



## The Pendulum Clock

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“Time and tide wait for no man” – a proverb whose truth can be in no doubt. Everything revolves around time, which is why it isn’t at all strange to see a constellation called “Horologium, the clock” in the starry sky.

Going back somewhat in time, Frikkie de Bruyn (Cosmology Director) has drawn our attention to the following: *By the end of the nineteenth century scientists believed in a universal quantity called time which all clocks would measure. However, Albert Einstein’s theory of relativity had overthrown two pillars of the nineteenth-century science: absolute rest, as represented by the idea of an all pervading ether and absolute or universal time. Every person has his or her own personal time. If two people were at rest with respect to each other their times would be the same, but not if they were moving. This has been proved in a number of experiments, including one involving two atomic clocks which were flown in opposite directions around the world and showed slightly different times on their return.*

Let us spend some time in the constellation Horologium which lies between

Eridanus to its north, Reticulum diagonally eastward, and Hydrus to the south. The constellation was originally named *Horologium Oscillatorium* to honour Christian Huygens, the famous Dutch scientist, inventor



Image source: Starry Night Pro

of the pendulum in 1657 and the discoverer of Saturn’s rings. Horologium is one of Nicolas-Louis de Lacaille’s (1713-62) fourteen constellations which he created during his stay at the Cape of Good Hope from 1750 to 1752. It was with this visit that he established the framework for astronomy in South Africa. In my mind’s eye I clearly see the gentleman Lacaille carrying his pocket watch with some pride, elegantly attached to his jacket by means of a gold chain (my imagination again!). Time possibly stood still for him too, so that he was able to explore the beautiful southern night sky in sheer amazement. USA amateur Tom Polakis nicely captured the truth by commenting: “Within the Clock constellation you’ll go back in time to find some of the Southern Hemisphere’s most distant galactic gems.”

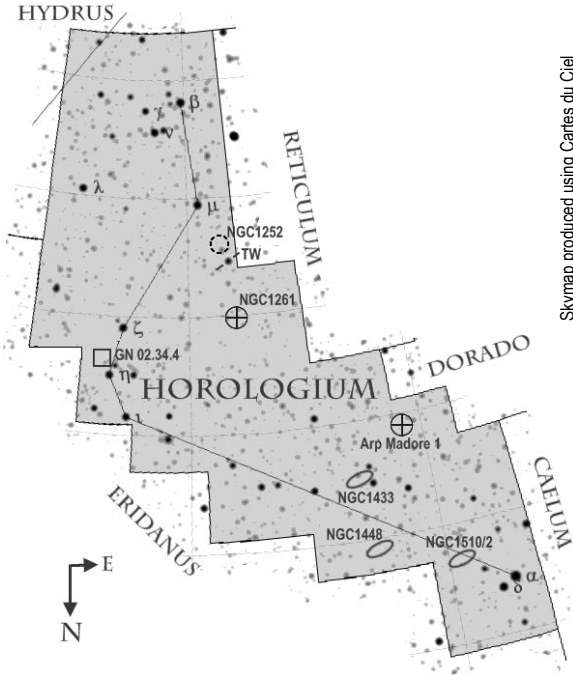
The constellation stretches from alpha Horologii in the north-east to beta Horologii in the south, a distance of more than 20 degrees. The bend in the pendu-

## the pendulum clock

lum clock around the hand section is situated around iota, eta and zeta Horologii. One could say the pendulum is hanging elegantly along a line from iota to alpha Horologii, housing a wealth of deep-sky objects to study along its way.

Our starting point in time is the super-white magnitude 4.9 beta Horologii which is situated only 25 degrees north of the south celestial pole. The star mu Horologii, north of beta Horologii, points the way a further 2.3 degrees north to the open cluster **NGC 1252**. This grouping displays a V-formation, pointing north. The area in between is filled with fainter members. A lovely, yellowish 6.2 magnitude star, HD20037, dominates this grouping and is situated towards the middle area of the western leg of the cluster, so to speak. It is not certain if this group is a true open cluster, although spectroscopy suggested that around a dozen of the members are at the same distance, about 2 000 light-years away, but they are not related.

Don't miss the beautiful carbon red star **TW Horologii**, normally magnitude 5.7, which displays slight variations of 0.6 magnitude – one of the sky's brightest carbon stars. TW Horologii is situated half a degree north-north-east of NGC 1252.

