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ORIENTATIONS OF NEOLITHIC MONUMENTS OF BRITTANY: (1) CONTEXT

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INTRODUCTION

In southwestern Europe — southern France, Spain and Portugal — the Neolithic monuments with well-defined orientations are mainly free-standing communal tombs (loosely known as ‘dolmens’). Other monuments, such as menhirs, cromlechs, and cave burials, may also have orientations, but if so they are ill-defined; and alignments of menhirs are unusual.

The structure of dolmens often followed a pattern of development over time in which a subcircular chamber with narrow passage became trapezoidal with an increasingly wide passage, culminating in a rectangular chamber with passage equal in width and height to the chamber itself (the *galerias catalanas* and the *allées couvertes* or ‘covered ways’). In orientation, as has been argued in these pages, the overwhelming majority of all dolmens of southwestern Europe faced within the range of sunrise (SR), or the sun when risen and climbing in the sky (SC). Exceptions are found mainly near the Mediterranean coast of France: all the dolmens east of the lower Rhône, and some lying between the Rhône and the eastern tip of Cataluña. These faced sunset (SS) or the sun when descending towards its setting (SD).

The evidence for this unexpectedly simple overview was briefly summarized in the last of the author’s nine Iberian Studies,¹ and has been set out at length in book form;² and subsequent work in the centre-west of France has extended northwards the area in which we find this pattern of SR/SC orientation.³ However, when we proceed still further north — when we cross the estuary of the Loire and encounter the megalithic riches of the Brittany peninsula in the far northwest France — the picture becomes altogether more complex and the tomb structures much more varied. In the present paper we provide a reconnaissance of the monuments of the region;⁴ two further papers will list the orientations of the earlier Breton dolmens and of the (later) *allées couvertes*, respectively.

BRITTANY

Brittany (see Figure 1) today comprises the *départements* of Côtes d’Amor, Finistère, Ille-et-Vilaine and Morbihan, but for our purposes it is convenient to deem the region to include Loire-Atlantique (which contains the estuary of the Loire), as indeed was once the case, together with the north of Mayenne and the handful of tombs of Normandy. The peninsula has sea to the north, west and south. To the southeast, across the Loire, are the tombs discussed in a previous article.⁵ To the east, traces of Neolithic occupation are hard to come by; some tombs are reported near Rouen, but we found no measurable remains, and only when close to Paris itself did we

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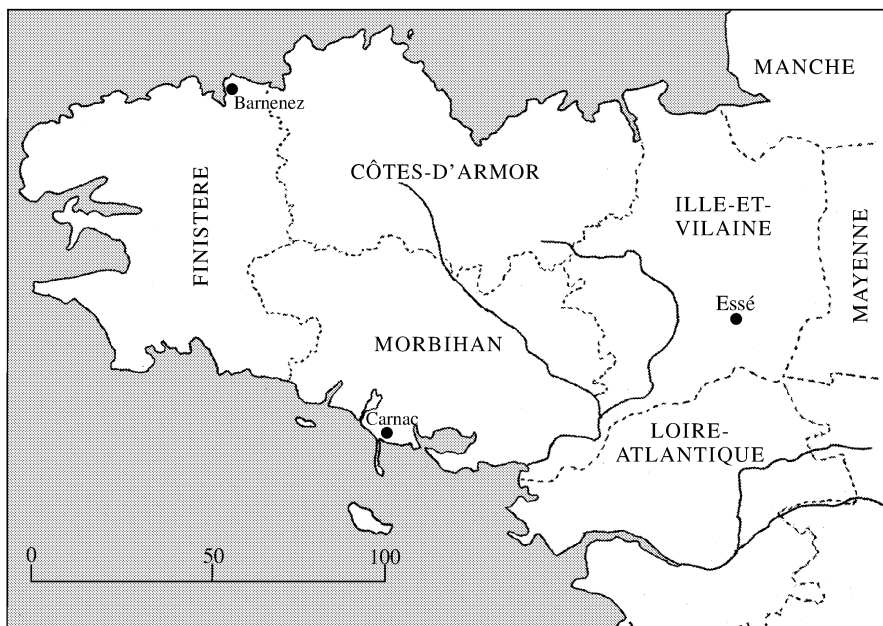


FIG. 1. Map showing the *départements* of northwest France.

encounter sizeable monuments once more.⁶ Except for maritime contacts, therefore, the Neolithic population of Brittany was relatively isolated, and so the region provides a natural terminus to our decade-long studies of dolmen orientations in the southwest and west of continental Europe.

The shores of the Carnac and Locmariaquer region of Morbihan on the south coast of Brittany are sheltered by the Quiberon peninsula and Belle-Île, and were still more sheltered in Neolithic times when the sea level was some 8 metres lower than it is today (see Figure 2). The waters there offered an easy means of transport. As the population grew, people moved inland, and spread throughout the peninsula. Accordingly, the earlier dolmens are found predominantly (but not exclusively) within reach of the south coast, while the later *allées couvertes* are scattered across the whole peninsula. Along the north coast, however, there were also early settlements, some of whose inhabitants built themselves great cairns with multiple tombs within.

