prior to the erection of the Cleopatra Needle, by almost 50 years to the year when a cenotaph (an obelisk like-structure, a sculpture made by a Mr. Preece) was erected in 1832 on the southern side of St. Pauls Chapel in lower Manhattan and dedicated to a Thomas Addis Emmet, an Irish immigrant. The distance (northeastwards) from this cenotaph (the Emmet Obelisk) to Cleopatra's Needle is 8459.5329 m (= d), see Fig. 2. (There is another obelisk located between the two which will be described below.).

Ratio of the distances

Now comes the interesting part. Recalling the Clarke 1866 distance between the Thames' and Central Park's Cleopatras Needles = D and the distance = d between the Emmet obelisk and Cleopatras Needle, the ratio of those distances, $d/D = 0.0015164$.

$$\text{And } 0.0015164 = 1.84/10.666^3$$

	Clarke 1866	Model	
Needle location	Latitude (N)	Longitude (W)	Azimuth of other site
Thames	51.508286°	0.118868°	288.41716°
Central Park	40.77967°	73.96578°	51.29192°
		5578.6532 (km)	←==== Orthodromic Separation (D)

Table 1: Separation (D) between the Thames and Central Park Cleopatras Needles using the Clarke 1866 Earth Model. The coordinates are those applicable to 1881.

Comments on the denominator and numerator values.

The 10.666^3 in the denominator can be understood to be a specifically derived value; it uses the Number of the Beast as its decimal part and 10 as its integer part, and then the full value cubed.

The numerator 1.84 as we have seen, is a common recurrent value.

The azimuths of each orthodrome from the other's Needle using the Clarke 1866 earth model are also worth a comment; The azimuth of the Manhattan Cleopatras Needle from the Thames Cleopatras Needle = $10^{1.53}/1.84$ degrees (North of West). One notes the re-use of 1.84 and one can also recognise in 1.53 as being one-hundredth of the 153 miraculously caught fish in Revelation (another sacred value). (The azimuth of the Thames Cleopatras Needle from the Manhattan Cleopatras Needle differs from $\text{arcsec}(1.6)$ by less than 1.6 minutes).

As indicated above, there is another obelisk in Central Manhattan, the General Worth Monument, a 15.545 m Quincy granite obelisk erected in 1857 in Worth Square at the intersection of Broadway and 5th Avenue. It was designed by James Goodwin Batterson and erected as a memorial to William Jenkins Worth. Published literature, including text in a book, have suggested that the 3 Obelisks, the Emmet Cenotaph, the General Worth Monument and the Central Parks Cleopatras Needle are misaligned and that misalignment mimics an alignment seen within the Orion Belt stars. That assertion is clearly incorrect. Obtaining coordinates of the three obelisks from OpenStreetMap, (or other sources) one can realise that they are essentially in alignment; (if the Worth Monument was moved by less than 1 m to the west they would be in alignment; the latter distance is based on the precision and correctness of the coordinates of the three obelisks and the result may well be that they are aligned along an orthodrome.

The distance separating General Worth's Monument from the Emmet Cenotaph = 3905.9584 m and the distance separating Cleopatras Needle from General Worth's Monument = 4553.5745 m.

Conclusions:

Not only were the Thames' and Manhattan's Cleopatras Needles erected just three years apart, their exact placements show a ratio of their distances (the separation between Central Park's Cleopatras Needle and the Emmet obelisk to the separation between the two Cleopatras Needles) can be expressed by a simple sacred ratio. The implication is that there was a further and deeper relationship underpinning both projects.

1 The separation between the parallels of the Airy Transit Circle and the Thames Cleopatra Needle = 0.03069529° . The Airy Transit circle parallel was considered (in 1884) to be at latitude = $51^\circ 28' 38.4''$ and its meridian was considered to be longitude zero, Assuming the parallel of Airy Transit Circle was not changed between 1878 and 1884 and the Thames Needle coordinates were obtained through local survey, the Needles coordinates were 51.508286° N ; 0.0118868° W in 1878.

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