Building up the land: a new appraisal to the megalithic phenomenon in the Barbanza peninsula (Galicia, NW Spain)

Construindo o território: uma nova abordagem do fenómeno megalítico na Península do Barbanza (Galiza, NO de Espanha)

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ABSTRACT

Funerary mounds, whether megalithic or not, feature prominently among the Galician archaeology and their sheer number and monumentality have attracted the attention of scholars ever since the end of the 19th century. The Barbanza peninsula (western coast of Galicia) stands out for its numerous barrows, with a noticeable cluster of those on the high plateau, where spatial analyses were undertaken by researchers in the early 80'.

In the last decade, there has been a renewed effort at surveying the Barbanza peninsula leading to the discovery of scores of new mounds, thus significantly modifying the distribution of these monuments and breaking somewhat the paramount role of the high sierra. Moreover, by employing new methodologies, such as Geographical Information Systems and spatial statistics, we can observe that mounds are indeed associated with transit routes and, at a local scale, with conspicuous areas more often than, for instance, rock art sites.

Therefore, an image surges forward where megalithic architecture does not act exclusively as a static milestone but, rather, as a dynamic agent linked to a cognitive geography developed by communities in the Late Prehistory that undertake the exploitation of different landscapes and resources, from the very coast to the uplands. In the framework of this process, however, a marked variability can be observed regarding the conspicuity that these monuments might have had in the prehistoric landscape. This may suggest a multiplicity of roles or audiences, ranging from those intended to be real landmarks to others apparently designed to go unnoticed.

KEY WORDS: Prehistoric mounds, prehistoric mobility, perceptibility, GIS, spatial statistics

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RESUMO
Os túmulos funerários, sejam megalíticos ou não, destacam-se dentro da arqueologia galega e o seu número e monumentalidade têm atraído a atenção dos estudiosos desde o final do século XIX. A península de Barbanza (costa ocidental da Galiza) destaca-se pelos seus numerosos túmulos, com um notável agrupamento daqueles no planalto, onde as análises espaciais foram realizadas por investigadores no início dos anos 80.
Na última década, houve um esforço renovado de examiner península de Barbanza, levando à descoberta de dezenas de novos túmulos, modificando significativamente a distribuição desses monumentos e quebrando um pouco o papel primordial da alta serra em relação a esse fenómeno funerário. Além disso, ao empregar novos métodos, como Sistemas de Informação Geográfica e estatísticas espaciais, podemos observar que os túmulos estão de facto associados a rotas de trânsito e, em escala local, com áreas conspícuas mais frequentemente do que, por exemplo, sítios de arte rupestre.
Portanto, surge uma imagem onde a arquitectura megalítica não atua como um marco estático, mas sim como um agente dinâmico ligado a uma geografia cognitiva, desenvolvida por comunidades na pré-história tardia que empreendem a exploração de diferentes paisagens e recursos, desde a costa às terras altas. No âmbito deste processo, no entanto, uma variabilidade acentuada pode ser observada em relação à conspicuidade que esses monumentos poderiam ter na paisagem préhistórica. Isso pode sugerir uma multiplicidade de papéis ou audiências, variando daqueles destinados a ser marcos reais para outros aparentemente destinados a passar despercebido.
PALAVRAS-CHAVE: Túmulos pré-históricos, mobilidade pré-histórica, perceptibilidade, GIS, estatísticas espaciais

1. FOREWORD

The relationship between megaliths and movement has been tirelessly explored in the last three decades in almost every area of the Iberian Peninsula where these monuments are present. Galicia has not been an exception, the impact that "Landscape Archaeology" had in the area during the 90s, leading to the publication of numerous studies exploring the correlation between the mound location and paths across the landscape (Criado & Vaquero, 1993; Criado & Fábregas, 1994). Thus, Galician mounds have been systematically linked to what has been called the "geography of movement" (Infante & alii, 1992), with their location analysed in terms of proximity to paths and key points for the transit across the prehistoric landscapes. In such a theoretical framework, monuments were

