

The Kilmartin Stone
erected easter-
2005



• a millennium project

For
the person who
struck the first blow
on Solid Rock,
Stone on Stone.
Little did they know
the results of that
endeavour.

The Kilmartin Stone

Anything that measures the revolving of the Earth has to be of some importance. Most things that are in full sunlight do just that by the shadow created - as the sun moves so the shadow moves; and by close observation can be measured. The sundial is an example of this, but of course it is the earth that is moving not the sun.

It is the earth revolving on its axis and its passage around the sun that creates our day and night and all the seasons; passages of time that mould our lives, that give us emotional and habitual patterns to our ways of living. The earth's populations see the movement of the sun as a visual picture and react to it. It is the source of our existence. Remove it and we will cease to exist.

Ancient peoples would soon understand its life-giving qualities and respond to its fluctuations but would not understand the complexities of the Universe. The sun would be to them the source of life's warmth and fecundity.

The night sky would be seen as a period when the sun was hidden. A certain amount of compensation would be found in the moon and stars, but there would always be that fear that the sun would not return. (Bushmen in the Kalahari Desert believed that everything that happened on the earth in the day was replicated in the night sky. "Lost World of the Kalahari" Laurens Van Der Post).

The pattern of the sun's movements would soon be documented if only in the mind of man, but it would be so much easier if there were instruments to measure its' passage, to record the times he considered of most importance to his everyday life so that he could convey this to others.

As a hunter he would soon realise that his quarry (be it birds, animals or fishes), responded to the sun's movements so a better knowledge of it made him a better hunter and gatherer. The same would apply to the farmer recording the most successful yields and times when the land responded to his efforts, and of course the animals once they became domesticated.

Visual observation of the sky would not be accurate enough if you wanted to transfer times to others. Something more positive would be needed.

We will never know what instruments or tools ancient peoples had that were made from organic materials, instruments that have rotted away

leaving no trace. All that is left to us are stones, carved and constructed, which could have had innumerable organic objects used with them that have dissolved back into the earth.

Kilmartin and the landscape around abounds in stones carved and constructed. One can only speculate as to their usage, but we can be fairly sure they related to the movements of the sun, moon and stars.

The 'Kilmartin Stone' was carved and constructed with all the pre-historic material as a direct influence. The 'Cup' is the same proportions as a 'standard cup' to be found in many groups of carvings, one that re-occurs many times in many places, not just around Kilmartin.

The shape of the cup is what is important. It can be any size from a centimetre across to many metres due to its shape on the horizontal plane. The shadow created by the sun will be the same, so it can be measured and documented, physically recorded so an actual time can be transferred to where-ever and who-ever.

At this point it is interesting to note that the Cairns (though now denuded), when intact were probably the shape of the inverted cup. Certainly they read the passage of the sun the same and are invariably in a position to do so. (Of course, they would receive intensified heat from the sun. Was that the intention for those within? Heat is intensified because of the angle of the surface towards the sun.)

Summer at its zenith is maximum sun; winter at its darkest is minimum sun. All life reacts to the plus or minus of the sun's rays. It is recorded in the trees annual rings; good times in summer with lots of nourishment; bad times in winter with no light and little encouragement. Fish scales read these fluctuations as do shells and other creatures. Perhaps deep in the human system there is a gland measuring our reaction to the fluctuations of the seasons?

The sculpture in question is not on bedrock, so can move if only by settlement. For me this explains why most carvings from the past are on bedrock; it cannot move, so the readings of the sun's and moon's passage will always be the same, even if the rock is not level, they can be calculated and documented.

The 'rings' on the Kilmartin Stone are incised letters - names of all the holdings in the community, so do not read the light quite the same as the deep 'V' grooves that are more positive but still tell their own story if

observed closely. The 'Kilmartin Stone' is a sculpture and so art, but art with a scientific purpose (as I believe the ancient carvings were).

It was my original intention to give the meanings of all the Gaelic place-names, but on venturing to do so I found it an impossible task as meanings have changed through time; some would be relevant but many would not make good sense.

The enclosed chart gives approximate shadows to be seen in the cup at specific times of the year. At midday on the summer solstice the cup will be full of light, but from that moment as the sun loses height, so shadow will accumulate daily until at the winter solstice 85% approximately of the cup will be in shadow. This is created by the low sun striking the rim of the cup, allowing only that small crescent of light to be visible, but as the sun lifts so the light in the cup will increase.

Only direct observation of the stone will give the exact division of light and shadow at a particular time, but once seen it will be a positive yearly occurrence; every second of every sunlit day is measured in the cup.

Alas, because we are not at sea-level and there are hills all around, sunrise is 'from over the hill', which is different to being at sea-level.

The salmon carved in the cup create secondary shadow so do complicate the reading of the cup; a clean-surfaced cup would give a more precise shadow, but the salmon serve another purpose to add to the stones' sculptural properties. Close observation of the two fish will show that they are male and female and both are issuing from the anal aperture. The female is laying eggs and the male is spraying them with sperm. These unite in the spiral and descend as one down the hole in the cup base. If water is poured down the hole it will outflow to the south in a carved channel in the base stones. Close observation will reveal small fish carved in the channel, suggestive of progeny heading for the ocean.

If one casts an eye over the river below one will see how it follows straight lines, which are artificial channels built to facilitate roads and traffic, and of course, agriculture. The original river in its wild state would have meandered serpent-like down the glen, so between the monuments finding the easiest route, but also creating lots of bends and depositions where Salmon and Sea Trout could hold and spawn. Who knows in those far off days there may even have been Sturgeon present.

