

# A Neanderthal stellar map? The La Ferrassie burial 6 block as a testimony of Neanderthal astronomy and star-orientated religion <sup>1</sup>

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**Abstract.** The present paper argues that the pattern of cupmarks on the Mousterian (ca. 70 ka BP) burial block attending the no. 6 child burial at La Ferrassie, Dordogne, France, is to be interpreted as a stellar map. Here such high-magnitude stars as Sirius, the asterism known as Orion's Belt, the Milky Way, Castor and Pollux, Procyon, Betelgeuze, Bellatrix, Rigel and Aldebaran, may all be identified on astronomical grounds (duly taking precession and proper motion into account), and with confidence. This throws a surprising new light on the advanced mental capacities of the Neanderthal humans producing the burial block, and constitutes an important further step in the rehabilitation process of Neanderthal minds and culture as has been going on among palaeoanthropological specialists for the past quarter century.

## Cupmarks in general

Before I can present the specific astronomical argument on the cupmarks of the La Ferrassie block, let me introduce the topic of *cupmarks* in general.

*Cupmarks* (shallow man-made part-spherical indentations in a rock surface; with cup-and-ring markings as a major sub-category, e.g. Lang 1901) have an almost global distribution. They have belonged to the oldest fascinations of academic archaeology (cf. Simpson 1867; for an overview of the oldest discussions, cf. Astley 1909-1921). A modern synthetic approach is Querejazu Lewis & Bednarik 2010, while Bednarik has also in other publications asserted himself as the major recent author on cupmarks. Cupmarks have mainly been attested in the Bronze Age, and later, especially in megalithic contexts; in this connection their geographic distribution (including Palestine – cf. Waddell 1925: ch. 18 – and Ireland) suggests affinity with the Pelasgian complex (van Binsbergen & Woudhuizen 2011: 378 f. and *passim*). However, cupmarks have also been found in much older context, especially in India and Australia, from the Middle and even Lower Palaeolithic on (Bednarik n.d. 'Early rock art of Australia', and 2004). Conspicuous are the cupmarks / circle-dot motifs pecked in a wall near the lower passage at Khumi Ruins, Zimbabwe (Robinson 1959: Plate II).

While we must acknowledge the fact that for a cultural phenomenon so widely spread in space and time, not one overall interpretation can be given, various hypotheses (cf. Bleuer 1985) have been advanced about their meaning and use, including:

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<sup>1</sup> This paper is a greatly revised and expanded version of pp. 277-283 of van Binsbergen 2018, which is greatly revised and shortened version of van Binsbergen with La Croix 2000.

- grinding / milling (of grain, shells, nuts – cf. Younker 1985; for the same purpose also naturally indented detached stones may be used);
- divination;
- geographic mapping (Hastings 1909-1921: IV 365; de Jonge & IJzereef 1996);
- proto-writing (Hastings 1909-1921: IV 365, 366; Rivett-Carnac 1903);
- representation of stars and asterisms (Baudouin 1926; Levy 1948; Schlosser & Cierny 1996: 91 f.);<sup>2</sup>
- gaming (Culin 1896; Murray 1952 / 1913; van Binsbergen 1997 / 2011, 2012);
- conceptual experiments in pre-art (Anati 1999);
- representations of fire making with the fire bore (Sophus Müller 1897: 150 f.);
- the sheer impetus to leave a human mark – more specifically the impact of human thought) on the natural world (van Binsbergen 2004 and in press (b)) or the representation of energy, force (Deleuze 1968; Lewis-Williams & Dowson 1989) – and more particularly of the supernatural force of lightning or the sun (Schwantes 1939; cf. Maringer 1960).

