Newgrange
The Sentinel

An introduction to the concept of the Heavens’ Hinge

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www.stonehinge.co.uk

This version is a discussion document and does not contain either references or some of the technical data:

* Where indicated, figures shown thus are approximate
† Where this symbol is used, references inserted in any final edition
Preamble

This introduction shows the mathematics and engineering behind a geocentric approach to a design of a chamber intended to forewarn of changes to the sun's cycle.

Newgrange’s layout, arrangements and symbols are shown to be the same as those required to establish that the sun has a fixed spiral ‘orbit’, allowing an idealised geocentric description of the Universe to be developed elsewhere (such as at Avebury and Stonehenge). Its inner stone monument is demonstrated to be capable of focusing solar light, using a simple method not relying on glass, to allow extremely accurate measurement.

The contention of this paper is that Newgrange was a device, part of a series of devices, that allowed subsequent structures (such as Stonehenge) to be developed as a depository of knowledge about the Universe and a place of learning designed for popular interest. Information about the geocentric properties of Stonehenge can be found at www.stonehinge.co.uk

Acknowledgements

Engineering concepts were expanded upon in various discussions within the Megalithic Portal Forum, whose contributors kindly offered advice and criticism. This introduction summarises the concepts behind some of those discussions.

In particular, I would like to thank the Office of Public Works (Ireland), N.O. Lievense, Chris Johnson and Neil Wiseman for their input.

Rather than presenting a fully referenced document, this introduction is based on a series of pictures which, hopefully, will be easy to understand. This particular edition is a discussion document and does not contain references. Despite being more than ten pages long, it does not describe all the findings and has had some of the more technical data removed to make the document more understandable. If there is interest in seeing full references, archaeological & engineering data, other additional monuments containing similar coincidences and so on, this paper may be expanded.
Newgrange: The Sentinel

Imagine you are transported into a world generated by a computer. The programmer has modified how almost everything about this world works: The only things you can rely on are that the food you eat and the water you drink is the same as wherever you have come from.

On this world, you are allowed to come back to the same place if you die. At least, that is what everyone else thinks the programmer would have said to them just before they got to come here.

This is like being in the Neolithic. You have to forget what you know and learn how everything works from scratch.

There are rumours of the old times; things that people know happened on this world: Generations of time of a great cold and a time of massive floods. This world can be tough if you happen to be in the wrong place at the wrong time. If you believed that you will come back to the same place in a next life, all your lives will be tough.

How do you know if where you are is safe? If things go wrong, getting anywhere by foot takes a very long time. You happen to be in one of the colder parts of this planet and also, just to make it even harder, you are on an island. If you need to move the community, you'll need to cooperate and do it as a pack.

And the times have become hard. People say it is getting colder. Crops have not been good recently. How do we find out if we will be able to continue to live in this place?

There are a few things we do know: Our world appears to be fixed. The skies above us rotate around one spot up in the skies. There is a season to the part of the world that we live in: In winter, the sun spends its time circling the south of the planet and in summer the sun circles over the north. If the sun decided to spend more time in the south, our place would become cold. We know from the tales of travelers that, on this planet, a few degrees makes a lot of difference to the cold zone of the North.
The sun appears to go south and north on a circle, but gradually moving each day to make a regular spiral: It is as if it is on the branch of a tree, swaying to one side, coming to rest in the north, then swaying back to the south before coming to rest: Two opposing spirals held in place by something else.

What if the tree or its branch moved: The thing that stops the sun traveling and then pushes it back? What if the branch, the thing which keeps the spirals in place, is on some sort of spiral itself. If it moves south, the sun would spend less time in the north. But by the time we knew about it, it could be too late for our community: Just a few degrees makes a lot of difference on this planet.

Another body, that we call the moon, often goes further south than the sun. The moon has its own spirals, which repeat in an a 28 day cycle*, but also seems to have a third: This third cycle makes it go to two other extremes that we have called its major and minor standstill†: Though nobody would know exactly how the moon works, it would seem to have two major spirals together with another unknown effect. But we do know that it goes much further south than the sun.