I believe the watercourse and its content was of great importance to the

monument builders, if only as a source of food, but perhaps it was more than that. People like the *Ainu* of Japan were a total 'salmon culture'; i.e. they lived off the fish but also made clothes and dwellings from the skins. No doubt they had a use for the bones and fins as well. It is possible the people who lived in this glen, who devoted so much time to building monuments and to ceremony were also deriving their sustenance from the river and its contents (speculation!), but it would certainly give them lots of time for other things if the 'supermarket' was right next to the 'church' and not miles away?

A separate sheet shows the earth in suspension on its axis and how Kilmartin at 56° latitude receives the sun's rays at the winter solstice and summer solstice. When picturing the earth going around the sun, but also spinning on its axis at 23.5°, one can evaluate the amount of sun the planet receives throughout the year. Sometimes it helps to use a ball as the sphere of the earth, mark the position of your home on it and just revolve it in space.

The shadow chart puts in diagram form the increase and decrease of light via the sun's position. It shows quite clearly how the sunlight is strongest at mid-summer, decreasing to the darkness of midwinter. Observation of the actual stone will tell everything the chart does, the only commodities required are sunshine, a keen eye and patience.

(At dusk in mid-summer, the church and its trees can block off the sun a little, just before it sets - but alas they are there to stay.)

By the addition of some round pebbles and a pencil or straight stick, along with some clay or *blu-tack*, times can be recorded.

- Place the pebble on an inner ring of letters on the sun side of the cup shadow. It will be seen that shadow is created on the cup side of the pebble.
- Now with the clay or *blu-tack*, put the pencil vertically on an outer ring of letters in line with the pebble and the cup centre. It will be noticed that the pencil casts a shadow into the cup.
- Adjust both pebble and pencil until the line of shadow crosses the dead centre of the cup and the pebble. That gives the precise position of the sun related to the stone.
- The pebble could be fixed at that point to record the moment in time but due to the place-names on the stone, it is easy to take a note of where they sit in the letters and record that way (photograph).

All the names are different, so a position is unique.

To measure the height of the sun, a straight lath and a protractor is

required. Put the edge of the lath on the exact edge of the shadow at its centre in the cup, and let it ride on the rim of the cup, crossing the shadow. The angle created between the surface of the stone and the bottom edge of the lath is the approximate height of the sun above the horizontal plane (photograph).

Due to the stone being a natural irregular slab, the surface is not exactly flat so getting a true level is difficult, but even with this irregularity readings are quite accurate.

The sculpture was intended to be both art and science; an indication of how cups could have been used and to say something about the natural resources of the glen. Due to this one must accept slight imperfections within its evaluations, but it will still allow the observer to see that a really precise scientific instrument could be made using the same principles. Due to the salmon carved in the cup, there is not a smooth surface to relate to, but an approximate figure can still be achieved.

Of course the stone will tell where the sun is at its zenith exactly, so that indicates 'due South'. Once that is achieved, all other compass directions are available.

I like to think that the stone speaks of the Glen's ancient history and as an instrument to aid man's existence. It works to some degree as a sundial, compass and sextant. With the use of these instruments a million other doors open or have opened. We must close these again to comprehend the potential.

Is it possible that the prehistoric peoples adjusted the course of the river when building these monuments (no doubt to their own advantage)? This we will never know. I have flown over the glen in a microlite, but the modification of the landscape is so intensive it is impossible to see the original river course, but there are suggestions in flood conditions.

The sculptures functions are facts to be observed. As regards these being used in Pre-history is for the individual to decide.

The use of the cup to record the sun's movements can be seen in India at the observatories, the *Jantra Mantra* in Delhi and Jaipur, dating back to 1700 (photograph).

The Cup

I believe the population at some point in time *needed* stone dust; for what purpose I am unsure. Perhaps it was for an abrasive or grit as a source of usable mineral.

If we look at the geological process, it was the grinding up of rock by ice that created silt which is the basis of soil. The mineral-rich particles encourage growth of vegetable matter. That is why the flood plains of the great rivers were the richest places for growing crops. By adding fresh rock dust to stale soil, it helps to give plants a boost.

There are those who believe it is good for the human body as well. When we consider how long man has been using stone to grind his cereals and his abraded teeth visibly show how much stone dust he was eating in his bread. Is that the 'norm'; how life should be, and are we lacking those vital minerals he was ingesting?

So we come to the cups carved in the bedrock, the first ones created, I believe, were for rock dust. Making a depression with a hard stone or a hard stone-tipped pick is without question the easiest way of acquiring dust from a rock. Constant pounding on the same spot will create a depression which will contain the dust, which can be removed accordingly; with some effort the depression is soon a cup and you have a nice little container of dust. It can be made as fine as you like by pounding it in the cup; (a little clay wall can keep it together in adverse conditions).

On making a stone pick - a wooden tool with an insert of hard stone - I found after a certain size it was quite hard to keep removing material. It was easier to start again with another depression. The shape of my cups were exactly the same as the ancient ones.