Natural phenomena resembling cupmarks may have inspired early humans to produce cupmarks, e.g. the natural indentures occasionally found on bee's nests; but especially the natural erosion effects (omars, omarolluks) on terrestrial limestone and other rocky surfaces; and on meteorites. The great French archaeologist Leroi-Gourhan suggested (1964) that cupmarks are akin to the grid as a form of geometrisation and as the representation of the female human body – what Streep (1994) and Gimbutas (1991) have characterised as 'a penetration into the [ Goddess's ] element; in this respect, the cupmarks could be interpreted as representing orifices of the human body but imposed on lifeless earth (van Binsbergen 1988). Conceivably, a cupmark or set of cupmarks might have formed the emblem of a social or ritual group, and (applying Durkheim's 1912 insistence on social group, congregation, and symbol; cf. van Binsbergen 2018) a locus of sacrificial offering (especially: on behalf of that group). A widespread genre (e.g. in European prehistory from Sweden to Crete; an early description offers Montelius 1900) is when several cupmarks (each for one type of offering, or for one specific deity) are combined on one rock surface to as to forms a sacrificial altar, cf. the κέρνος or κέρχνος *ker(h)nos* of Neolithic to Classical Greek Aegean tradition.

## The Mousterian La Ferrassie child burial 6

Around the year 2000 my initial work on *mankala* gaming boards<sup>3</sup> worldwide had kindled my interest in the cup markings that are begin to appear in Middle and Upper Palaeolithic contexts and that especially abound in Bronze Age contexts. By 2000 my attention was particularly drawn<sup>4</sup> to the Mousterian infant burial at La Ferrassie, near

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<sup>2</sup> Schlosser & Cierny 1996: 58 f. offer an apparently convincing argument *against* an astronomical interpretation of cupmark patterns: *obvious representations of the globally most conspicuous asterisms such as Ursa Major and Orion's Belt have not been attested*. However, this is a moot point. Not because of proper motion: the asterism did undergo some change due to the proper motion of the main stars defining their outline, but for the past 100 ka the proper motions of the stars in question remained sufficiently low so as to keep them recognisable even by today's pattern. To recognise an apparent line of three equidistant cupmarks as a possible representation of Orion's Belt. No ,the problem is that the modern analyst already needs a mind frame conducive to an astronomical interpretation of cupmarks to begin with, and such a mind frame is still rather unpopular. For Ursa Major the situation is quite different because that asterism is graphically much more complex, so less likely to be produce unintentionally. Meanwhile our La Ferrassie burial block appears to offer at least one case of the plausible representation of Orion's Belt. And also among the cupmarks depicted in Fig., 6 a, b, c, several sequences might be interpreted as Orion's Belt.

<sup>3</sup> A form of board game, already attested in the Neolithic, where, according to intricate rules, tokens have to be moved along one or more rows of *cups*, and to be captured in the process.

<sup>4</sup> In fact by a very inadequate depiction in Levy 1948.

les Eyzies, Dordogne, France (44° 57' 07" North; 0° 56' 17" East).<sup>5</sup> Here<sup>6</sup> an infant had been meticulously buried,<sup>7</sup> the head separated from the body, under a capriciously-shaped<sup>8</sup> rather flat limestone block covered with cupmarks. Ever since the burial was discovered in 1921, a lively industry of scholarly interpretation has developed around this burial as a whole, the limestone block, the controversial identification of the place and number of the cupmarks on it, and the interpretation of the pattern they were forming if any.<sup>9</sup> An astronomical interpretation has been plausible, in the first place because the cupmarks were facing downwards, to the earth (indeed, as if in analogy to stars),<sup>10</sup> but also because such astronomical interpretation of prehistoric patterns has often been attempted in relation to other sites, and has meanwhile developed into the flourishing sub-discipline of archaeoastronomy.

## Astronomical interpretation of the La Ferrassie cupmark pattern

The following four images (Fig. 1-4) summarise my astronomical interpretation of the La Ferrassie-6 burial block. After showing the unprocessed block (Fig. 1) and identifying the cupmarks and other relevant features on it (Fig. 2), the next two images, Fig. 3 and 4, present an astronomical situation as modelled with the software *Starry Night 5 Pro*. In the background, all major stars (Mag ≤ 6) are shown in their correct

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<sup>5</sup> I am indebted to the African Studies Centre, Leiden, the Netherlands, for granting me leave of absence and travelling funds enabling me to visit the Les Eyzies Museum and the nearby La Ferrassie site.