Today we might describe the moon's progress from its minor to major standstill (over its 19 year* period†) as following a spiral-like pattern. Like the sun's movement over one year, it's movement, and also its movement between standstills, follows a path which equates to a spiral‡. The path of the moon is due to its orbit following a path which is at a skew of some 5 degrees or so relative to our orbital path‡:
If the moon can go further south, the sun might start to go south as well. Perhaps this is the reason for the floods and the cold times of long ago? (Technically speaking this is correct: Ice ages are induced by the relative position of the sun over Milankovitch cycles. However, it is exceptionally unlikely that neolithic peoples would have known this)

So we need to know if the 'tree' is also moving: The spring, the ying-yang; the thing that keeps the sun coming back so that we can survive in the North.

Specifically, we need to know if the sun is going further south in the winters. The only time we can measure this is at solstice; the time that it comes to a standstill, when circling over the far south of the planet.

Lots of people have got good ideas about this. When the sun rises, and when it falls, we can get a sight line onto the horizon. By checking the angle using a couple of sticks we can see how far south it has gone. And we get a few days every year (either side of winter solstice) to be up early (or late) to check this out:
But there are problems with this: If it is cloudy just at the wrong moment, we won't get to see until the next year. If and when the sun starts to change its spirals, we need to know at that exact moment so that we can make plans in advance: The sun rises and falls at a slant relative to the horizon, so missing the moment of sunrise would lose the opportunity to measure the angle:

So capturing the angle without having to see the exact moment of sunrise would be a great advantage.

One other way to capture the angle is to create a dark room with a long corridor. At the back of the dark room we can see the shadow line of whatever shape we make at the entry. If we create a box at one end of this chamber, we will see the 'box shadow' fall from left to right in a slanted line at sunrise. We can measure this line from year to year and no longer need to see the exact moment of sunrise.
But there is also a problem with this: Because the sun is half a degree wide, it produces a fuzzy shadow on the back wall of our chamber. Only point sources of light produce black/white shadow over a long distance. So our method is good, but it is not great: And there are other ways to do it which are almost as good.

So we need a method, using a black room or some other way, to find out exactly where the centre of that fuzzy shadow falls.

This is where the black room method comes into its own. If you make a box at high level, you can place a rock, either a lozenge or circle shape, into that box to partially black out the light. Providing the dimensions of the box are correct relative to the diameter of the sun and length of the chamber, the shadow you will get will still be fuzzy but will have a completely dark centre point. From this, you will be able to distinguish exactly where the centre of the shadow falls.

The photo below (left) shows the near-shadow of this arrangement when a lozenge shape is fitted into a square light box. Provided the correct focal length is used, a faint cross will be formed on the far back plate between the 'petals' of the fuzzy shadow-light (right photo; not computer generated). At the right focal point, this shadow, which looks a little like a shamrock, will have a small black dot at its centre:

The above example uses a 30mm high lozenge with a focal length of about 2.6 metres (equivalent to a 220mm high lozenge over 19m). If you print this page out this page without using scale to fit, then cut out the white parts of the template above: In strong sunshine the dot will form at about 2.6 metres away (about 8½ feet).
If a slightly smaller lozenge is used (equivalent to 150mm high over 19 metres), a faint cross, rather than a dot, is produced.

At Newgrange, a backed out chamber was created beneath a mound:

Above the entry, there is a light-box: The light box has a lintel above it showing crosses set in squares: It appears that there were originally about nine crosses† (8 are shown in the current re-build). This box is significantly larger (approx 1.2m wide by 1.0m deep) than the height of the beam of light which penetrates the chamber.

The dimensions at the rear of the wide entry box allow a 25cm or so high slot of light to enter the chamber. Relative to the chamber length and the diameter of the sun, this slot height is the same as would be required to perform this operation†. For example, using a 25cm box with a 17cm (sided) lozenge: The angular diameter of the sun would produce a lozenge spot at a focus distance of some 19 metres or so.
At the rear of the opening is a slot, producing a slot of light some 250mm or so deep, above which is a row of carved lozenges approximately 150mm high:

Extracted from O'Kelly: Newgrange. p131 plate 45
A lozenge, or other suitable shape, would probably be best inserted on the 'shelf' below this location (some 19-20 metres or so from the rear plate). To produce the black dot effect, it would be approximately 225 high (165mm along its short faces), and inserted onto the shelf forming the light slot. Alternatively, to produce the 'faint cross' effect, the lozenge would be approximately 150mm high.

Though the effective slot wide (340mm†) down the chamber is small today, the stones are likely to have been pushed inwards by passive† pressure.

The reason for building a shelf, rather than a small box, is a construction detail: This sort of building would ideally be constructed when it is warm. However, the winter solstice only happens when it is cold. If the subsequent construction were a little out, the shelf arrangement allows both adjustment and subsequent slight changes of use.