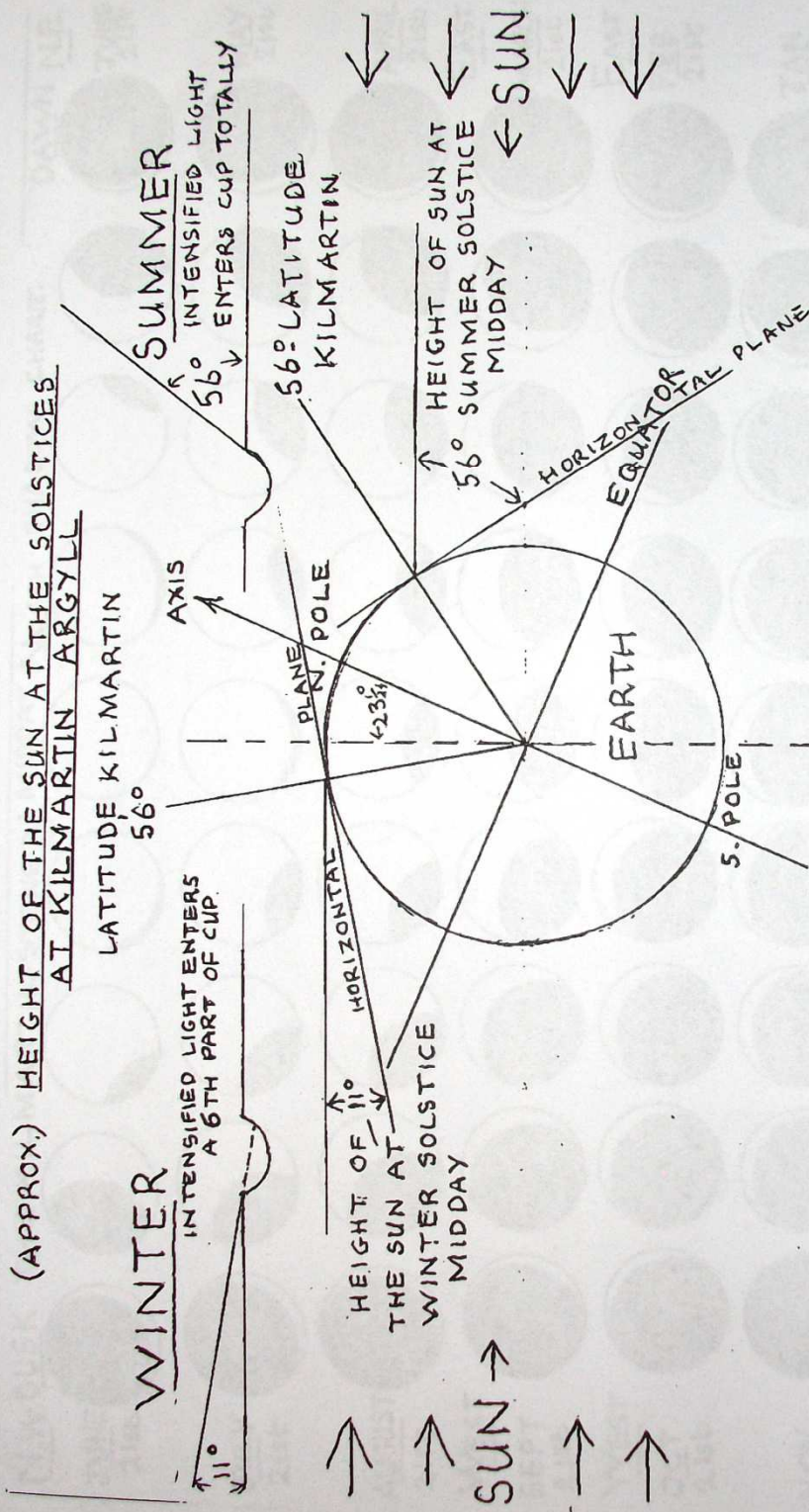
One use for rock dust from the Kilmartin area was to temper pottery. This was ascertained by analysis of a burial pot found in the area, so a cup could actually be evidence of a dead person; the material from the cup being the amount in the pot the burnt remains were in. In actual fact the cup could represent a life lived and recorded to be handed down through time by those who wanted to remember. Like so many grave slabs in the area there is no name that exists; only in the minds of those that remember until they don't! Next time you view a cup-marked rock give a thought to who they may be representing.

As with most significant human inventions, it is part design, part accident. First we had to have a cup to see the sun's shadow in it, then all else can follow; elaboration inevitable. An interesting point is that there are no cups, or cups and rings in permanent shadow; those on bedrock are always in a position to read the sun to some degree. At Loch Tay there are hundreds of carvings on the north side of the loch, where they get the full arch of the sun; there are none on the south side, which gets minimum sun.

When dust was removed was the rock warmed by the sun and were you giving that to the dead for eternity? Another experiment I did was to observe a shallow cup of which there are many. It was found that it held shadows at midday, until one day there were none; that cup actually records that day, which may well be important to human existence - a time for something?