<sup>6</sup> Peyrony 1934, and numerous secondary discussions in the specialist literature.

<sup>7</sup> A quarter of a century ago, the palaeoanthropologist Shreeve (1996) published an authoritative synthesis of what we then knew about the Neanderthals. In the light of later finds and reflection, including the La Ferrassie burial 6, much of that synthesis needs to be revised, e.g.

‘The Neandertals buried their dead, but they did not devote much time and attention to the act.’ Shreeve 1996: 271).

<sup>8</sup> In personal correspondence, the archaeologist James Harrod (2010) suggested to me that the shape could have been meant to represent the outlines of a bison kid, but so far I have found little comparative evidence to support such a claim. Nonetheless, elsewhere (van Binsbergen 2012: 187 f.) I have presented a tentative analysis of the famous *Le Puits* scene at the Lascaux prehistoric complex from the Late Upper Palaeolithic, and then I advanced iconographic and linguistic grounds why the bison could be considered a symbol of the primordial Waters (Above and Below) with both celestial and underworld connotations. Bisons did occur in the Dordogne region c. 70 ka BP, when the burial is to be dated; and there is a slight possibility that already by those Mousterian times the bison had a similar symbolic connotation – as a fitting overall evocation of heaven, in which the cupmarks may then have represented conspicuous major stars within asterisms. This suggestion tallies with my finding, mainly on linguistic grounds, that the bison in the European Upper Palaeolithic had aquatic connotations (van Binsbergen 2012: 188 f.), in other words, stood for ‘the Waters Above’.

<sup>9</sup> Such rival interpretations include, in addition to those already mentioned above: Anati 1999: 42 f.; Anati 1992: Fig. 17; Bednarik 1995 (who unconvincingly claims that there are 18 cupmarks, forming pairs, and fails to notice the tripartite Orion’s-Belt sequence); Lorblanchet 1999: 193 f.; (who counts 20 cupmarks); Maringer 1960: 65 f.; Strep 1994: 30 (who anachronistically appropriates the La Ferrassie data towards Neolithic-focused Goddess religion – the latter being at least 60,000 years more recent);

<sup>10</sup> However, for Levy (1948) and, citing the latter in approval, the feminist Strep (1994) – writing in the vein of the inspiring, equally feminist archaeologist Gimbutas 1991: 289, – the down-facing of the cupmarks in the La Ferrassie burial is an argument not for their celestial reference but for their terrestrial, by implication Goddess, reference.

places 71 ka BP, with modern constellation names (no doubt totally anachronistic for the Middle Palaeolithic) in larger print; selected modern star names (no doubt equally anachronistic) in smaller print. As confirmed by <sup>®</sup>Starry Night 5 Pro, the asterism we today call Orion's Belt was plainly visible from a Ferrassie 71 ka BP and a substantial period before and after. Upon this background I have projected the outline of the limestone block and relief feature; (Fig. 2).