ICONOCLASM AT CARNAC

An astonishing aspect of the early phase of megalithic building in the Carnac area has come to light in recent years. In Locmariaquer the tomb known as Mané-Rutual has a lengthy passage covered as usual with a number of roof slabs, but one of these extends so far beyond the sidewall that it has fractured under its own weight. The

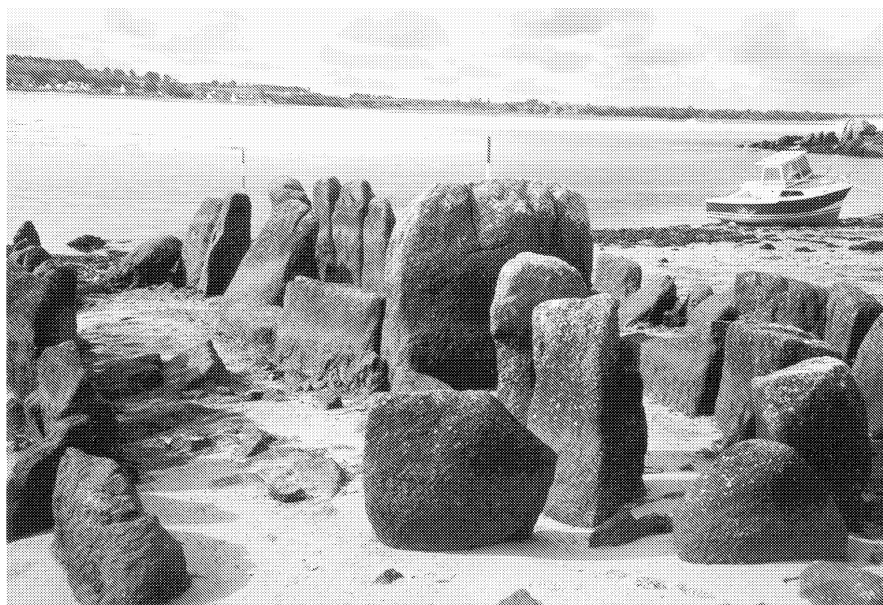


FIG. 2. Evidence of the rise in sea-level since Neolithic times: the *allée couverte* on the beach of Kernic at Plouescat on the far northwest coast of the peninsula, now visible only at low tide. It has been robbed of its capstones to make a little pier. The largest orthostat is the backstone, and the sidestones of the chamber are beyond. Immediately this side of the backstone is the terminal cell found in many such monuments and used for ritual. Many of the kerbstones of the tumulus are still *in situ*.

reason for the use of such an unsuitable stone becomes clear from an investigation of the huge capstone (Figure 3) of the chamber. This is no less than 11 metres in length and dwarfs the modest space it is covering, projecting far to the rear. The capstone has engravings on what is now its inner surface, and this betrays the fact that it was originally a huge vertical stele that has been felled and — notwithstanding its inappropriate dimensions — reused. The fractured passage slab must likewise be a re-used stele.

A few hundred metres away, near the broken remains of the greatest of all west European menhirs (appropriately known as Le Grand Menhir Brisé), is the passage grave of Table des Marchands. It has a finely-engraved backstone whose pointed shape makes it less than ideal for its present purpose of supporting the capstone. Excavation has shown that this backstone was originally a free-standing stele, and that it was later adapted *in situ* to become the primary orthostat of a dolmen.

That this was all part of a program of purposeful iconoclasm that took place around 4200 B.C. became clear recently when Charles-Tanguy Le Roux made a careful study of the roof slab of Table des Marchands (Figure 4). This has engravings on its inner surface, and among them — at the very edge of the slab — is the lower part of a quadruped. Le Roux found the matching upper part of the animal on the *outer* surface



FIG. 3. The huge capstone of Mané-Rutual in Locmariaquer. The part in the foreground covers the chamber but the rest extends far beyond.



FIG. 4. The interior of the capstone of Table des Marchands in Locmariaquer. At the edge of the stone (bottom left) are the feet and lower body of a quadruped. The matching upper half was found on the outer surface of the capstone of Gavrinis some 4km away, where it was invisible from the time of construction until recently, when excavators removed the tumulus above.

of the 17-tonne roof slab of the tomb-like structure of Gavrinis, an island some 4km away as the crow flies. This part of the engraved quadruped had remained invisible for nearly six thousand years, from the time of construction until Le Roux and colleagues removed the stones and soil of the tumulus above and exposed the outer surface of the slab once more. These roof slabs of Gavrinis and Table des Marchands were once part of a giant vertical stele, and it is probable that a third fragment of the 14ft stele now roofs Er Vinglé (otherwise Er Grah), close to Table des Marchands: the stele had been felled, broken, and its parts reused.⁷