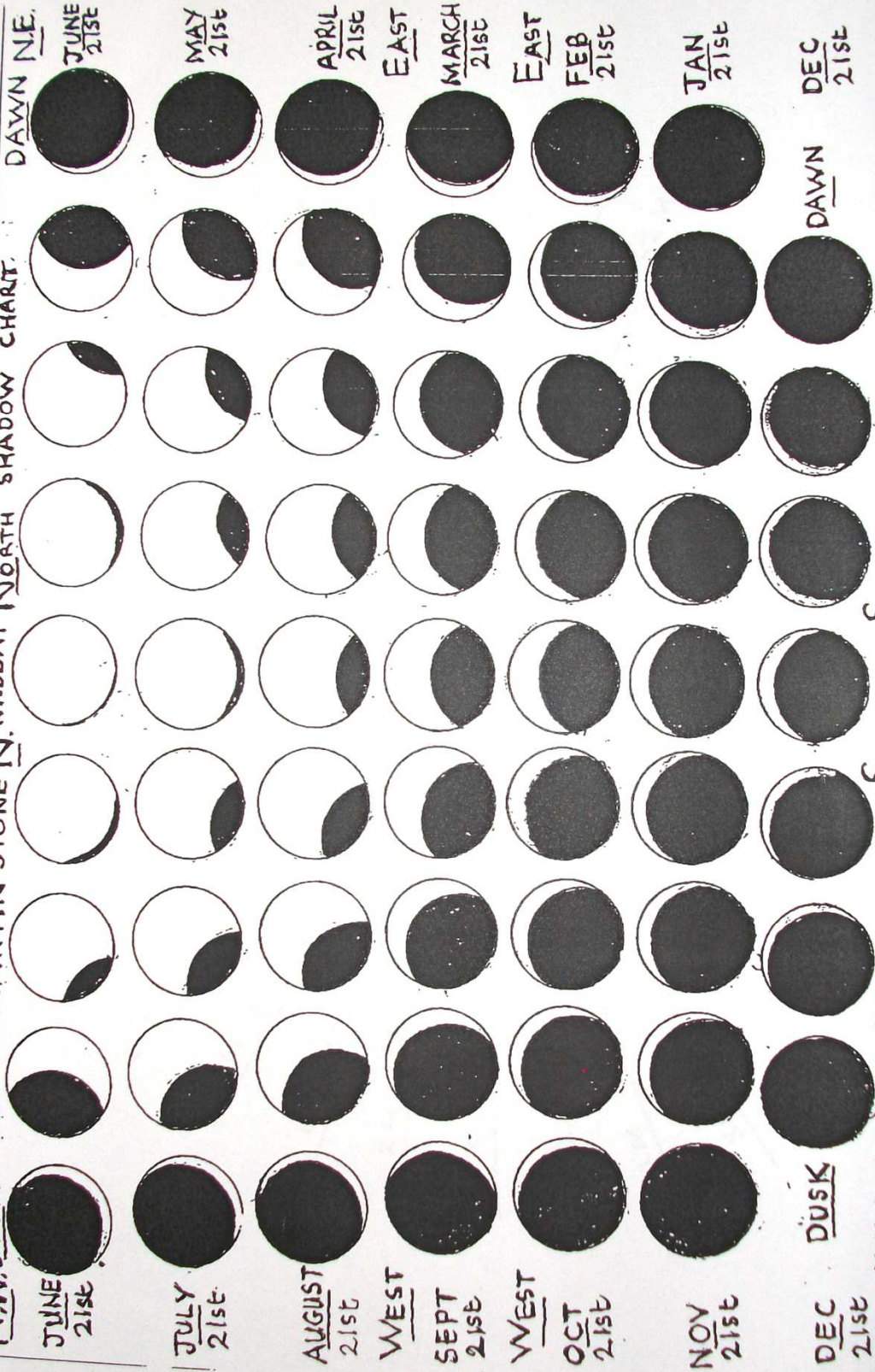
Alas I cannot be that person several thousand years ago, but I can lift my eyes to the same sun, feel its warmth and see its effects on me and upon the land and sea as they did, and rejoice as they must have done.

Did they also think that the energy and warmth from the sun was stored in the earth (rock) and was transferable; if so, who am I to argue?



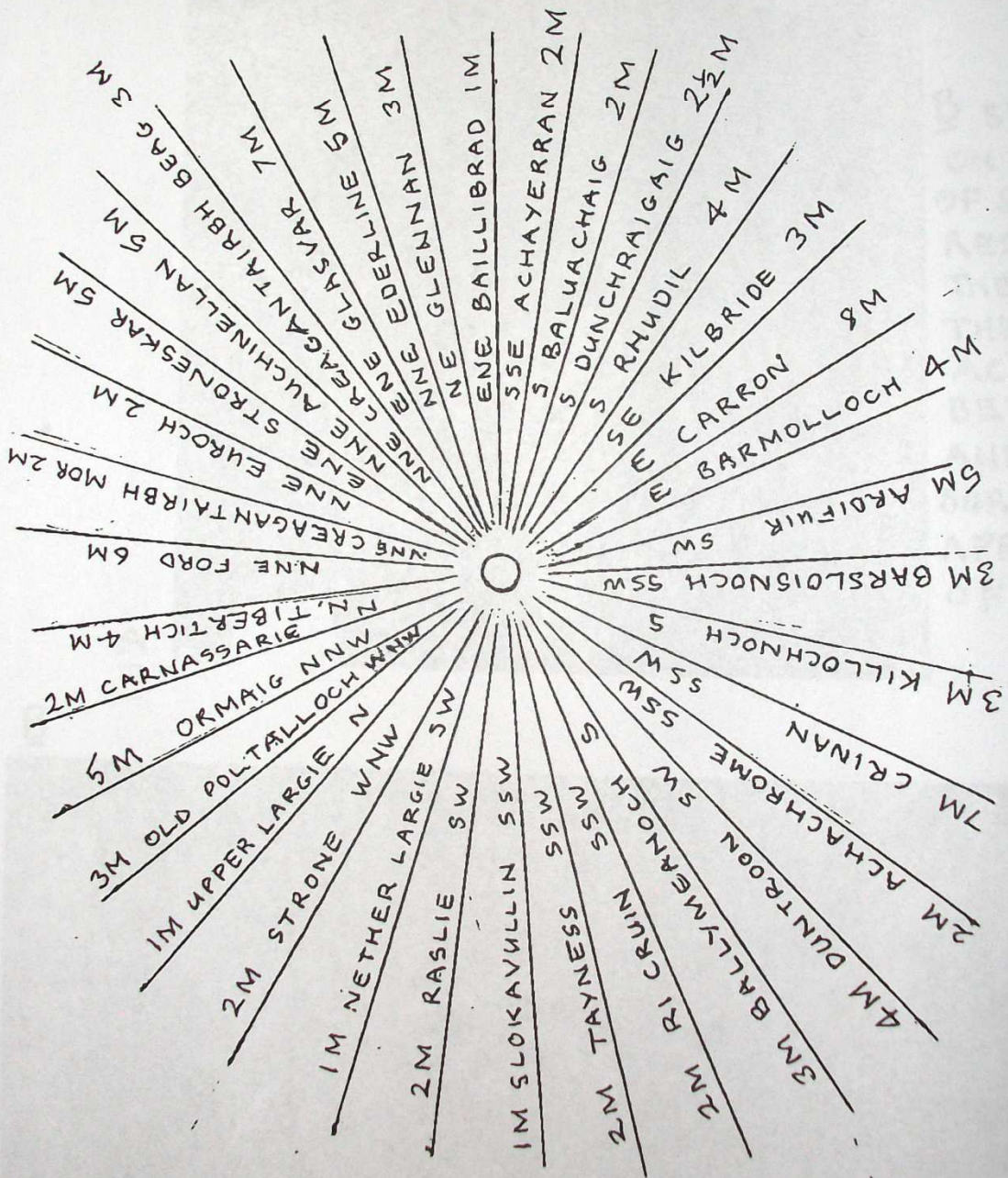
THE EARTH SPINS ON ITS AXIS OF $23\frac{1}{2}^\circ$ FROM THE VERTICAL CREATING A 24 HOUR DAY, IT ALSO TRAVELS AROUND THE SUN - ONE COMPLETE ORBIT TAKES ONE YEAR 365 DAYS THIS CREATES THE SEASONS. THE EXTREMES ARE THE SOLSTICES WHEN THE SUN IS AT MAXIMUM AND MINIMUM.