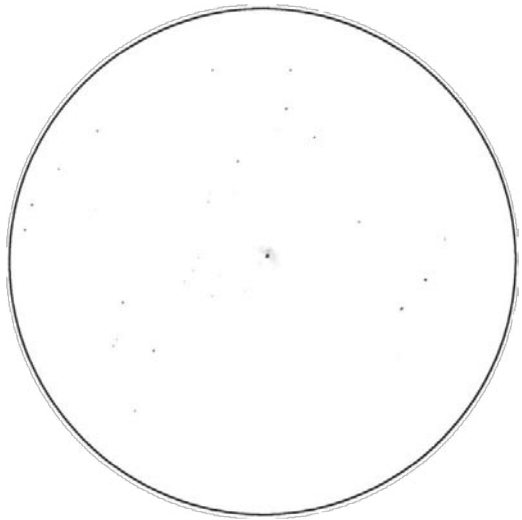


Still on the move, like the typical hand of a clock and another 2.3 degrees to the north, brings us to the globular cluster **NGC 1261** (Bennett 11). First impression is of a very nice, bright globular, well condensed, quite round in shape with no sharp edges (218x). With higher power the frosted glow becomes granular in texture, with a random sprinkle of faint stars (290x). The core appears slightly elongated in a north-to-south direction with a knot of stars on the globular's northern edge. Some amateurs also claim to see a dark patch embedded in this area. A prominent magnitude 9 yellow star (HD 20224) is situated about 4 arcminutes to the north-east. My Austral-

ian friend, Jenni Kay, described it as “a stunning peppery glow with a brief flickering of countless stars”. NGC 1261 is around 50 000 light-years distant. The galaxy pair ESO 155-10 or PGC 11916 is situated 4.5 arcminutes to the south-west, but far too faint for me to glimpse.

The magnitude 5.2 eta Horologii marks the real bend around the indicated time zone, which is 33 arcminutes north of the small **emission nebula, GN 02.34.4**. The nebula is about 250 arcseconds in diameter and surrounds the magnitude 8.3 star (HD 16405), which illuminates it. This star, one of the best-known variable stars detected by Harvard observers in Peru, changes its light every 219 days from magnitude 8.3 to 11.8.

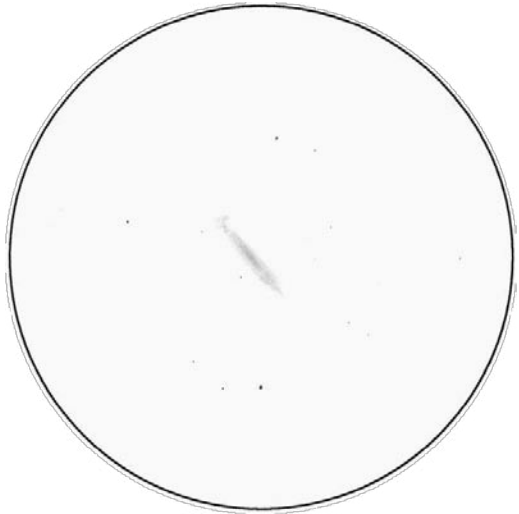
The most distant globular known, **Arp-Madore (AM-1)**, is situated in the eastern part of the constellation, half a degree east of the galaxy IC 2004. Astronomers discovered this object on plates taken with the Cerro Tololo 4-metre telescope in 1979, confirming the nature of this object as a globular. It is perhaps the most distant globular cluster associated with our Milky Way, with speculation that it could be as much as 400 000 light-years distant. It is believed to display only a small circular haze less than 1 arcminute across with understandably no stars resolved.



**Sketch of emission nebula GN 02.34.4 taken with my 12-inch at 218x. North is up en east to the left.**

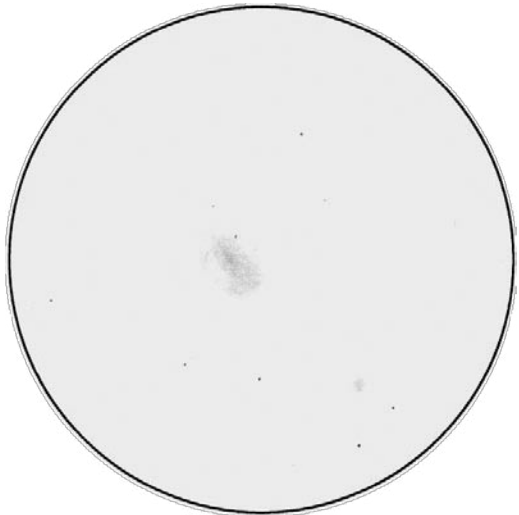
**NGC 1433** (Bennett 21) rides the centre of the pendulum between alpha and iota Horologii – a distance of nearly 17 degrees. The galaxy reveals a reasonably large soft circular to oval smear of light in an east-west appearance. From a relatively bright bar-like nucleus it shades out softly to form a woolly outer edge (290x). Careful observations reveals detail around the core and outer halo. Known as a barred spiral or prototype ring galaxy, it has faint arms connected to the east and west ends, swinging north to south, understandably only visible in larger telescopes. The small oval magnitude 12.5 galaxy, IC 1984, is positioned 24 arcminutes west of NGC 1433.