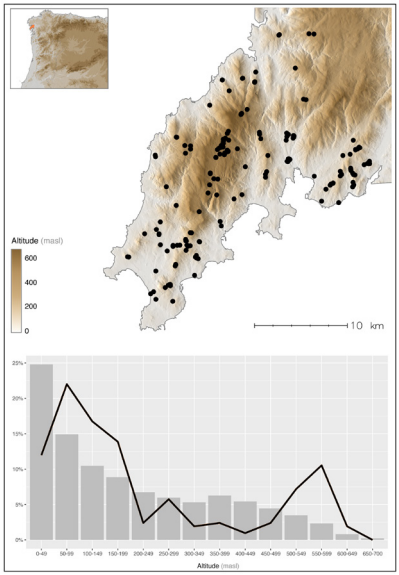

Figure 1. Top: Location of mounds within the Barbanza Peninsula. Bottom: Altitudinal distribution of mounds (line) compared to that of the terrain in the study area (bars).

understood as agents humanising and structuring the space, shaping it according to the perceptions and beliefs of the groups responsible for the construction of the monuments (Criado & Villoch, 2000).

The Barbanza peninsula (Figure 1) has been the paradigmatic scenario of several of the most influential approaches of this kind (Criado & Villoch, 1998; 2000; Villoch, 1995) and the research in the area continues to the present, with work carried out after the generalization of the GIS (Llobera, 2015; Rodríguez-Rellán & Fábregas, I.P.). Still, several of these attempts share limitations from a methodological and archaeological point of view. A thorough review of the inventory of monuments -leading to the discovery of 29 new mounds- combined with the use of GIS and statistics, can help us to take a step forward towards the understanding of the role that megaliths played within the landscape and the mobility patterns of the prehistoric human groups in the Barbanza peninsula.

2. MOUNDS IN THE BARBANZA PENINSULA

The most up-to-date inventory for the Barbanza Peninsula comprises a total of 209 mounds, including 29 new monuments and discarding 6 sites mistakenly catalogued as such but being –in fact– accumulations of earth of natural origin or recent chronology. This inventory shows that while the highlands of the Barbanza peninsula follow the general distribution patterns of the funerary

tumuli in north-west Iberia, which tends to show a noticeable concentration of these along medium-height plateaus and the flattened top of mountain ranges (Figure 1), barely 46 (22 %) of the reported 209 mounds are located above 400 meters high, while 138 (66 %) are found on the coastal platform (0-200 m.a.s.l.) (Bustelo & alii, I.P.).

If we consider the relative presence of monuments against the weight of the different altitudinal ranges within the study area (Figure 1, bottom), the percentage of mounds in the highlands is higher than the terrain in that specific altitudinal range, but –again– so it is in the coastal platform. Moreover, the latter is densely populated and the landscape there has been much more altered. It is quite possible –therefore– that the initial number of mounds in the coastal platform were even greater, with a good proportion of monuments destroyed over the last two centuries due to agricultural and building activities. Significantly, the 3 mounds that have been recently destroyed in the study area were located in the coastal area.

Regarding the density of monuments in the highlands, the highest values identified (1.85 mounds per km2) are not superior to the lower areas's (2.39 mounds per km2). Finally, no significant statistical differences have been found between the mounds located at the top of the sierra and those in other areas of the Barbanza peninsula in terms of size (diameter, height or volume) or structural characteristics (Bustelo & alii, I.P.).

3. PREVIOUS APPROACHES

Despite recent analyses suggesting the absence of an altitudinal zonation of the megalithic phenomenon of the Barbanza Peninsula, many of the studies in the area have focused on the monuments located at the top of the Sierra (Criado & Villoch, 1998; Llobera, 2015). These approaches have remarked the existence of an alleged link between mounds and highlands (Criado & Fábregas, 1994; Criado & alii, 1991), opposing the distribution of these monuments to that of other archaeological sites, such as petroglyphs and settlements (Fábregas & Rodríguez, 2012). These proposals have contributed to promote a –somehow– dualistic vision of the landscape in which the highlands would have been a territory with a high symbolic content and partially devoid of population (Criado, 2005).