N.W. DUSK THE KILMARTIN-STONE N. MIDDAY NORTH SHADOW CHART DAWN N.E.

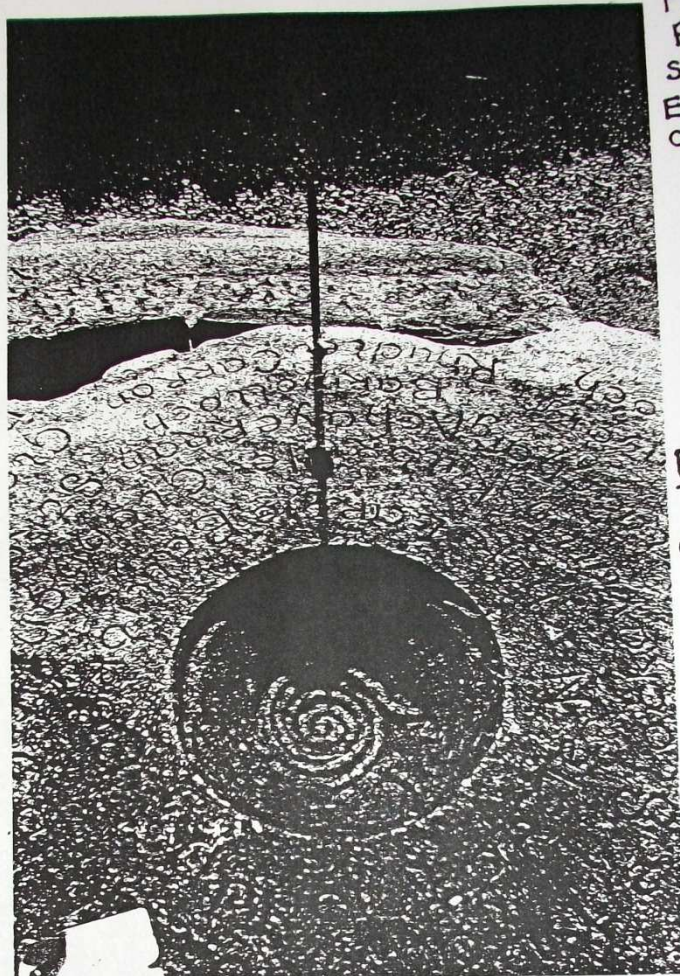


KILMARTIN STONE S. MIDDAY SOUTH
 APPROXIMATE SHADOW IN SALMON CUPEACH MONTH OF SOLAR YEAR S.E.
 S.W. DAILY VARIATION CAN BE ASSESSED ACCORDINGLY-NOTE BLOCKAGE BY HILLS AROUND.

APPROXIMATE DIRECTION AND DISTANCE
OF ALL THE NAMES CARVED
ON THE STONE



A PENCIL AND
PEBBLE IN
POSITION - THE
SHADOW CREATE
EXTENDS THROUGH
CENTER OF CUP



A

B STRAIGHT STICK
ON THE EDGE
OF SHADOW AND
RESTING ON
THE CUP RIM,
THE ANGLE
ACHIEVED
BETWEEN THAT
AND THE STONE
SURFACE IS THE
APPROX HEIGHT
OF THE SUN