1. *Orion's Belt (nos. 1, 2 in Fig. 4) provides the first clue to the identification and orientation of the limestone block pattern to the precisely reconstructed night sky at the time. Admittedly, and as the dotted lines in 8.u.d indicate, Orion's Belt appears as too large and too far to the East on the limestone block.*
2. *The next, even firmer, clue consists in identification of the conspicuous North-South groove<sup>11</sup> as the Milky Way (no. 3 in Fig. 4); its conceptualisation as a river is attested worldwide in several mythologies<sup>12</sup> – also cf. the adjacent modern constellation Eridanus, a river name.*
3. Further fitting of the pattern of location and size of the limestone block pattern is by trial and error.
  - In the Eastern (bottom) part of the limestone block, major and isolated cupmarks appear to roughly correspond with the major stars Castor ( $\alpha$  Geminorum), Pollux ( $\beta$  Geminorum) and Procyon ( $\alpha$  Canis Minoris). In my interpretation of the limestone block as star map, a section of the heavens is proposed where the block's abundance of cupmarks *does match the abundance of relatively very bright stars in reality.*
  - No further very precise correspondence between cupmark pattern and star pattern can be claimed, but the concentration of larger cupmarks in the centre of the limestone block tallies with the presence, in the proposed part of the night sky, of major stars such as Sirius ( $\alpha$  Canis Majoris), Betelgeuze ( $\alpha$  Orionis), Bellatrix ( $\gamma$  Orionis), Rigel ( $\beta$  Orionis) and Aldebaran ( $\alpha$  Tauri; co-inciding, in the Figure 3, with the constellation label Taurus).
  - Sirius is the brightest star in the night sky, was so most probably also 68-74 ka BP, and I propose that the isolated large cupmark with emphatically raised edges (no. 5 in Fig. 4) is a likely candidate for identification as Sirius. Beyond Aldebaran, at the edge of the projected limestone block, we can make out the Pleiades (Messier M45; 6 Fig. ).

Plausible and attractive though this hypothetical archaeoastronomical interpretation is on both astronomical and comparative mythological grounds, in the light of the

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<sup>11</sup> Such a groove in combination with a cupmark is not unique; Bednarik n.d. (my Fig. 5) shows a similar arrangement. In the La Ferrassie bloc, this major groove is, according to Lorblanchet 1999: 193, the only feature of the bloc that has been modified for conservation purposes:

‘L. Capitan et D. Peyrony ont heureusement publié une photographie du bloc sur le site même; or, la correspondance entre la photographie de la publication et le bloc du musée est si parfaite qu'il est certain, non seulement qu'il s'agit bien du même bloc, mais que ce dernier nous parvient aujourd'hui dans son état primitif, avec pour seule modification le comblement [ filling ] d'une profonde fissure toujours visible qui menaçait sans doute sa solidité et sa bonne conservation.’

In other words, the groove was there originally and was only reduced, not reinforced, by modern conservation intervention.

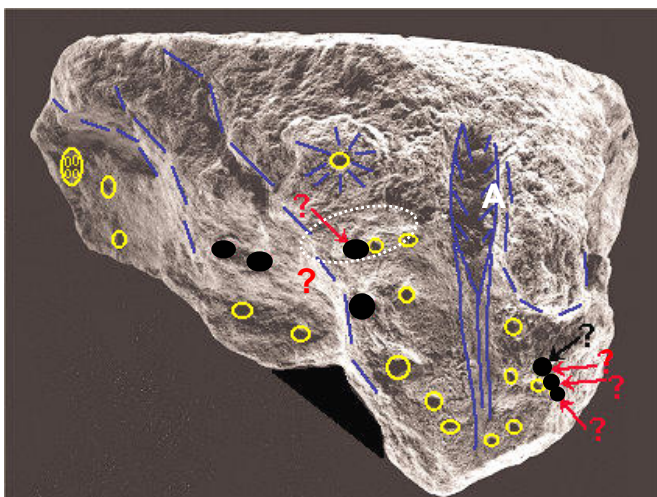
<sup>12</sup> *E.g.* Australian Aboriginals; Ancient China: Silvery River, so also Japan and Korea; Gaelic: White Stream of Heaven; India: as Ganges River of the Sky; sources include: Anonymous, 'Milky Way'; Allen 1963 / 1899; Hastings 1909-1921 / 1974-1981; Toivanen & Heikki 2006. For fuller information on Milky Way conceptualisation, see van Binsbergen 2010.

Duhem-Quine Thesis (Harding 1976, to the effect that there are always more than one explanations to account for a data set) we cannot hope to *prove* it to be correct.