The reason why these works have focused almost exclusively on the highland tumuli is difficult to determine, but it seems to be more aesthetic than strictly archaeological. The landscape on the top of the Serra do Barbanza has been significantly less transformed by the pass of time, apparently retaining a more "prehistoric" appearance. The absence of buildings, trees, etc..., makes the

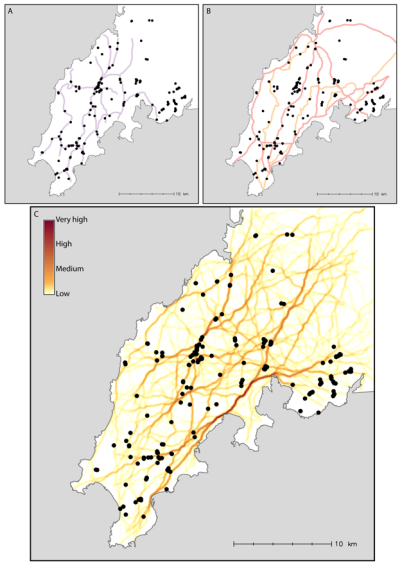

Figure 2. A: Paths as proposed by Criado & Villoch (1998). B: Historic paths across the Barbanza (orange: The Way of Saint-James, according to Nárdiz & alii, 1999; red: roads in D. Fontán's map). C: Least-Cost-Paths network and density kernel derived from it.

mounds more easily perceptible and its monumentality seems to be somewhat increased, therefore providing a good framework for testing hypotheses about the role of these monuments in the creation and organization of territories. However, the results of these approaches are, in our view, dangerouly skewed, given the reduced size and low variability of the sample used during the analysis.

Although the results achieved by some of the traditional studies in the area are undoubtedly useful (e.g. Criado & Villoch, 1998; Villoch, 1995), they tend to show some of the limitations typical of these pioneering approaches, such as the "gratuity" of many of the statements made regarding complex processes such as movement and perception (Llobera, 2001). Thus, in most cases, the paths and routes through which the movement would have been implemented were defined in an ad hoc manner, based on field observations conducted only in the proximity of the sites subjected to analysis (Bradley & alii, 1994; Criado & Villoch, 1998). As it happens, the resulting path networks do not actually connect different places in the landscape, but rather different clusters of monuments (Criado & Villoch, 2000) and –as such– they have little in common with the traditional road network (Figure 2). This kind of approaches increase the risk of artificially overestimating the spatial relationship between mounds or other sites (such as petroglyphs) and transit routes.

The surge of the GIS technology has drastically changed the analysis of move-

ment and perceptibility, allowing the calculation – in a quick and relatively simple manner – of potential routes across the landscape, based on the economy of effort and the energy consumption of the virtual walkers. Thus, least cost path (LCP) analyses have become routine in the archaeological studies. Among the numerous works applying this kind of simulations, some have included innovative solutions trying to solve the limitations of the LCP analysis, such as those derived from the impact of the election of different points of origin and destination on the final outcome (Fábrega-Álvarez, 2006; White & Barber, 2012, among many others).

The Barbanza peninsula has been also the subject to attention by other researchers using GIS (Rodríguez, 2012; Rodríguez & Fábregas, 2015). Among them, we must highlight the recent work by Llobera (2015), which shows the existence of a link between the mounds located –again– in the highlands of the Barbanza and the transit corridors connecting different parts of the peninsula.

4. ONE MORE APPROACH FROM THE GIS

In this paper, we have taken into account variables such as altitude, slope, distance to the nearest LCP, density of LCPs, topographic prominence (Llobera, 2001), cumulative viewsheds, horizon height (Hofierka & alii, 2007) and sky-view factor (Zakšek & alii, 2011), registering their values in the locations of the 209 mounds known in the Barbanza. In order to determine whether they are different from those of any other place within the study area, the same variables have been analysed in the location of 209 (the same number as the mounds) points randomly distributed across the Barbanza peninsula. These calculations have been conducted over a 5-metre resolution DEM and using GRASS GIS (version 7.4). Aiming to detect the existence of significant differences regarding the aforementioned variables, the mounds and random points have been analysed together using a generalised linear model (GLM). Such statistical analyses have been conducted on R, version 3.5.0 (R Core Team, 2018).

In order to contextualise the monuments within the general movement network across the study area, we have used a simple approach based on the calculation of a dense net of LCPs connecting those points in the study area where prehistoric settlements have been documented (Fábregas & Rodríguez, 2012) that may be coetaneous with the construction and use of the megaliths and thus may have belonged to the same communities, those areas that may have played a significant role in getting in and out of the Barbanza peninsula; and –finally– random points located in both the Northern and Southern shores of the Barbanza.