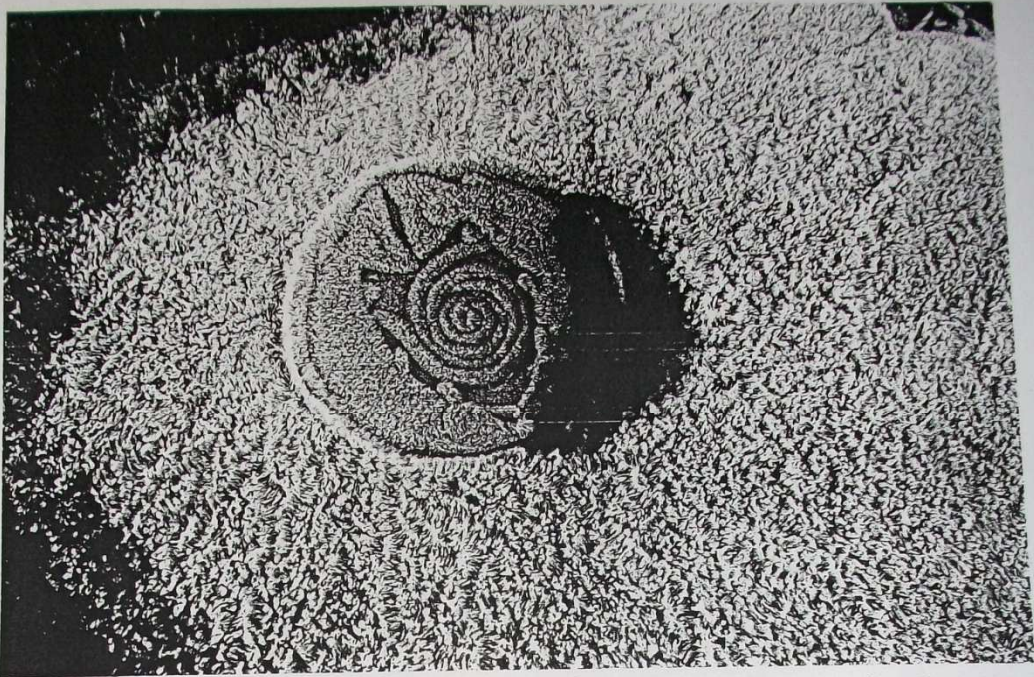


B

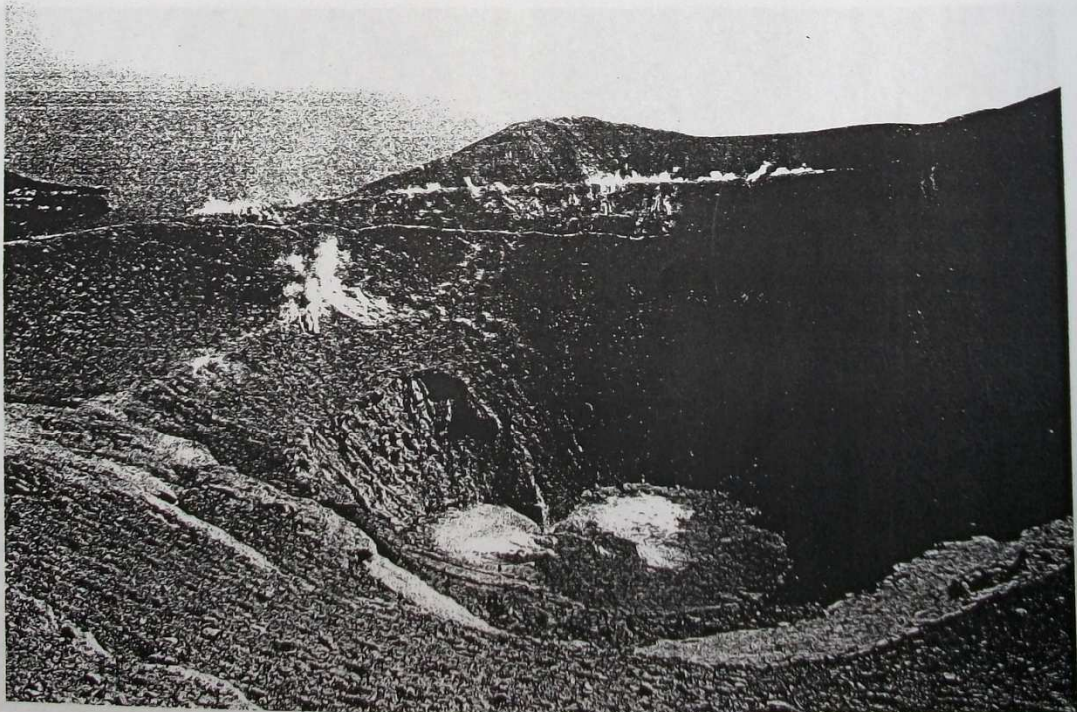


LIGHT IN THE CUP AT MIDDAY
ON THE WINTER SOLSTICE

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ON A VERY FROSTY DAY AROUND THE WINTER SOLSTICE 'AT MIDDAY' THE AREA OF INTENSIFIED LIGHT INSIDE THE CUP HAS MELTED THE FROST AND THE HEAT CONDUCTED HAS MELTED THE FLAT SURFACE. IT REMAINED MELTED UNTIL AFTER 7:30 IN THE EVENING DURING INTENSE FROST