Nor was this all. In a speculation so attractive that one might wish it had been well-founded, Thom⁸ saw Le Grand Menhir as a universal foresight standing 20 metres high, and he postulated various backsights at distances of several kilometres, from which the rising or setting of the sun and moon would have been observed at key moments of their cycles. He also speculated on the event — perhaps an earthquake — that had caused the great stone to fall and fracture.⁹ It has recently been argued that the menhir was felled intentionally, for the once-united surfaces of the bottom two fragments seem artificially flat; and that it too was a victim of the iconoclastic fury of the Neolithic destroyers,¹⁰ though its fragments (Figure 5) were presumably too bulky to be reused and so were left where they fell. However, Francis Bougis, a retired engineer, has subjected the menhir to an exhaustive technical analysis.¹¹ He concludes that earth tremors caused the menhir to tilt, and that while tilted it split



FIG. 5. The four fragments of Le Grand Menhir Brisé as they are today.



FIG. 6. Fragments of Le Grand Menhir Brisé and (centre) the pits showing the locations of the menhirs of the alignment of which Le Grand Menhir was the culmination. In the left foreground is the pointed base of Le Grand Menhir. The flat upper surface of this fragment points away from the camera (this as a result of human action subsequent to the fall of the menhir); the matching surface of the next fragment is seen on the right. In the distance is Table des Marchands. Courtesy of Margarita Sanz de Lara.

along the planar division between what are now the two bottom fragments. The upper section toppled over and the top of the menhir hit the ground, at which the section shattered into three parts. The present position of the base results from the subsequent action of people (possibly Roman) who swivelled it around, presumably to gain access to the pit in which the menhir had stood.

In fact, and unknown in Thom's day, Le Grand Menhir was the largest (and the end-stone) of a closely-packed alignment 55 metres long and consisting of no fewer than nineteen menhirs;¹² nothing of the others remains in place except for the pits in which they were set (see Figure 6).

THE BRETON MONUMENTS

Radiocarbon construction dates for Neolithic monuments in Brittany are very rare, and other clues to their chronology are limited as most of the tombs were emptied of their contents long ago. Nevertheless it is clear that the tombs with subcircular chambers and narrow passages were constructed in the fifth and early to mid-fourth millennia B.C., and the *allées couvertes* in the late fourth and early third. However, tombs with a range of variant forms are also to be found, forms whose interrelationships are

obscure; slender evidence and enthusiastic use of intuition underlie the schemes that have been proposed to link them.¹³ And in addition to isolated tombs (and tomb-like structures — almost every available orthostat at Gavrinis is covered with engravings and this must surely have been a temple¹⁴), there are cairns and tumuli great and small, while near Carnac thousands of menhirs march in rows across the countryside.

The monuments have the following principal forms:

MONUMENTS OF THE EARLY PHASE

(i) *The Passage Graves*

As in southwest Europe, the earliest dolmens (late fifth millennium B.C.) had a subcircular chamber and a short passage, and with the passing of the centuries the chamber became trapezoidal and the passage widened. However, variant forms developed in Brittany around the second quarter of the fourth millennium that are not found elsewhere. In one of these, transcepts are to be found, rectangular side-chambers to left and right of the passage, so that the tomb may have the shape of a Cross of Lorraine (Figure 7). Alternatively, single large chambers to left and right are sometimes subdivided; or the tomb may have the form of a capital letter T.

In all these variants the orientation of the tomb is not in doubt. However, in other



FIG. 7. The dolmen of Crugellic, near Ploemeur, 9km west of Lorient. From the entrance (bottom left) the passage leads to a first pair of cells, one to either side (that to the left is clearly visible but its partner to the right is partially hidden by the mound), and then to a second pair (both visible), and finally to an end cell. The plan of the tomb is that of a Cross of Lorraine.

cases the passage may be angled in relation to the axis of the chamber (Figures 8 and 9), sometimes turning through a full right-angle (Figure 10); if so, it is not evident which azimuth should be taken as the orientation of the tomb. Matters are still less clear when the passage appears to sweep gradually around in an arc. Because of the problems posed by angled tombs, we list and discuss them in an Appendix.

(ii) *Angevin Dolmens*

Some of the most massive Neolithic tombs of western Europe are to be found immediately south of the Loire river, between the cities of Angers and Saumur, and are therefore termed 'Angevin' or 'Loire dolmens' (or, since they have a porch, 'dolmens à portique'). Angevin dolmens form an identifiable group that has a handful of outliers in Brittany (Figure 11). Their chronology and their role in the overall scheme of dolmens are far from clear. An Angevin tomb has a rectangular chamber that is often vast in extent — much too vast, one would think, to serve purely as a mortuary — and is sometimes elongated but sometimes almost square; it is frequently subdivided internally (Figure 12).