(a)

Fig. 1. The La Ferrassie burial lime-stone block; photo courtesy the Les Eyzies Museum, 2000



(b)

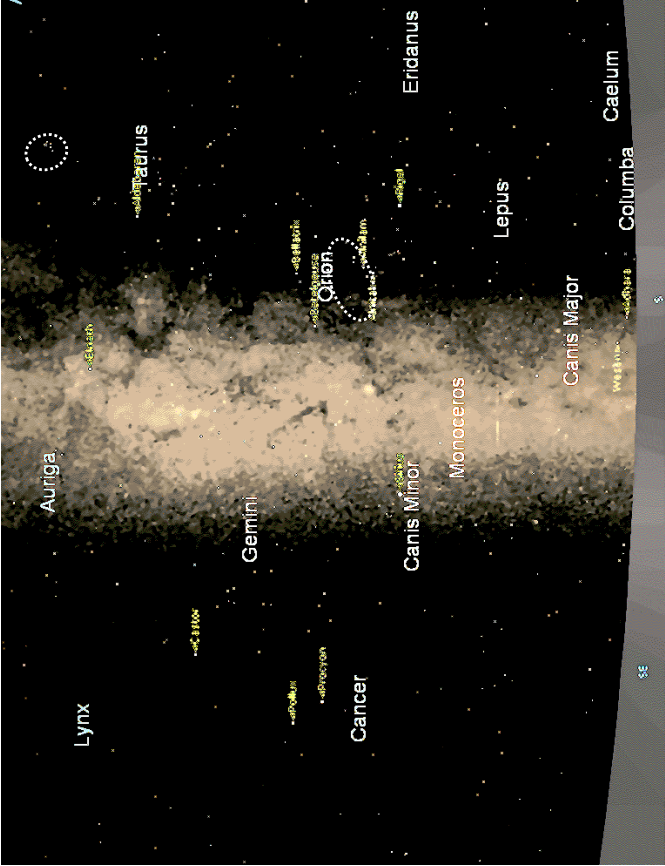
LEGEND

- ovals with bright outline: confirmed cupmarks
- black ovals: probable and doubtful (= ?) cupmarks
- oval with dotted outline: proposed location of Orion's Belt if this were indeed a celestial map of the Orion region
- dark superimposed lines: ridges and gradients (A = major groove)

Fig. 2. Significant features of the lime-stone block identified

Here a methodological point arises: *which cut-off value to adopt for stellar magnitude?* Now and in the remote past, from Earth, some 6,000 stars are visible (i.e. have magnitude 6 or lower, up to -27 for the Sun by day) to the naked eye, My approach is based on the idea that mainly the brightest ones (magnitude 2 - i.e. the relatively

modest magnitude of Polaris – and lower, *i.e.* brighter) would have been sufficient conspicuous to the Mousterian actors to be represented on their stellar map.



stars with Mag.  $\leq 6$  shown, the light central belt is the Milky Way, the larger dotted ellipse marks Orion's Belt consisting of the three aligned stars Alnitak ( $\zeta$  Orionis), Alnilam ( $\epsilon$  Orionis), and Mintaka ( $\delta$  Orionis); the smaller dotted ellipse indicates the Pleiades. *Fig. 3. The night sky above La Ferrassie, Dordogne, France, c. 71 ka BP; reconstructed with the astronomical application Starry Night 5 Pro. taking precession and proper motion into account*

