THE ARCHAEOLOGICAL REMAINS OF CATTLE’S PATHS IN SOUTH BRAZIL

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Abstract: Cattle’s paths are analyzed through landscape’s archaeology in the ancient area of Campos de Lages (Brazil). The data sources were the record of the archaeological traces documented in the field, the written, cartographic and iconographic documents, the satellites imagery and the altitude indicators according to those imageries. It contains an analysis of the archaeological remains of the roads’ structures that were or weren’t built for the cattle’s traffic. For the first time all of the archaeological traces were mapped (dry stone walls, draining system, supporting walls, sidewalk area, etc.) as well as the negative of actions such as paths or rails due to the soil compression from the cattle’s traffic and the erosive effects on the soil because of the rain.

Key-words: Cattle’s paths, Brazil, road

Résumé: Les chemins de bétail sont analysés par l’archéologie du paysage dans l’ancienne région de Campos de Lages (Brésil). Les sources de données sont l’enregistrement des traces archéologiques documentées sur le terrain, les documents écrits, cartographiques et iconographiques, l’imagerie satellite et les indicateurs d’altitude en relation avec ces images. Il contient une analyse des vestiges archéologiques des structures des routes qui ont été ou n’ont pas été construites pour la circulation du bétail. Pour la première fois, toutes les traces archéologiques ont été cartographiées (murs de pierres sèches, système de drainage, murs de soutien, zone de cheminement, etc.) ainsi que les négatifs des actions telles que des chemins ou des rails due à la compression du sol par la circulation du bétail et les effets érosifs sur le sol à cause de la pluie.

Mots-clés: chemins de bétail, Brésil, routes

INTRODUCTION

This article is the result of a thesis, “Archaeology of the cattle’s paths: spatial study of historical sites stretched between Pelotas River and Canoas River, SC”, which was defended at the Pontificia Universidade Catolica do Rio Grande do Sul (Herberts, 2009). The author had a scholarship from Conselho Nacional de Desenvolvimento Cientifico e Tecnologico (CNPq) for an exchange with PhD Program in Université François Rabelais of Tours. This current research was developed with institutional endorsement from 11ª Superintendência Regional do Instituto Nacional do Patrimônio Artístico Nacional (IPHAN) and Historical Museum Thiago de Castro de Lages, where data are stored.

The studied area is approximately 1,500 km long, crossing the current States of Rio Grande do Sul, Santa Catarina, and Paraná and São Paulo in the south area of Brazil. It was necessary to set a geographical transect. The research area is located between Pelotas River and Canoas River, including the cities of Lages and Correia Pinto in Santa Catarina State, Brazil. This territory is roughly equivalent to the ancient area of Campos de Lages.

The study was based on an analysis of several sources, combining field data through a systematic survey and a recording file with the analysis of the sources (written, cartographical, iconographical and oral). Imagery interpretation of the orthophotography and contour lines has given a previous notion of the road structures and the archaeological and architectural remains that still exists in elevation.

A Management of Data Base System (SGBD) was developed in order to organize and keep the different data. The setting up of Geographical Information System (GIS) provided spatialization of the field data, interaction with the environmental characteristics of the area (relief, inlines, hydrographical system, vegetation, etc.), and production of detailed maps. The aim was to evaluate the similarities and differences within the several contexts in order to get an understanding of the way paths are structured in their materiality and how landscape gets delimited by the paths.

A systematic archaeological survey was carried out on a sample of 23.5 km of road in different topographical contexts and distinctive environmental characteristics (vegetation, hydrology, soil, altitude). The recording of the path’s structures was implemented taking as a model basis a recording file adapted from C. Vitry (Vitry, 2005) and from evaluating the satellites imagery of the path’s stretches at a small scale. The archaeological traces were mapped with georeferenced points in the pictures and recorded in the register file. The drawings of the structures discovered on the pictures or in the field allowed the making of detailed maps of the analyzed stretches.

1. ARCHAEOLOGICAL SURVEY OF THE CATTLE’S PATHS

The selected area was determined according to the existence of representative and well-preserved archaeological remains of road’s corridors. Within the
segment between Pelotas River and the city of Lages, four stretches were selected as a sample.