(iii) *The Cairns of the North Coast*

A number of huge stone cairns are found along the north coast, each made of stone and containing within a number of dolmens accessed along passages that are roughly



FIG. 8. The tomb of Luffang, Crach, 5km NE of Carnac. The lengthy chamber (centre-right) is oriented 106° , but the passage (foreground) faces 157° .



FIG. 9. The roof slabs of Pierres-Plates, on the coast at Locmariaquer. In the foreground is the passage, while the chamber is upper-right. At the angle between them is a side-chamber (centre-left). The passage is unusual in facing west of south.

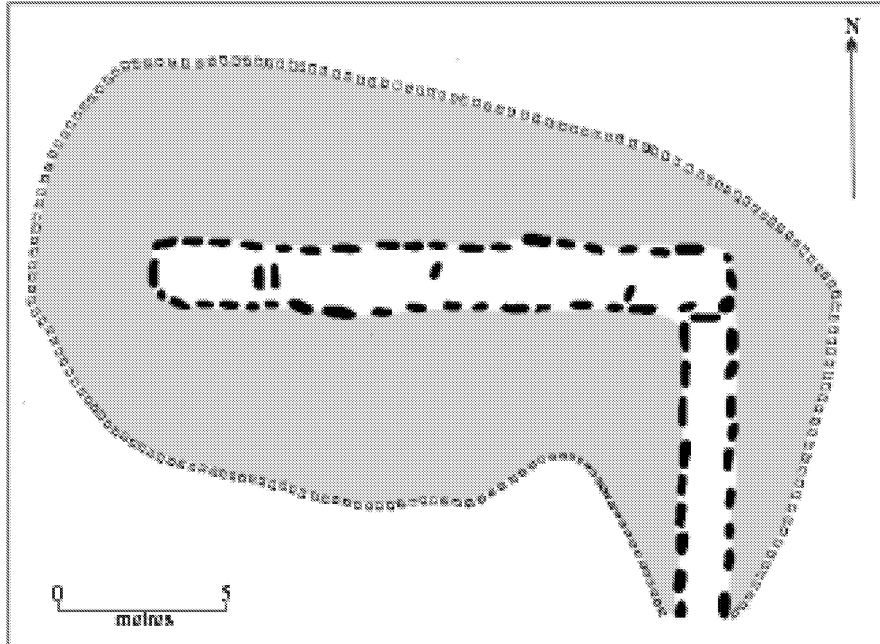


FIG. 10. Plan of the angled tomb of Goërem at Gavres, 6km SSE of Lorient. The tomb is covered by a cairn and is not now accessible to visitors.

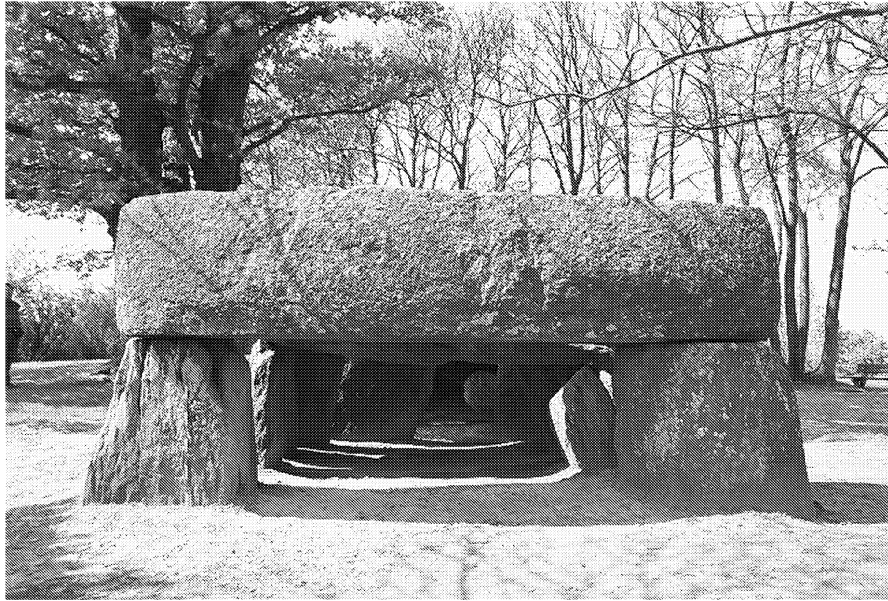


FIG. 11. The monumental Angevin dolmen of Essé, 28km SE of Rennes. The lintel covering the porch weighs some 25 tonnes, but the westernmost of the nine capstones is nearly twice as heavy. Courtesy of Margarita Sanz de Lara.