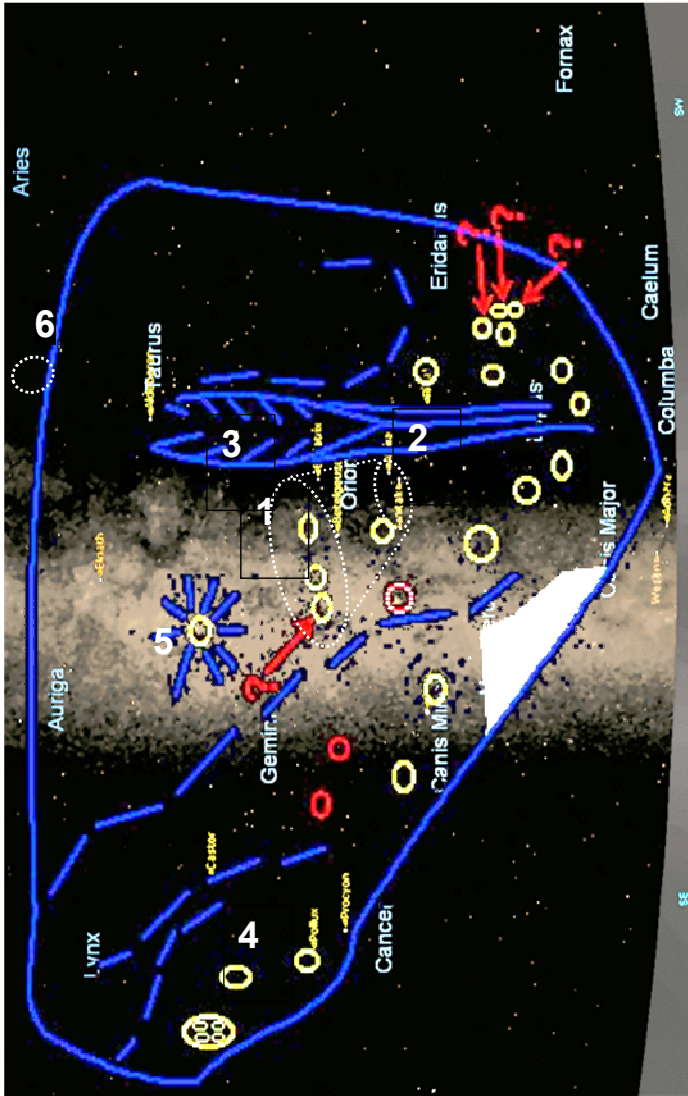


Fig. 4. One possible astronomical interpretation of the limestone block's cupmarks' pattern as a stellar map.

## Discussion

The attractive point about astronomic interpretations in archaeology is that, even if we lack meta-texts to explain prehistoric artefacts in the *emic* terms (conveying the original subjective meaning) of the original actors, yet for every place on earth and for hundreds of thousands of years we can reconstruct in all detail the pattern of the heavens, so that we have an objective touchstone to confront the prehistoric record with, albeit under two conditions which render the whole exercise conjectural:

- the astronomical hypothesis will need to be rendered plausible in the first place, even though it runs counter to stereotyping, once *en vogue*, of the sub-human capabilities of Neanderthals!
- the specific astronomical feature selected and calculated is one out of several possibly relevant ones.



Fig. 5. ‘Cupule [ and minor adjacent ones – WvB ] and meandering line engraved on quartzite boulder in Auditorium Cave, India, and found covered by undisturbed Acheulian [ Lower Palaeolithic, ca. 250 ka BP ] occupation deposit.’ (Bednarik n.d. Figure 3)

I closely examined that particular limestone block and many similar ones at the Les Eyzies Museum in 1999 and 2000, so that I was no longer dependent on mere drawings or photographs to determine the characteristics of the cupmarks; also I enlisted the collaboration of the Belgian experienced amateur astronomer Jean-Pierre Lacroix, who helped me calculate the relevant positions of major fixed stars during the Middle Palaeolithic, taking proper motion and precession into account – across stretches of tens of kA these two factors may render the prehistoric pattern of the heavens rather different from what we see today, so they need to be considered when we seek to interpret Middle Palaeolithic artefacts as depictions of such patterns.<sup>13</sup> With these pre-