The selection of these areas as points of origin and destiny of our LCP has allowed us to calculate the movement network independently from the mounds, contextualising these monuments in the general transit network across the study area, which connected the settled zones with both shorelines and with the paths in and out of the Barbanza peninsula. This network probably reflects some of the everyday movement patterns of the local groups during the prehistory in a reasonably realistic way.

Thus, 5,800 LCPs have been calculated across the Barbanza peninsula. The sum of all the routes – despite being sensibly lower in number than those calculated by Llobera (2015) – allowed us to estimate the potential transit intensity for the study area, identifying those places with a higher probability of having acted as nodes or key points in the transit network (Figure 2C). The results identify several areas that would have higher probabilities of being walked, some of which closely match some of the historical routes in the Barbanza, such as the local branches of the Way of St. James (Nárdiz & alii, 1999) (Figure 2A) or the roads featuring in the map by Domingo Fontán (1817-1834) (Figure 2B), thus suggesting that this method might be useful for approaching the traditional movement strategies across the landscape.

The interaction between mounds, petroglyphs and the prehistoric landscape was probably not only determined by the remoteness or proximity to important transit routes, but also by their capacity of being noticed from the surroundings. However, while remoteness is relatively easy to approach from a GIS perspective, the simulations of the level of perceptibility of a given spot/monument have not yet been implemented in a satisfactory manner. Regarding the Galician prehistoric monuments, their perceptibility has only been addressed sporadically (Bradley, 2009), usually being confused with the "visibility" exerted from the monuments (Fábregas & Rodríguez-Rellán, 2015).

The specific location, size or the presence of a cairn made of quartz cobbles or other shining stones would have acted as important elements for modulating the perceptibility of a given mound (Bradley & alii, 2000). However, it is important to remember that the capacity to be noticed is not entirely (or even mainly) based on physical factors: the social or ritual significance of a specific mound might have multiplied its perceptibility, regardless of its remoteness or size. However, this kind of socially-based factors can hardly be managed by either Archaeology or –more specifically– spatial and GIS studies (Gaffney & Leusen, 1995). Nonetheless, very interesting approaches have been carried out trying to determine the possible significance of specific places within the landscape (Rennell. 2012; Wheatley. 2000). Most of them are based on similar concepts: those areas more noticeable from the surroundings are more likely to have

acted as landmarks and thus might have played a significant role within the cognitive and symbolic geography of the human groups living nearby.
A recurrent setting of archaeological sites in those prominent or conspicuous areas might imply that these were purposely built in those places where they would have had a higher chance of being noticed and they also shared the importance and/or symbolism of the place. One of the approaches to analyse the potential significance of a given area within the local landscape is the "topographic prominence", described as the percentage of locations that lie below a specific location within a certain radius (Llobera, 2001).
Another important characteristic for ensuring the perceptibility of a given monument is whether it is located in an open space where it could be easily seen from the surroundings. In his work analysing the mounds of the Sierra del Barbanza, Llobera (2015) remarked upon the tendency of mounds to be located in places that would have acted as local horizons, as a circumstance that he relates with the will of modulating the perceptibility of these monuments, either making them patent or restricting their view to certain areas (Ibid.).
We have also approached this variable, albeit in a much simpler way. For this purpose, we have calculated the horizon height (Hofierka & alii, 2007) in the areas where mounds, petroglyphs and random points are located. A type of calculation with outcomes similar to these is the sky-view factor, a value determining the portion of the visible sky from each area as limited by the surrounding relief (Zakšek & alii, 2011). The higher this factor, the higher the openness of the area where the monument is located, thus increasing its possibilities of being noticed.
The next step in attempting to measure the perceptibility of mounds and petroglyphs of the Barbanza peninsula was to calculate the level of conspicuity of their specific locations. The calculation of such a variable can be very difficult to implement, although several approaches such as the "visual affordances" or "visualscapes" have proven quite useful (Llobera & alii, 2010). These simulations are based on calculating either a cumulative viewshed for a significant number of points unevenly distributed across the area of interest or a total viewshed in which a viewshed analysis is conducted for each of the cells in the study area. In our case, we have created a cumulative viewshed from points generated every 500 metres along the 5.800 routes crossing the study area, 5.400 points randomly generated and 2193 points forming a grid separated by 500 metres.