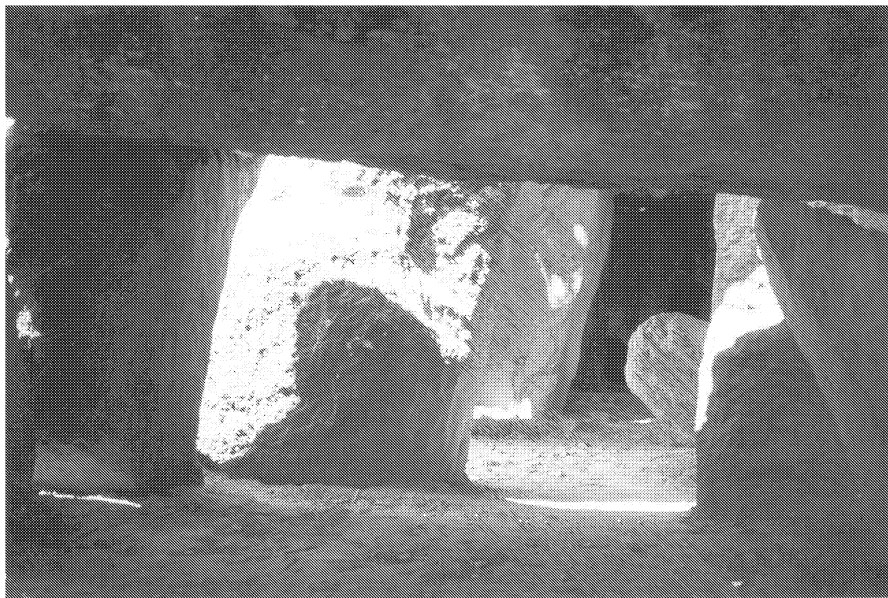


FIG. 12. The view as one enters the Essé dolmen. The entrance stones themselves are in the foreground, and in the centre is the first of the three septal slabs that subdivide the chamber.

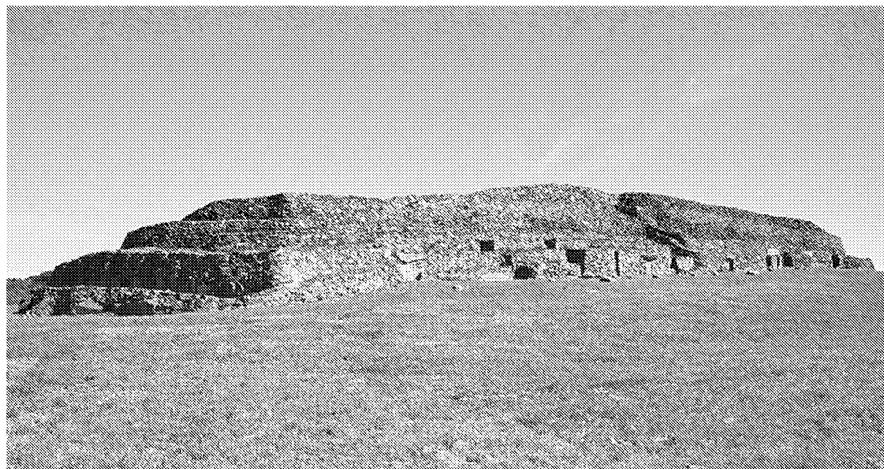


FIG. 13. The great cairn of Barnenez, 10km NNW of Morlaix. Courtesy of Margarita Sanz de Lara.

parallel. The greatest of these is Barnenez (Figure 13), north of Morlaix and overlooking the estuary of the river. Built in stages, it has a total of eleven passage graves, all facing SE or SSE (and south of the ranges of sunrise and moonrise), downhill and to the river.¹⁵ Curiously, there is no consistency in the construction of the chambers: some are megalithic while others are false-cupola (see Figure 14). A hundred metres or so to the north was a further cairn, but this fell victim to a road contractor.

Another but smaller cairn is on Île Carn near Ploudalmézeau, an islet accessible only at low tide. It was built to cover three passage graves that faced sunrise in the late autumn and early spring.¹⁶ One of these was the very first French tomb to yield a radiocarbon date, and its antiquity caused astonishment; subsequent calibration puts its construction around 4300 B.C.

(iv) *The Carnac Mounds*

Peculiar to the Carnac region are a number of huge tumuli made of earth and stone.¹⁷ Unlike the cairns of the north, whose overall extent is dictated by the graves within, the Carnac mounds are gigantic statements wholly disproportionate to the tomb or tombs they cover. A generation ago these tumuli were thought to be from the late Neolithic, but they are now considered to date to the late fifth millennium B.C., and are therefore as early as, if not earlier than, the first passage graves.¹⁸ The best known is St-Michel in the town of Carnac itself; it has the appearance of a natural hill, and has a chapel on top. Unfortunately the tombs of St-Michel are closed to visitors. By contrast the passage grave of the more modest tumulus near the hamlet of Le Moustoir 3km NNE of Carnac is freely accessible (although this grave is in fact a later addition to the original construction).



FIG. 14. The back of the cairn of Barnenez, where a bulldozer removed much of the drystone before being stopped. As a result, the backs of the chambers of several tombs are visible. Note that the chamber right of centre is megalithic, while that left of centre is false-cupola.