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<sup>13</sup> A few years into the new millennium Michael Rappenglück read with enthusiasm my 2000 preliminary archaeological astronomical analysis of the La Ferrassie-6 limestone block cupmark pattern (van Binsbergen with Lacroix 2000)



cautions I felt sufficiently confident to argue that, indeed, a specific pattern of major stars visible in the sky above a Ferrassie c. 71 ka BP had been depicted on the limestone block – which meant it was a very early star map. Such a claim goes well beyond the intellectual capabilities that had been attributed to the Neanderthals in the first hundred years after their discovery, but is in line with the revised appreciation of Neanderthal capabilities in the more recent literature (e.g. Marshack 1988; Mithen 1996b; Shreeve 1996; d’Errico *et. al.* 1998; Hayden 1993). Still we had to wait till 2018 (Anonymous (a) and (b)) for the first publication of Neanderthal rock art – twenty years after my provisional web-published analysis of the La Ferrassie data in archaeoastronomical terms.

In the light of our fairly compelling interpretation of the La Ferrassie burial block as a stellar map, it becomes attractive to try and apply the same perspective onto other cupmarked stones, e.g. those in Fig. 6:

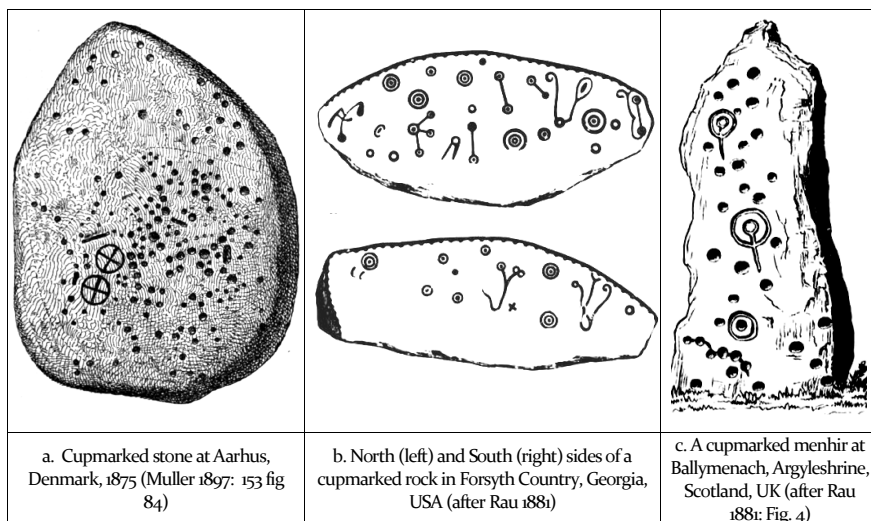


Fig. 6. Various cupmarked stones from Europe and North America perhaps interpretable as stellar maps

Perhaps on closer scrutiny, Fig. 6c may turn out to be interpretable on the same astronomical lines as our main exhibit from Mousterian La Ferrassie. Moreover, a specimen very similar to Fig. 6c was described for South Ethiopia (Jensen 1936; Zaslavsky 1990: 126; with Indian parallels) and has often been discussed in the context

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and brought to my attention the astronomical application *Starry Night Pro*, the only one then on the market (at least for non-specialist use on microcomputers) to take precession and proper motion into account, notably for periods extending up to 100 ka Before of After Present. This greatly facilitated and reinforced the analysis since the complex astronomical calculations for each star separately no longer needed to be made by hand. The results presented here therefore differ significantly from those I posted two decades ago on the Internet, and support the astronomical interpretation even better.

of the *mankala* (or *wari*) board game, in which tokens are to be redistributed along rows of cups according to intricate rules. Rau's book offers many more examples of cupmarked stones from the British Isles.

Considering the fairly precise astronomical fit, and analogies with astronomical human sacrifice at other times and places,<sup>14</sup> the decapitated infant may have been sacrificed to Sirius (well above the horizon at the time, as was Orion's Belt), or to the Milky Way – both astronomical items being ostentatiously marked on the limestone block – if it is indeed a stellar map. Just at the limestone block's edge (in my present interpretation) lie the Pleiades (no. 6 in Fig. 4), to which also human sacrifices are known to have been made in proto-historical times. Meanwhile at least two questions remains for further research.