The black dot, from various experiments, would be in a discernibly different line for changes over about an inch (25mm). Refer to the pictures above to get an idea of the type of accuracy that could be expected.

At the rear of the chamber is a back-plate stone, just like the back of a camera. According to various archaeological texts, this plate is in exactly the correct position to allow the shadow-box light to fall onto it at the time it was constructed. Relative to the accuracy of this chamber (4 minutes, equivalent to a slope of 25mm over 20metres†), this arrangement would work for up to about nine days a year (four days either side of solstice during which the azimuth of solstice varies by 5 to 6 minutes† at Southern Ireland's northern latitudes).
To either side of the passage are places where representatives from each of the clans could have stood to view the event. Above the place where the people would stand is a chamber; enough air for all these people to cram themselves in over the ten to twenty minutes or so that the operation might require.

The position of the line of fall of the shadow within the far chamber at Newgrange is arranged to allow one person to mark, perhaps with chalk, where it fell.

To the right at Newgrange is another stone with a curious mark above it: If we used Newgrange for this purpose, and the line traced by the shadow started to move towards that stone, we would realise that we are in deep trouble: If the shadow-line goes right (towards the north east), the sun must be rising at a position which is further south. So if that line starts to move, this would mean that our winters will gradually start to become worse.
At Newgrange, the mark on that stone\textsuperscript{\textdagger} is three joined spirals\textsuperscript{\textdagger}. But this mark is special: It has two joined vertical spirals with a third (seen to the left in photo below) 'pulling' it to the north-east corner of the chamber.

![Mark on Newgrange stone](image1)

\textit{Picture courtesy of the Office of Public Works (copyright)}

This 'pulling' direction is the same as the direction that the line of the shadow-light will travel in if the sun were, like the moon, to be drawn away by a third spiral:

![Shadow-light line](image2)

\textit{Picture courtesy of N.O. Lievense}
At Newgrange, the entry also has spirals drawn to be surrounded by lozenge shapes: The three spiral set is to the left of the shadow-box; the direction that light will come from if the sun were to start to travel further southwards at the time of solstice.

As with the three joined spirals in the chamber, two are vertical: The one to the left shows the direction that the sun's rays will travel from if the sun have moved south. The other spirals are not arranged as a group of three and show where rays will come from if all is well (see right hand side of photographs).

If this were the purpose of the monument, then it is a sentinel of climate change: It would have been constructed by an exceptionally intelligent people working with limited means.

Every year, the sentinel would tell the people if they will be OK, even if it is a bad winter and the weather is saying otherwise. If we make two of these, one for the morning and one for the afternoon, then we can cover all bases. The afternoon is our back-up. A similar 'afternoon' chamber exists at Dowth (near Newgrange); but a second chamber will also tell us something else.
This potential explanation leaves the purpose of the bowls (which exist in the chambers at Newgrange) unexplained. However, a geocentric explanation for Knowth (to be covered in a separate paper) provides a reason for the bowls at Newgrange. Rather than complicate this paper, the logic behind the positioning of these items is omitted for the time being.

If laser scanning, or some other method, of this 'shadow-rock' (at Newgrange) reveals traces of lines drawn to fall (at low level) downwards from left to right at a shallow angle, then this will have been the purpose of Newgrange. Whether traces of marks would survive for 5000 years* is unknown.

After a few decades, perhaps centuries, you will know with great certainty that the sun is not moving (after two centuries, the movement would indiscernible: About 10mm, equivalent to 0.012 degrees† [two minutes], to the left of the chamber rather than the right).

If you did this for millennia, the accuracy at Newgrange is sufficient to find out that the sun is in fact 'moving' as the tilt of the Earth gradually changes its obliquity† over its 41,000 year cycle*: The position of the dot would move to the left by some 300-400mm; eventually landing on the side wall rather than the back stone and then appearing to rise up the chamber as it hits the floor level).

Over a few centuries†, it would give sufficient certainty (approx one minute of change per century)† to allow somewhere like Stonehenge to be built, showing how the sun works and that the lands of the North will remain safe.

Summary

Newgrange’s layout, arrangements and symbols are the same as those required of a system to establish that the sun has a fixed spiral ‘orbit’, allowing an idealised geocentric description of the Universe to be developed elsewhere (such as at Avebury and Stonehenge). Its inner monument is capable of focusing solar light to allow extremely accurate measurement.