(v) *Lesser Cairns*

It was common for two, three or more of the early dolmens to be enclosed within a cairn of modest dimensions (Figure 15). In such cases the dolmens normally have similar orientations. An example of this is Cairn 1 at Colpo, some 20km north of Vannes; interestingly, one of its two dolmens has megalithic roof-slabs, whereas it is likely that the other had false-cupola roofing.

(vi) *The Alignments of Menhirs*

The alignments of menhirs at Carnac and elsewhere were the subject of the first ever *JHA* articles on archaeoastronomy, published over thirty years ago.¹⁹ The principal alignments (Figure 16) which may have been begun as early as 4000 B.C.,²⁰ extend over some four kilometres, with up to a dozen roughly parallel rows of stones. Each section seems to begin and end with an oval cromlech, and it may well be that the cromlechs were sacred areas reached along sacred pathways. The size of the stones varies greatly, some of them being impressive while others would have presented little problem to even a small family. Their numbers are astonishing: to this day some four thousand menhirs are in alignments.

On these alignments we have nothing to add to the surveys of Alexander Thom. Time has not dealt kindly with his explanatory theories, despite the great debt owed



FIG. 15. The twin passage graves of Les Mousseaux within the town of Pornic, on the coast of Loire-Atlantique. Courtesy of Margarita Sanz de Lara.

to him by archaeoastronomers for having raised important questions in challenging and provocative form. The alignments are roughly east–west, but they vary direction in a manner that seems casual.

(vii) *The Individual Menhirs*

Many hundreds of menhirs in the Carnac area are located outside alignments, and few of these could be said to have a measurable orientation. Some are truly massive (Figure 17), and Le Grand Menhir Brisé, of which the four fragments remain, is estimated to have weighed some 280 tonnes. Impressive menhirs are also to be found in many other parts of Brittany (Figure 18).

(vii) *The Crucuno Quadrilateral*

One monument, a large rectangle of stones near the hamlet of Crucuno some 6km NW of Carnac, deserves special mention, for the sides of the rectangle are aligned east/west and north/south. According to Burl,²¹ the monument was restored in 1882 when only nine of its stones were standing, but a plan made in 1867 confirms that the restoration was accurately done. Thom made a careful survey of the site and found the sides to measure 24.9m × 33.2m, so that adjacent sides and a diagonal respectively measured 30, 40 and 50 times the unit of length (the ‘megalithic yard’ of 0.829m) that Thom believed was standard in Neolithic Brittany and the British Isles.



FIG. 16. Two views of the rows of menhirs at Carnac.



FIG. 17. A fallen menhir, one of Les Géants near Kerzhero, 8km NW of Carnac.

The restoration, coupled with the bulkiness of the stones and therefore the absence of precisely-defined corners for the rectangle, leaves a greater margin of uncertainty than Thom would allow. But a quite different claim has been made, that the diagonals were aligned on sunrise and sunset at the solstices. Calculation shows that, if the sides are aligned in the cardinal directions and have the lengths determined by Thom, and on the assumption of a level horizon, then one of the diagonals is aligned on celestial bodies rising with declination $-24^{\circ}19'$ and setting with declination $+23^{\circ}23'$, the small difference in the numbers being the effect of atmospheric refraction. Similarly, the other diagonal is aligned on celestial bodies setting with declination $-24^{\circ}19'$ and rising with declination $+23^{\circ}23'$. $-24^{\circ}19'$ is almost exactly the declination of the sun at the winter solstice when the rectangle was erected, and $+23^{\circ}23'$ is less than a degree from the declination of the sun at the summer solstice. If these are coincidences, they are remarkable.

MONUMENTS OF THE LATER PHASE

As in southwestern Europe, the passage of a Breton tomb built in the centuries either side of 3000 B.C. approached or equalled the chamber itself in both width and height. In the earlier of these tombs, the 'dolmens en V', the sidewalls converge slightly towards the entrance; but these soon developed into the true *allée couverte* (hereafter 'AC'), in which the sides are parallel and of uniform height throughout. In some