In the first place, the Neanderthals's alleged capability of making stellar maps does not just reflect on their mental powers in general, but very specifically implies that they had a conscious conception of heaven and of stars. This is not impossible, and may foreshadow the widely attested, advanced state of astronomy in the Upper Palaeolithic (cf. Ruggles 2015), *but it is at variance with my own idea as to the relatively recent 'discovery of heaven' by Anatomically Modern Humans in the Later Upper Palaeolithic* (van Binsbergen 2006, 2012, 2018) – e.g. in \*Borean, the reconstructed language form supposed to have been spoken in Central to East Asia in the Upper Palaeolithic and to have left reflexes in all linguistic macrophyla spoken today, there are many words for sun / luminary, but only one for star and one for 'heaven, sky', – as if the human upward gaze – so essential for shamanism – was (like shamanism itself, in my opinion) primarily an achievement of the Late Upper Palaeolithic and after. In what I have called 'Pandora's Box', i.e. the reconstructed collective mythical inheritance of Anatomically Modern Humans (the basis for our many cultural universals), astronomy did not yet feature. Did Anatomically Modern Humans not inherit, then, the Neanderthal's apparently extensive perception and conceptualisation of heaven? Or did Neanderthals not really possess, after all, the astronomy imputed to them in the

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<sup>14</sup> Cf. van Binsbergen 2018 (for bibliographical details, see that book):

'ON HUMAN SACRIFICE. Generating a voluminous literature, the practice of *human sacrifice* is widespread in space and time. It played a considerable role in the Ancient West Semitic world and the Ancient Greek world (Day 1989; Zintzen 1979; Hughes 2013) and is allegedly still being practiced, not only in Africa (Toulabor 2000) but also in North Atlantic occult circles. It receives ample attention in Hastings's still authoritative *Encyclopaedia of Religion and Ethics* (1909-1921: VI, 840a-867a, including human sacrifice to earth demons (Hastings 1909-1921: VI, 852b) and water spirits (Hastings 1909-1921: XII, 710b). Astronomically more relevant, the Midsummer human sacrifice is discussed there for a number of regions (Hastings 1909-1921: VIII, 503a). The Pawnee of North America annually used to sacrifice a maiden to the Morning Star at the Winter Solstice (Hastings 1909-1921: IX, 699). Human sacrifice at astronomically significant moments in the calendar was particularly prominent in Ancient Mexico, Peru and Columbia (Hastings 1909-1921: XII, 67). Among the Tascalans of Ancient Mexico, 'red-skinned people' (?) were sacrificed in order to stop the fighting of sun and moon, thought to cause eclipses (Hastings 1909-1921: XII, 68). Especially elaborate calendrical sacrifices to the sun, moon and stars have been reported for Ancient China (Hastings 1909-1921: XII, 78 f.); no mention of human sacrifices is made in that connection; but cf. Allan 1984.'

present argument, so that they had nothing astronomical to share and pass on the Anatomically Modern Humans that supplanted them?

In the second place, *what status must we attribute to the astronomical interpretation, as pursued in the present argument, amidst the many alternative interpretation of cupmarks as listed in my introductory paragraphs?* Were all these alternative perspectives merely late accretions upon an essential astronomical core? Or did the astronomical perspective develop out of any of these alternatives? How could we attempt to read the evidence of the La Ferrassie cupmark pattern if we were to trade the astronomical perspective for one stressing grinding, or fire making, or mapping, or divination, or proto-writing, or the human-body-with-orifices metaphor, etc.? Clearly this line of enquiry would require a book-length argument in its own right, but only if we were to make it, could we hope to put in relief the competitive superiority (if any) of the astronomical; interpretation, for the La Ferrassie data.

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