In the four stretches of the path, no differences in the building can be observed nor settlement that could indicate hierarchy (main stretch and links). All segments are very homogeneous. This hierarchical aspect of the road net will only be analyzed at a smaller scale, when all the ways and/or corridors are charted.

The different structures that make up the cattle’s Path also confirm the idea of a way with corridors that are similar. However, this does not mean that there is an engineering project or some building plan, as observed in the diversity of workmanship, dimensions and morphology identified.

The archaeological sites, along the dry stones corridors of the way, make groups within a great net formed by roads and several settlement points, showing how this space was occupied during the past days.

The corridors were used as fences. However, lately they are often mistaken for the walls that delimitate the private property and the public space of the road.

2. THE REMAINING STRUCTURES OF THE CATTLE’S PATH IN THE LANDSCAPE

The adopted strategies for the opening, construction and maintenance of the Path delineation involved a great knowledge of the environmental conditions such as the elevation or the hydrographical network. The constructors knew the land and the needs for each stretch very well.

The material traces analysis of the cattle’s path corroborates this idea and explains why some of the path’s stretches change because of obstacles that made harder or even impossible the animals’ crossing.

The observations in situ were decisive to identify the structures visualized by the satellite imagery. Besides,
concerning the dense vegetation covering the area, there was no kind of visual information that could be used as reference.

According to the assumption of Juillard (2007), we decomposed the cattle’s path into archaeological/architectonic units. The archaeological traces mapped are remains of constructed elements (corridors, drains and sidewalk) or marks of actions such as pathways or ruts formed by the soil compression because of the traffic of animals, erosive effects on the soil and rain action.

2.1. Corridors with dry stone walls

Corridors are made by two parallel walls built up of stone pug without any kind of grout, dryly fitted together. According to Silva (2006, p. 131), these structures are characterized as “[…]a route delimited by two parallel lines that nowadays still mark impossibly the landscape of the spaces where they have their structures”.

The environmental variables that had influence on the building locations for corridors are of two main orders: gentles slopes and availability of water. Most of the times, we observed the predominance of corridors in open field areas with a flat elevation or slightly waved, searching preferably for areas of higher altitudes like the top of the hills or going through elevations in the land on hillside.

The building of corridors follows the land ripples, trying to divert from steep slopes, sometimes having to perform sudden curves because of sudden hillsides or avoid places of difficult traffic. The course’s choice considers the best areas for animal traffic, in an attempt to spare them the physical exhaustion of crossing corridors.

Many corridors keep on for several kilometers without any interruption, and consequently with no other route option. Therefore, when going into a corridor the only alternatives left were to move on or to go back. That way, this kind of path needed desperately to have some stops for the journeys of the mules, horses and cattle like spots for water and pasture.

Another decisive factor in the choice of the delineation of the corridors was the availability of water resources and landing areas for the animals that were traveling. This was one of the fundamental conditions for the survival of the cattle and the success of the trip.

That way, in several places we can see corridors crossing flat areas and not avoid them, which could be easily done by climbing up further to the hill. The raw material used in the construction of the corridors pugs is the basalt, a stone that is widely used in the southern plateau.

2.2. Enlargement of the corridor

The enlargement of the corridor is a singular and peculiar structure, registered along the cattle’s path flanked by stone pug wall. They are some spots where corridors’ sides are enlarged forming a sort of “belly” in the linear outline of corridor. In general, the walls on both margins change the direction of its outline, opening up the angle in an external direction, forming a great “plaza”.

As the corridors discipline the passage of the animals in a land marked course closed by walls, with no side access and in extensive stretches, it would rise the need for resting areas that in the case of big herds are wide enough for parking the entourage, either for rest or to supply with the daily needs for feeding and watering.

It is underlined that these areas, despite their great sizes, could not supply the need for pasture for the animals, because of the low vegetation capacity of the region.

These pugged areas inside the corridors were propitious places ready for landing, because, as they were surrounded, it would not be difficult to keep the animals together.

We found two kinds of enlargement that can be classified as local “plazas”, in dry areas and in places of water course crossing. In the research area, three spots of enlargement were registered, excluding more recent modifications that have altered the corridor’s form and ended up adding spaces to public servitude.
In enlargement areas, there are currently buildings for people who live in the public servitudes, which is a phenomenon of settlement in vacant areas consequently to the end of cattle’s droves, by inhabitants with no access to private property.