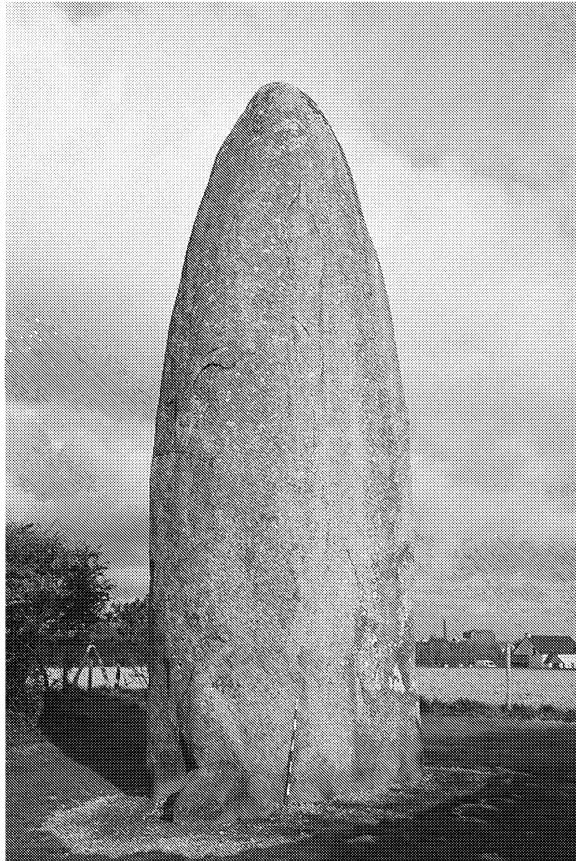


FIG. 18. The menhir of Champ-Dolent, near the north coast 2km SE of Dol-de-Bretagne. Its height is a little under 10 metres. Courtesy of Margarita Sanz de Lara.

‘dolmens en V’ and ACs there is, outside the chamber and on the other side of the backstone, a cell that is often formed simply by the backstone and a vertical slab to either side, with neither cover nor endstone. At Tressé (Figure 19) there are breasts carved on one such sidestone and on the verso of the backstone, and so it is clear that these cells served a ritual purpose. The tumulus that covered such an AC could therefore be entered from either of two diametrically opposed directions: through the entrance to the tomb itself, to be used for the introduction of additional bodies, or through the open cell, for ritual.

ACs are isolated structures, lengthy and with well-defined axes, and their orientations can usually be measured with confidence. However, a problem of interpretation



FIG. 19. The terminal cell of the *allée couverte* of Tressé, 20km SSE of St Malo. The backstone is in the centre, and the lengthy chamber can be glimpsed beyond. The orthostats to left and right in the foreground define the terminal cell, which was normally (as here) open and without capstone. On the orthostat to the right can be seen four 'breasts', and four more (but vandalized) can be seen on the backstone. The tumulus would have permitted access either to the cell or (at its other extreme) to the entrance of the chamber. Courtesy of Margarita Sanz de Lara.

arises with certain tombs that have a structure very similar to that of a typical AC, their axis aligned (say) west-to-east, except that the eastern end is closed; the entrance is instead just around the corner, in the southern side (Figure 20). Whether these 'dolmens à entrée latérale' are variant ACs, or a development from the T-shaped dolmens, is moot, and the decision is significant for the archaeoastronomer: the axis (and the orientation) of an AC is along the length of the chamber, whereas the axis (and the orientation) of a T-shaped dolmen is down the spine of the T. Even if we prefer the former interpretation, it might be argued that the orientation should be taken to be in the direction of the side-entrance, unusual though its location may be; for it is rare in European archaeoastronomy that the investigator adopts an orientation that is not through the entrance.

This is one of the questions we shall explore in the two further papers in this series.



FIG. 20. Rocher de Tréal at St Just, 15km north of Redon. This restored tomb has the structure of an *allée couverte* except that the entrance is not at the (east) end as normal, but around the corner to the south. Courtesy of Margarita Sanz de Lara.

APPENDIX: ANGLED TOMBS

The following are the principal angled tombs, all of them within reach of Carnac:

Goërem, Gavres: Giot #483, Burl #133 (with plan and detailed description), see Figure 10; 6km SSE of Lorient. The tomb still lies beneath its cairn and is closed to visitors, but the 9m-long passage is oriented 184° , and (according to Burl) has drystone walling alternating with orthostats. At the end of the passage, a huge slab barred access to the chamber, which lies at right-angles to the passage and so faces about 94° . The chamber was divided by three side-slabs into four compartments measuring 3.4, 6.8, 5.5 and 3.6 metres respectively, the westernmost having been sealed soon after the tomb was completed in around 3200 B.C. There are numerous carvings on the walls of both chamber and passage.

Kergonfalz, Bignon: Giot #576, 24km N of Vannes. The tomb still lies beneath its cairn and is closed to visitors. Burl does not include this monument, but a plan and description are given by Gouezin.²² From this it appears that the rectangular chamber is oriented about 140° , and that the passage — uniquely — is angled left, to face about 70° . There are engravings near the entrance.

Le Rocher, Bono: Giot #641, Burl #211a (with description), 7½km N of Locmariaquer. The subcircular chamber has a passage that for its first 8 metres has the very unusual azimuth of 27°, and it then turns through a right angle for a further 11½ metres, facing 117°. Orthostats and drystone alternate, and once again there are numerous carvings on the slab.

Luffang, Crach: Giot #613, Burl #192 (with detailed description), see Figure 8; 5km NE of Carnac. A long chamber is oriented 106°, and the passage is angled to face 157°. There are, or were, various carvings, including a stone at the angle (a cast of this is in the Carnac Museum); this was engraved with an anthropomorphic figure with breasts.