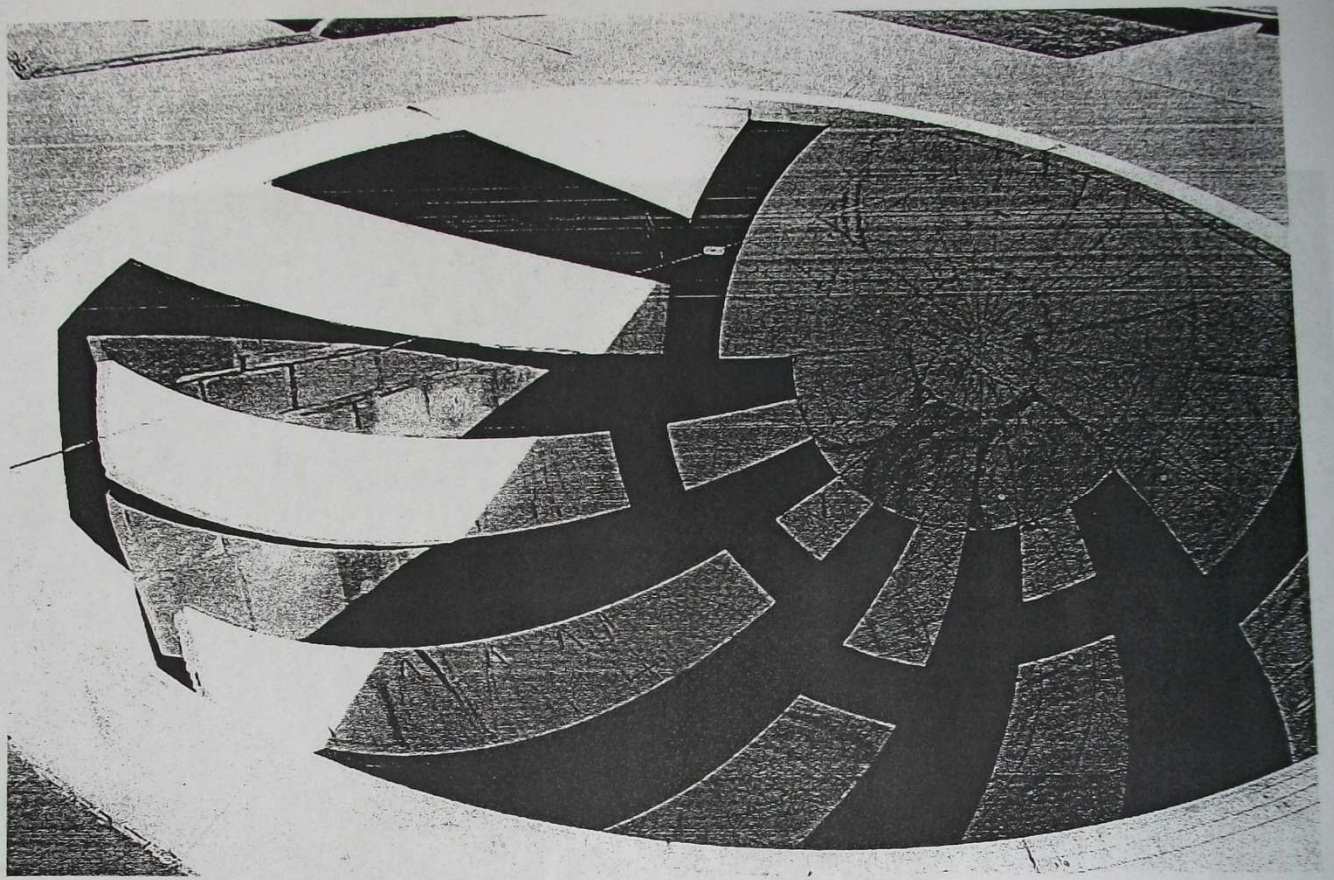
VOLCANO CRATER WITH LIGHT AND SHADOW CREATED BY THE SUN APPROX. HALF A MILE ACROSS