The main locations of such places are the plateau areas with availability of water resources, a fundamental condition for landing. Another important fact to be considered, i.e. the distance between the structures, is the hypothesis of the landing function as a space marker.

2.3. Crossing Water streams

The crossing of water streams requires a great effort from the drovers to manage the herd in flowing or deep rivers. The kind of river, whether it was deep or not, required different strategies and distinct ways of crossing.

The spots for crossing water streams were called passes, which means, the most appropriate point for crossing. Usually, one searches them in fords or shallow part of the rivers, because they were the most propitious places to be crossed.

To know the local hydrographical system was fundamental in the search for the best alternatives, as there was no possibility of escaping the crossing or go around the river, especially in a region marked by several rivers and streams, with little or big creeks. It was important to evaluate the river’s access conditions. In the southern plateau, valleys are very embedded with sudden rocky slopes, like in Pelotas River case.

2.4. Drainage Structures

Drainage structure is a device or a set of systems that flow out the water from the soaked lands as well as the rain water and avoid the accumulation of it. Subterranean drainage structures were not identified for the studied stretches. In these areas there is no possibility to flow out water behind the walls, because the devices were at the same level as the land’s surface.

We identified drains and ditches. However, another strategy of drainage was noted with interruptions in the pug wall to facilitate or conduct the crossing of a small water course, whose volume would change according to the water flow. The drains are related to the pluvial and fluvial water, while the interruptions of the pug are related to the crossing of the fluvial water.

The draining structures have a double function in the corridors: to allow the flow of the water, avoiding the accumulation of it and mud formation and consequently swamps inside the corridor; and to help the pug’s conservation, avoiding the risks that could compromise its structure, resulting for example of a landslide.

2.4.1. Drains and Ditches

Drain is a built structure or installed device with the function of draining water or intercepts it and conducts
the water on a paved area. It's usually a pipe buried under the ground.

However, the kind of drainage structure registered along the corridors is characterized by a gap built at the stone pug wall's basis, that allow the draining of water from one margin to the other, avoiding the accumulation of water inside the corridor. They are gaps in the stone pugs with several shapes (rectangular, quadrangular, triangular and shapeless).

The ditch or drainage gutter is a structure used to conduct the water to lowland areas, getting the water from the adjacent land and conducting it to a certain location. It is a linear excavation in the land, usually with a bigger depth than width. The observed ditches along the corridors were not necessarily dug. Some have a natural appearance, formed by the water's own draining and wastage of the soil. The natural ditches have, in general, concave section shape and are coated by vegetation, such as grass. The ditches that were dug usually show a rectangular section.

Ditches and drains are different structures, but they act together in a system of superficial drainage. The drains and ditches work by gravity, draining the water from the higher spot to the lower, acting on the natural drainage of the land.

Drains were built with the same technique as the stone pug. A characteristic is remarkable in most of the registered drains: the opening under the wall was obtained by putting an elongated shaped rock or a flat stone stacked over vertical shaped stones sustaining the other rocks of the wall. The horizontal shape of the stone is natural, no kind of carving was ever performed to obtain its rectangular shape, that is to say the stone was selected because of its shape.

Among the main characteristics of the drains and ditches in the landscape, is their location near the wet areas such as marshes, water outburst and topographical compartments in hills. They are preferably set in elevation with a slight side inclination towards the corridor, cutting transversally a hill. Only in three situations the drains were located in a plain surface.

Another remarkable characteristic related to the drains is the gap observed between the margins of the walls of the corridor: one of the sides is located further up than the other, making up a way that naturally conducts water from one margin to the other. This gap could cause the accumulation of water inside the corridor, consequently forming muddy areas and even risking the conservation of the pug, in case there was no drainage device. The occurrence of sets with more than one drain was also observed in two cases, working as drainage net.
By analyzing the maps we could stress that allowing the crossing of water streams was necessary once the corridor had completely closed up the access for the cattle for several kilometers.

In other situations, when there was no way of building a corridor on a hillside without crossing any stream, the solution was to adapt the construction of the pug wall, crossing the wet spot without further damages to the way.