Mané-Bihan, Locoal-Mendon: Giot #487bis, Burl #150e, 13km N of Carnac. The 7-metre chamber faces 85°, but the 10-metre passage leading from it, though not strictly angled, veers gradually to the right, and eventually faces 167°.

Pierres-Plates, Locmariaquer: Giot #633, Burl #208 (with plan and detailed description), see Figure 9; near the shore 1½km SSW of the town. A chamber 15m long faces 142°, and an angle leads to a 6m passage facing 193°. At the angle there is a side-chamber facing westerly. There are fine engravings on many of the sidewalls.

We see that of the six angled tombs, five were angled to the right, and only one to the left. The deviation varied between 51° and 90°. With one exception (27°) the chambers faced between 85° and 142°, a very usual (SR/SC) range in western Europe, while the passages faced between 70° and 193°, arguably still within the SR/SC range if a few degrees west of culmination is deemed admissible.

The motivation underlying the construction of angled tombs is therefore not resolved by the study of the orientations.

Acknowledgements

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1. Michael Hoskin, "Studies in Iberian archaeoastronomy, (9): An overview", *Archaeoastronomy*, no. 27 (2002), S75–82.
2. Michael Hoskin, *Tombs, temples and their orientations: A new perspective on Mediterranean prehistory* (Bognor Regis, 2001).
3. Michael Hoskin and Gail Higginbottom, "Orientations of dolmens of west-central France", *Archaeoastronomy*, no. 27 (2002), S51–61.
4. For the visitor the basic purchase is *La Bretagne des mégalithes* by Pierre-Roland Giot (Rennes,

1997), a masterpiece in the use of colour-coding and other devices to condense a vast amount of information into a limited space. Giot does not attempt completeness in Carnac and the surrounding area, and here *Le guide des mégalithes du Morbihan* by Gabriel Le Cam (Spézet, 1999) is invaluable. For the interior of this same region, Philippe Gouezin, *Les mégalithes du Morbihan intérieur* (Rennes, n.d.) has a detailed study of the monuments. Aubrey Burl's *Megalithic Brittany* (London, 1985), though dealing with only a fraction of the monuments covered by Giot, remains the only guide that tells the reader how to reach each site. The 1:25000 maps of the Institut Géographique National are invaluable as they show the location of many monuments.

5. Hoskin and Higginbottom, *op. cit.* (ref. 3).
6. See for example Philippe Soulier (ed.), *La France des dolmens et des sépultures collectives* (Paris, 1998), 115–28.
7. A convenient summary of these exciting discoveries is in Charles-Tanguy Le Roux's contribution on Brittany in Soulier's *La France des dolmens*, 57–66. See also *Les mégalithes du Morbihan* by Florence André (Châteaulin, 1995), 82.
8. A. Thom and A. S. Thom, "The astronomical significance of the large Carnac menhirs", *Journal for the history of astronomy*, ii (1971), 147–60, Fig. 2.
9. For example, in A. Thom, A. C. Thom and J. M. Gorrie, "The two megalithic observatories at Carnac", *Journal for the history of astronomy*, vii (1976), 11–26, p. 21.
10. "Archaeological discoveries in recent years have, however, led one to suspect the Neolithic people themselves", Charles-Tanguy Le Roux, *Carnac, Locmariaquer and Gavrinis* (Rennes, 2001), 18.
11. Francis Bougis, *À propos du Grand Menhir Brisé de Locmariaquer*, privately published in typescript, n.d. I am very grateful to Chris Scarre for lending me a copy of this inaccessible work. Dr Scarre wonders if it was the natural collapse of the Grand Menhir that triggered the wave of iconoclasm.
12. See Le Roux, *op. cit.* (ref. 10), 18.
13. For example, by P.-R. Giot, *Préhistoire en Bretagne* (Châteaulin, 1998), 25.
14. Charles-Tanguy Le Roux, *Gavrinis* (Rennes, 1995). Some 29 orthostats were used in the construction of the passage and chamber, and of these 23 are engraved, most of them over every available space, so that Gavrinis is one of the treasures of prehistoric art. This strongly suggests that the building had a special purpose, perhaps as a mausoleum for a person of outstanding importance.
15. Most of the passages have been bricked up, presumably for safety reasons. The orientations of graves B, C and D are all close to 133°.
16. Approximately 101°, 111° and 110°.
17. According to Burl (*Megalithic Brittany* (ref. 4), 19): Er-Grah, Kerlud, Le Moustoir, Saint-Michel, Mané-Lud, Mané-er-Hroëck, and Tumiac.
18. Giot, *op. cit.* (ref. 4), 8.
19. A. Thom and A. S. Thom, *op. cit.* (ref. 8).
20. Le Roux, *Carnac, Locmariaquer and Gavrinis* (ref. 10), 30, gives a chronology which we follow here.
21. Burl, *Megalithic Brittany* (ref. 4), 133.
22. Gouezin, *op. cit.* (ref. 4), 41–42.