5. RESULTS

The distribution of the 209 mounds known in the Barbanza peninsula suggests

Parameter	Estimate	Standard Error	z value	Pr(>|z|)
(Intercept)	-2.246e+01	9.230e+01	-0.243	0.807744
Altitude	-1.486e-03	8.506e-04	-1.747	0.080710*
Slope	-1.747e-01	5.095e-02	-3.429	0.000605**
LCP Density	3.146e+00	8.987e-01	3.501	0.000464**
Distance to LCP	-6.277e-04	5.512e-04	-1.139	0.254832
Prominence (Avg.)	4.379e-02	1.030e-02	4.251	2.13e-05**
Horizon	1.940e-01	1.286e+00	0.151	0.880061
Skyview	2.401e+01	9.246e+01	0.260	0.795086
Viewshed	-4.496e-04	6.730e-03	-0.067	0.946732
Null Deviance: 579.47; df: 417; Residual deviance: 391.49; df: 409; AIC= 409.49				

*Table 1. Generalized Linear Model showing the comparison between mounds and random points. (*Significant at 0.1 level, **Significant at 0.001 level).*

that mounds are not specially linked to higher altitudes. As we have already noted, only 22% of these are located above 400 meters high, while the 66 % are found in the coastal platform. While the GLM suggests that the altitude may have had some statistical significance in explaining the location of mounds (Table 1), the Estimate points to a decrease in the probability of finding mounds as the altitude increases, clearly indicating that the traditional link between mounds and highlands in the study area should be qualified.

In fact, the results of the GLM show that -rather than altitude- slope gradient is much more powerful as explanatory variable (Table 1), suggesting that the mounds were preferentially located in places with no or gentle slopes rather than in areas with a specific altitude. This circumstance may explain also the altitudinal distribution of megaliths in the Barbanza Península, since mounds tend to cluster in the ranges between 0 and 200 m.a.s.l. and –again– between 500 and 650 meters. Meanwhile, monuments are very scarce in those intermediate altitudes, which –in the Barbanza peninsula– are characterized by the presence of strong slopes.

The analysis of the monuments in our inventory suggests the existence of a strong relationship between mounds and LCPs, especially in the case of the

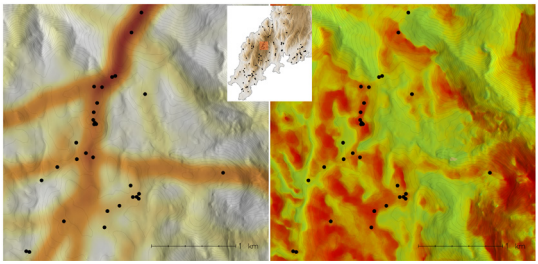

Figure 3. Detail of the density of Least-Cost-Paths and accumulative viewsheds in the mounds at the top of Serra do Barbanza.