The oblique gaps of the stone pug wall can be seen with high resolution and great scale satellite imagery, helping a lot with their localization and the interpretation of the environmental characteristics, such as the hydrographic system and the topography.

2.5. Paved Area

A paved area can be characterized by being paved or stoned with selected rocks, adjusted to each other. The aim is to improve the traffic, especially in wet areas, with slopes. It is a kind of pavement used in the past to coat streets and roads, by juxtaposing the stones. Currently, the technique is still used to pave streets with cut stone blocks, like parallelepipeds for example.

A spot of pavement was found only in one stretch, using the paving technique. The raw material used was basaltic rocks, very common and abundant in the region.

The area is characterized by being in a curve of a hillside with approximately 8m long by 1.80 m of width and 25° of inclination. It is adjacent to rocky blocks and to a stone slab on the floor, being outlined by other smaller rocks, the ravine’s cut and the steep margin which was making it impossible the search for another alternative of course in the hillside.

The initial hypothesis was that it was a steep stop in a wet hillside that therefore needed to be paved so that the animals would not slide when climbing up. In fact, only a field evaluation allowed to find the real situation and to propose a more suitable hypothesis concerning the use of the path. The paved area was built so that the stepping of the animals would not make the path sink more, because this would result in time to a greater step with the close stone slab, making it harder for the animals to pass, precluding the cattle’s’ climb.

2.6. Pathway

Pathway is a trail, a depression of the soil marked by the passage of people, animals and vehicles. It is the first material evidence of a path, forming ruts in the landscape due to the land’s erosion.

Technically, we’re talking about non-built structures, naturally formed by the soil’s wastage and materialized by the repetitive passage of travelers in a same pathway, testifying of the frequent use of a same itinerary during a large chronological period (Juillard, 2007). The pathways
more adapted to the slope and because of that are constantly dealing with modifications of their outline.

In most of the old paths, this kind of phenomenon can be observed. It is the first trace that marks the space by the constant passage of people or animals, as long as the land is formed by soil and the path is not cut in stones. The path is resilient to time’s action, as physical remain of the past in abandoned segments where the current roads were not made over the ancient route’s outline.

This kind of evidence could be identified on several stretches of the analyzed Path, except in the segments in which the municipal road is located and was responsible of the path’s erasure, due to the earthwork and leveling process of the river bed by the traffic of motorized vehicles.

2.7. Stone piles

Stone piles result from one or several deliberate rocks’ stacks in the path’s bed or at the margins of it. This kind of occurrence is common in the region and it is used to “clean” extremely rocky fields when, for example, they are meant for planting.

In the case of the cattle’s Path remains, studied in this research, the stone piles are situated under the path’s bed or at the margins of it and they’re used to replace the loose stones of the bed consequently making the traffic easier.

Constant activities around the path’s bed, mainly in the stretches climbing hills are needed: stacking the stones, forming mounts or improvised “walls” and sometimes lines. Such actions were part of the strategy used to “clean” the Path’s outline and allow better traffic conditions for the cattle, as well as less risks of accidents for the animals.

The hillsides where the piles were observed, are characterized by steep s and wet areas, propitious to soil wastage provoked by stepping and pluvial erosion, resulting in loss of soil and the appearance of stone blocks.
Therefore, stone piles are always located in deep paths: where the paths are deeper the piles of blocks are present.

2.8. Cut banks and supporting walls

Cut bank results from cutting a hillside and taking off the materials, leading to a flat vertical profile or an inclined one, without the natural slope. The cuts, made in the land or the stone, are resources used to obtain a leveled area in places where the land is inclined. It refers, for example, to the negative mark where the soil was taken away upper from the hillside to be put at the lowest part.

Concerning the studied area, cut banks and supporting walls were performed on stretches located in hills. That way, the materials cut from one margin, were used for the opposite margin, forming a bed with a bigger and leveled surface.

The bank's cuts are used to level and expand a road’s bed in steep lands. On the other hand, supporting walls built with the peg technique and dry stones are used to retain the volume of land at the embankment. They are linked to the soil's leveling action, forming a leveled road bed and increasing its width. It refers to the use of segments for wheel vehicles (cart, oxcart, buggy, etc.) or motorized vehicles.