Ding-dong another 2.5 degrees further north to a fine example of an edge-on galaxy. **NGC 1448** (also know as NGC 1457), displays a beautiful thin ray of light in a north-eastern to south-western direction. The north-eastern tip of the light ray is slightly hazier, perhaps curving towards the north. Although the core is very extended it does not sport an outstanding nucleus. The supernova 1983S was discovered in this galaxy on 6 October 1983.



The elegant pendulum bob is characterised by the magnitude 3.8 alpha Horologii in the far north-east of the constellation, with magnitude 4.9 delta Horologii its close neighbour. The two stars are only 40 arcminutes apart, beautifully representing the little bob. The galaxy **NGC 1512**, (Bennett 21a) forms a long triangle of 2 degrees south-west of the two above mentioned stars. The galaxy displays a soft circular glow and reveals a slightly brighter extended nucleus in a north-east to south-west direction. Seen in perspective with higher power, this glow clearly becomes elongated with a distinct bar across the middle. The inner nucleus brightens up to a stellar appearance. James Dunlop described it as a small faint round nebula, a little brighter in the centre. John Herschel noted that it is slightly elongated. Recent Hubble photographs

Sketches of the galaxy NGC 1448 (above) and the galaxy pair NGC 1510/1512 (below) drawn using my 12-inch at 218x. North is up en east to the left.



show a starburst ring containing a wide circumnuclear (around the nucleus) ring of infant star-clusters. The companion

## deep-sky delights

galaxy, **NGC 1510** (magnitude 13.4), is situated on the south-western edge and is just a glimmer of light, barely visible.

If we think of outstanding clocks around the world, the first one that comes to mind is of course London's Big Ben. Located at the Houses of Parliament, Big Ben features in songs, movies and photographs. Times Square's Clock needs no introduction, but the fairly ordinary old Cuckoo Clock in Germany is one I remember from my childhood days. The world's largest clock is the Pyramid Clock in the temple City of Chichen Itza, Mexico. A clock with an incredible record for accuracy is Rome's Tower Clock, now well over 100 years old and also on the National Register of Historic Places. More than 946 000 hours of history have been marked by the sound of this clock. The historical Strasbourg Cathedral Clock, which dates back to 1843, stands an

incredible 18 metres tall. For our starry lovers the Orloj Astronomical Clock in Prague is worth remembering – it is a mechanical clock and astronomical dial, dating back to 1410. Then there is the Jens Olsen's World Clock in Copenhagen – it tells the time, shows the night sky, Moon phases and solar eclipses, and consists of 12 movements, which together have over 14 000 parts. One of the most intriguing clocks was built by George Jessop near Ely Nevada, and is now in the Horton Mall in downtown San Diego. On the day its creator died, the clock stopped and no-one was able to get it going again, so they say.

Time is reflected by the world's clocks and marches on. Time rules our life and our endless motion through space, but please create some time in your busy life to watch the endless revolutions of the starry skies above you. ☆

Object	Type	RA (J2000.0)	Dec	Mag	Size
GN 02.34.4	Emission Neb	02 <sup>h</sup> 36.1	-53°03'	8.3	250"
NGC 1252	Open Cluster	03 11.4	-57 38	8.4	20'
NGC 1261	Glob Cluster	03 12.3	-55 13	8.3	6.8'
TW Horologii	Carbon star	03 12.6	-57 19	5.7	
NGC 1433	Galaxy	03 42.0	-47 13	9.9	6.5' x 5.9'
NGC 1448	Galaxy	03 44.5	-44 39	10.7	7.6' x 1.7'
Arp Madore 1	Glob Cluster	03 55.0	-49 36	15.0	1'
NGC 1510	Galaxy	04 03.5	-43 24	12.7	0.9' x 0.9'
NGC 1512	Galaxy	04 03.9	-43 21	10.3	8.9' x 5.6'