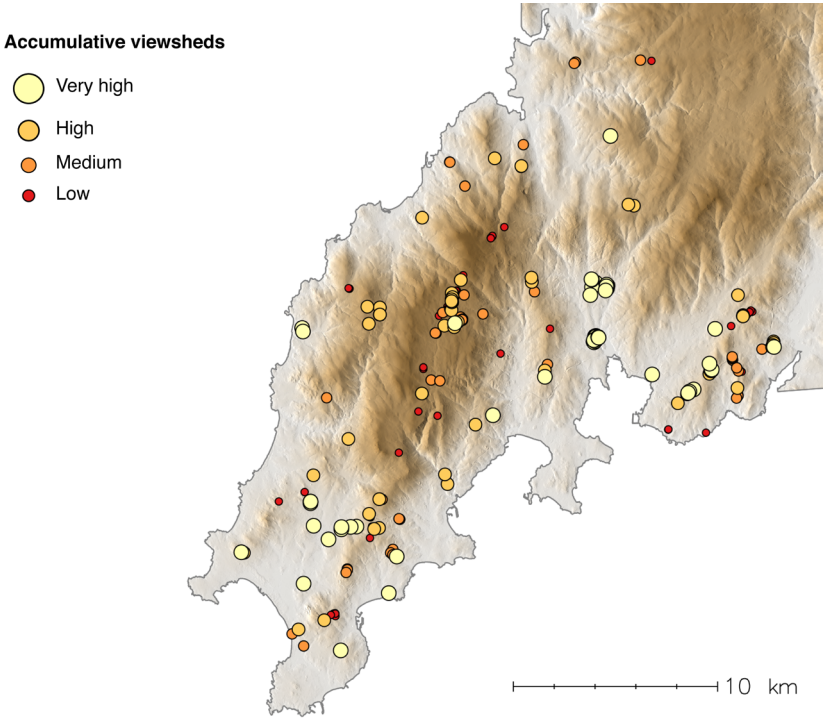

Figure 4. Classification of mounds according to the sum of accumulative viewsheds of their locations.

cluster located at the top of the Sierra del Barbanza (Figures 2 and 3) –where all the megaliths located on or immediately adjacent to those areas have a higher probability of being walked, as Llobera (2015) has already reported- and also in several areas of the coastal platform. The results of the GLM specifically comparing mounds and random points show that the variable LCP density is significantly different and thus the proximity to areas that are more likely to have played an important role in the movement across the Barbanza peninsula would be a useful predictor for the position of barrows (Table 1). This is not the case for the variable "distance to LCP", which –unlike in former analyses (Rodríguez-Rellán & Fábregas, I.P.)– does not seem to be statistically relevant. The distribution of mounds regarding the other variables considered in this paper shows how mounds tend to be mainly located in those places with a low horizon height and a high sky-view factor: that is, in open spaces with no major topographic obstacles hampering their conspicuousness (Figure 3). Being

built in these areas, mounds may have been able to act as local horizons and thus become significant landmarks. Likewise, the analysis of the relationship between mounds and topographic dominance points towards a trend of these monuments to being located in places with a higher prominence than the immediate surroundings (Rodríguez-Rellán & Fábregas, IP).

However, the GLM shows that the difference between mounds and random locations is significant in the case of the topographic prominence (Table 1), but not for the variables, horizon and sky-view and viewshed, suggesting that the latter have a low predictive power regarding the location of mounds within the study area. Such a circumstance does not exclude the possibility of mounds sometimes being preferentially located at open places where they could have acted as local horizons and therefore being widely seen, as it seems to happen in the clusters analysed in detail in this paper or previous ones (Llobera, 2015), although our analyses suggest that this is not a characteristic widely shared by the barrows in our area.

As a result, the analysis of mounds in the Barbanza peninsula seems to suggest an important variability regarding the location of these monuments, with monuments located near major routes or easily perceptible from the surroundings, while others seem to have been conceived to go almost unnoticed (Figure 4), resembling the relationship with the landscape shown by the rock art (Rodríguez-Rellán & Fábregas, IP).

6. CONCLUSIONS

A case has been made for mounds in NW Iberia acting not as simple landmarks but rather as reference points in a social landscape presided by a noticeable degree of mobility. This seems to be fit among communities whose life was not altogether settled until well into the Copper Age and groups or individuals moved about relatively ample distances and exploited different sections of the landscape, which included both high- and lowland or coastal areas. Assuming this circumstance, we have tried to ascertain and objectify the relationship between mounds and mobility across the landscape, choosing an area – the Barbanza peninsula – that has been well studied in recent decades.

The results of the calculations made using the GIS and statistical tools suggest that the mounds of the Barbanza peninsula tend to be located near those areas that might have played a significant role as keypoints or nodes in the mobility across the study area. Such a circumstance seems to endorse the results of both the traditional approaches and previous GIS analyses implemented in this area and it reinforces the notion of the Galician megaliths as monuments linked to the movement between different sectors of the landscape.

However, at the same time, our results convey the idea that the levels of perceptibility or conspicuity of the monuments' settings are highly variable, with mounds placed in areas that may have acted as local landmarks and others situated in spots that – at least apparently – would have made them less noticeable from the surroundings. Such diversity calls for a qualification of the automatic consideration of these monuments as landmarks intended to be seen. Although such a wish is indubitable for some barrows in the study area, there would be other monuments that may be intended to pass as unnoticed as possible. This variability is only understandable for a cultural phenomenon that – in NW Iberia – comprises several thousand tumuli and lasted for more than 2,500 years.

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