It is believed that the use of cut banks and supporting walls is linked to the period in which some of the stretches of the cattle's Path began to be used by motorized vehicles. In fact, for that kind of transportation, flat surfaces were necessary. It is important to underline that we've got no information about the means of transportation with animal traction.

It is not believed that at the beginning these walls were built in order to retain the land, but that they are the result of the post-depositional process due to the use of the municipal road and the maintenance activities, such as the accumulation of land at the margins of the road by bulldozer.

3. THE BUILDERS

About the builders or the ones responsible for the edification of the corridors, they could have worked with private contracts, because no official, military nor administrative documents were found that would mention the construction of the corridors or the dispatch of financial aid for the job. Field data analysis showed the lack of any plan to standardize the corridors construction. Another factor is the fact that some people are living at the margins of the path. The land owners were the ones responsible for the preservation and maintenance of the road.

The structures were built with a variety of dimensions, finishing differences and peg construction on several stretches of the corridors, not necessarily connected. Some stretches show extensive gaps in the corridors in the same stretch, or walls only for one of the margins.

This diversity shows the lack of a building plan for the corridors. It suggests the hypothesis that they were built.
by the land owners of the margins, each one in their own way, where and how they thought it was better according to the technical abilities of the pug builder.

The lack of corridors detected during the field survey in some places can be explained by different reasons, some related to the existence of archaeological sites and the reuse of the blocks in buildings; others related to natural barriers (marsh, rivers, steep slopes, etc.) so that those places would not need corridors.

On the other hand, when remains couldn’t be found it may be that corridors were not necessary to outline the passage of the animals in that part of the way.

CONCLUSIONS

The making of the cattle’s Path has shown a deep knowledge of the geographical space and the use of building techniques, simple ones most of the time, with the available material such as basalt wherever it can be reached, making evident a harmony with the land.

The archaeological survey performed on the sample stretches of the Path has shown a set of road structures, built and non-built, beyond the stone corridors recognized until then. It played a fundamental role for the landscape’s shaping, as well as for the functionality of the traffic route: river crossings, drainage systems, enlargements, pavements, paths, stones’ piles, cut banks and supporting walls.

We could observe similarities in the way stone corridors, drains and other structures were built in masonry of dry stone. On the other hand, we underlined the frequent morphological variations, meaning that there was no any project of plan, adapting the Path to the land’s shape. Actually, the Path was looking for the best route possible for the animals’ journey, not taking into consideration the shortest distance but the best route based on reducing the physical effort.

The analysis of the archaeological remains of the Path concludes that no planning was made in order to homogenize the structures. On the contrary, the analysis of the corridors pugs’ construction, of its morphology and outline, has pointed out variations and differences. The stone pug walls aren’t homogeneous, in spite of using the same building techniques, showing small differences in their finishing and dimensions.

Thinking about the chronological occupation of the path, one gets two distinct phases: the first for animal and people traffic, by foot or mounted; the second for the transportation by wheeled and/or motorized vehicles. Previously to these two periods, trails could have been used by the Indian population. However, there are no data nor solid arguments for that hypothesis.

The reuse of some stretches of the cattle’s Path as current traffic roads impacted in some cases the preservation of the old path, as well as the archaeological remains, which could compromise data interpretation. This aspect needed to be taken in account during the field registering. A clear
example of it was the case of corridor walls that, at some spots, became supporting walls, due to the effect of the accumulation of the municipal road’s bed soil. In this case, the shape of the structure was not altered, but its purpose.

About dating the corridors, the analysis of manuscript documents suggests a chronological marker before which corridors of pug walls did not exists, which is at least the beginning of the 19th century. This points out that, during the first century of existence of the cattle’s Path there were possibly no stone walls structures as delineators of the traffic space.

The archaeological landscape of cattle’s passage left in the Lages Fields, in its hills and in many water courses, results in several archaeological traces of use and occupation of the space. It is either structures in elevation, built to delineate and divide such as stone corridors, drains and stone pug cemeteries, or non-built traces, such as the negatives of the soil loss and environment alterations, such as paths and trails as well as the steps for crossing the rivers.

References