SHADOW AROUND THE EQUINOX - TWO SIZES
NOTE SHADOW IN RINGS OF SMALL ONE AND THE
LETTERS OF LARGE ONE



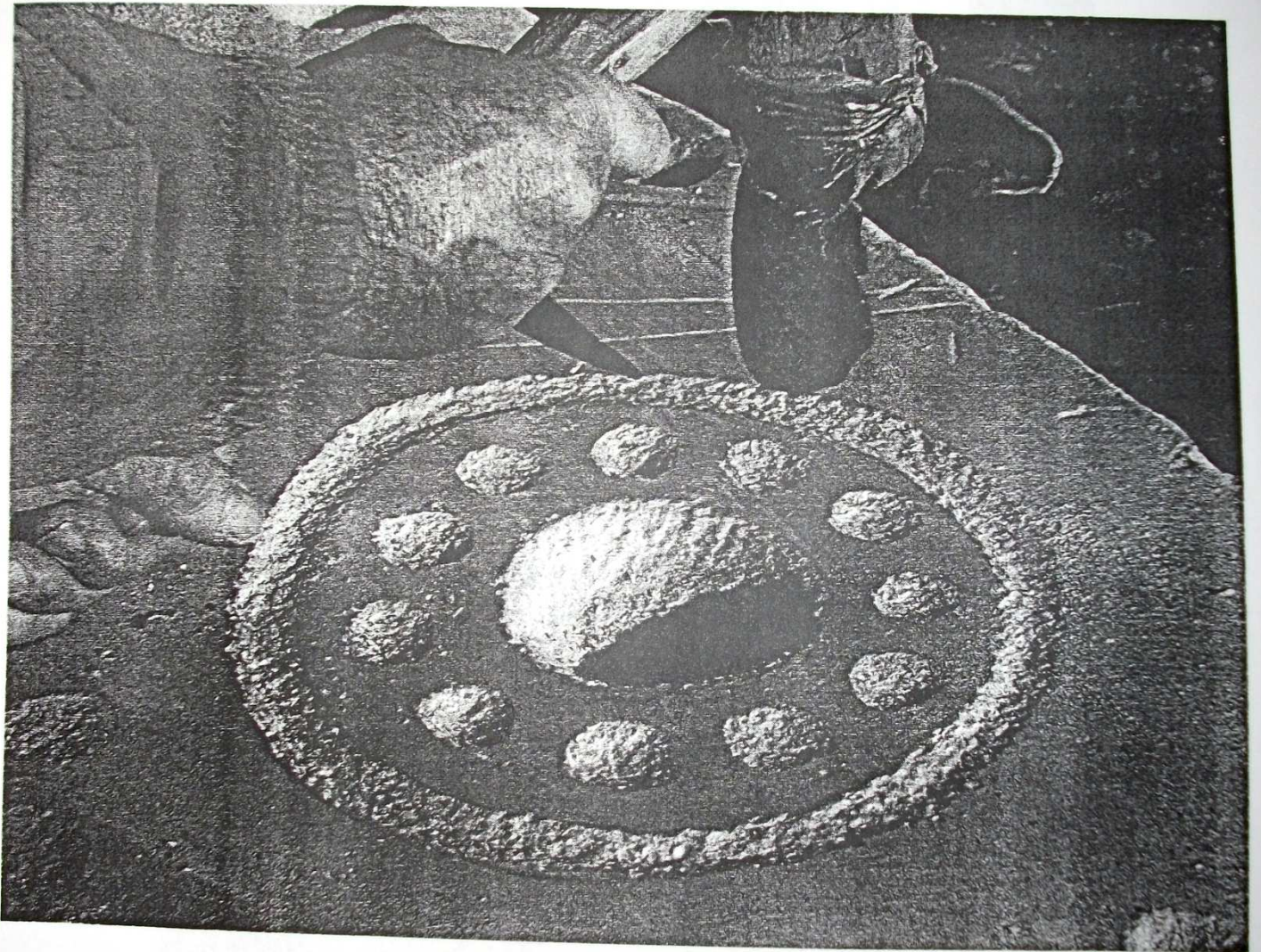
AS 'A' BUT NOT THE SAME WINTER



'JANTRA MANTRA' JAIPUR, INDIA - CUP FOR MEASURING
THE POSITION OF THE SUN ETC.



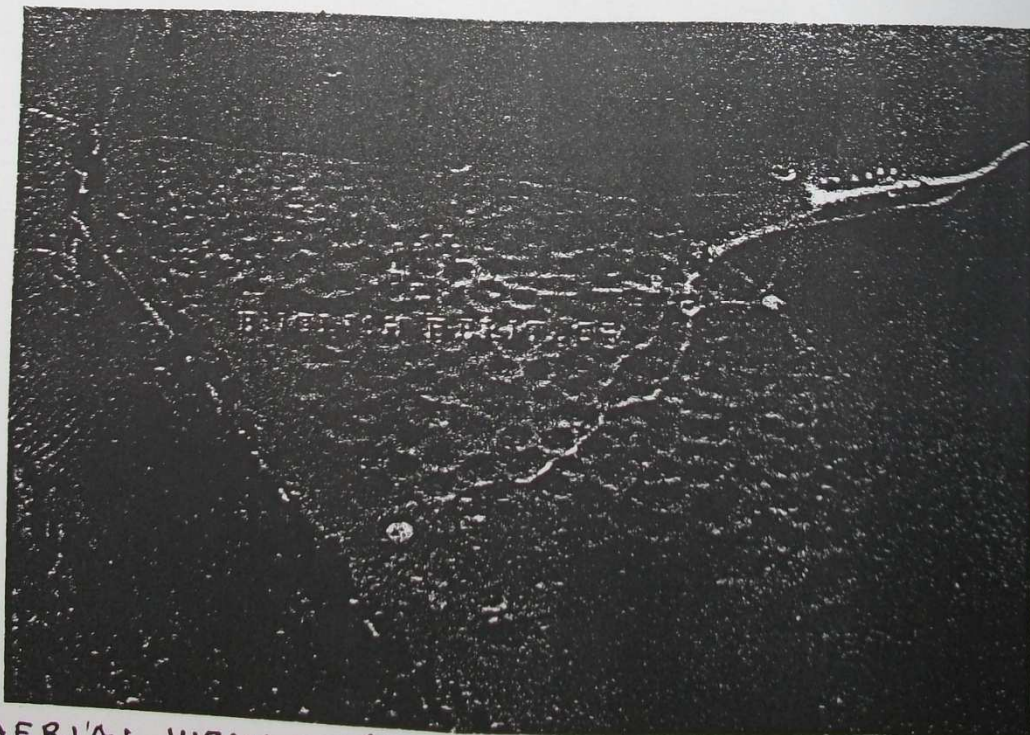
STONE PICK AT WORK (BASALT TIP)
LATE AFTERNOON SUN



STONE PICK AT WORK (ORMAIG REPLICIA.)
NOTE SHADOWS (BASALT TIP)
(RAWHIDE WASHING.)
MIDDAY SUN



CUP MARKED ROCK NOTE JUXTAPOSITIONING OF CUPS IN RELATION TO THE EXTRACTION PITS BELOW AND HOW CUPS MERGE TO CREATE A LINE .



AERIAL VIEW OF 'GRIMES GRAVES' NORFOLK, FLINT MINES
NOTE LIGHT AND SHADOW IN PITS AND RINGS AROUND SATELLITE PITS—NATURAL JUXTAPOSITIONING OF EXTRACTION PITS. BELL PITS FOR COAL ARE SIMILAR.

The only real certainty for life's continuance is the 'sun' and its cycle, all else would fade into nothingness and despair without it. This applies past, present and future (particularly in Argyll) - a good reason to venerate and record it.

I read where in the far north of Siberia the first sign of the sun's return is a white bird, so high in the black sky that it is illuminated by the sun as its rays creep over the earth's sphere—that bird is venerated by the people who live there!

Thanks to ~
Ann Wilson
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Museum staff

Martin Murphy - Oct 2011