

sous la direction de
LAMIA HADDA
SAVERIO MECCA
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STEFANO GALASSI
DANIELA PITTALUGA

Villages et quartiers à risque d'abandon

*Stratégies pour la connaissance,
la valorisation et la restauration*

TOME 1


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TOME 2



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Tunisie, village berbère de Zriba el-Alia (© L. Hadda)

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**Cultures pour la
conservation et la
valorisation du
patrimoine à risque
d'abandon en Italie**



CASTEL FOCOGNANO, SURVEY AND DOCUMENTATION OF A CENTRAL APENNINE BOROUGH WHICH HAS FALLEN FROM THE PROVINCIAL CAPITAL TO A PERIPHERAL HAMLET, NOW AT RISK OF ABANDONMENT

Giovanni Pancani, Gianfilippo Valentini
Università degli Studi di Firenze-Italia

←
Portion of wall facing in which there is the original style of the joints between the ashlars.

The Municipality of Castel San Focognano is located in Tuscany in the province of Arezzo. The first historical memory dates back to 1028, the castle stood in the middle of three ditches, above a precipitous eastern buttress of Pratomagnowirew and was surrounded by a double circle of walls. The Giannelini family maintained its possession until 1322 when it was conquered, after six months of siege, by the bishop of Arezzo Guido Tarlati. In 2012 the borough was to an accurate laser scanner survey, with this methodology a protocol for returning the works was conducted in order to obtain a detailed repertoire on the facades and floors of the village. The development of this path on the representation of the village was centered on the certification of the point clouds of the laser scanner survey. The laser scanner survey was accompanied by an accurate 2D photogrammetric survey, recalibrated on the projections of the facades of the point clouds, thanks to which it was possible to make the photoplanes of most of the fronts of the village. The study made it possible to create a database on the state of conservation of the small Casentino village, particularly accurate thematic maps were made on which a study was carried out on the degradation of the facades but also on the state of conservation of some parts of the pavement, in particular of those areas where the original stone pavement is still present. Ultimately this work allowed the establishment of a wealth of information and analysis on the state of conservation of this mountain village, which, however, is still in good condition, because of the depopulation that affects this type of settlement, it risks, before remaining uninhabited and then disappear forever.

Keywords: Casentino, medieval village, Survey, documentation, enhancement, recovery

Introduction and historical notes

Castel Focognano is located in Tuscany in the province of Arezzo. The Municipality of Castel Focognano occupies the eastern slope of the Pratomagno up to the Arno Valley, at the southern end of the Casentino (Fig. 1). The first historical record on Castel Focognano dates back to the 11th century but its territory has certainly been inhabited since the earliest times. The Etruscan presence is attested by the discovery in Pieve a Socana, behind the apse of the Romanesque church (Caselli G. 2003), of a large altar dating back to the 5th century BC. together with the remains of the access stairway to an ancient temple, with fragments of pottery or black paint, artefacts from the 5th century BC. and stone blocks bearing Etruscan engravings. Socana was probably the intersection of main roads that connected the Casentino with the Valdarno and, across the Major, with the regions of northern Italy (Nassini C.,



Fig. 1
Map of Tuscany, with identified the province of Arezzo, the valley of Casentino and the territory of Castel Focognano.

Fig. 2
The remains of the hexagonal tower (severed) to defend the access road to Castel Focognano.

Martinelli M. 2002). There are also traces of the Roman period, whilst the emergence of the first settlements perched on the peaks dates back to the 5th and 6th centuries AD when the populations were forced by the barbarian invasions to abandon the valley to seek refuge in the more easily defensible mountain areas (Caselli G. 2003). The first historical record of Castel Focognano dates back to 1028 (Pironci Branciaroli A. 2008): the castle stood “in the middle of three ravines, above a steep eastern buttress of Pratomagno” and was surrounded by a double circle of walls. It remained in the Giannellini family’s possession until 1322 when it was conquered, after a six month siege, by the bishop of Arezzo Guido Tarlati. It then passed to the Ubertini and, from 1404, to the republic of Florence. The Potestà resided in Castel Focognano until 1778, when the Grand Duke Pietro Leopoldo ordered the administrative headquarters to be transferred to Rassina (Prezzolini P. 1859). From the end of the Middle Ages, as defense requirements were declined, the village of Rassina acquired increasing autonomy and its position at the confluence of the Arno and its self-named river was instrumental in its development. Rassina becomes (Taddei D. 1995), in the following centuries, one of the most important

manufacturing centers in the area: for the manufacture of woolen cloths, the weaving of linen and hemp, and silk processing. By the end of the nineteenth century the town had already assumed the appearance of a small artisan-industrial center which it still retains today. Rassinna is currently a lively thriving town, with its economy centered predominantly around industrial, artisanal and commercial activities. The territory of the Municipality also includes the centers of Salutio, once the famous castle, homeland of the Tarlati and Carda (Nassini C., Martinelli M. 2002). Continuing further along this second route Carda offers an excellent view, clearly showing its conformation with the church situated at the highest point. At first glance it seems the village nestles on the mountain slopes, whereas it is in fact located on the top of a small hill. Originally Carda, mentioned as Garda in ancient documents, was certainly a small fortified settlement, probably of Lombard origin (Pironci Branciaroli A. 2008) in the upper part of the town. The church was much smaller than the present one, and with development this, too, had necessarily to undergo expansion. The structures of the village buildings are analyzed and investigated for their stylistic aspect and architectural quality: a walled-up part is the result of a sequence of constructive and destructive actions, actions that can be the work of man or caused by natural events. There are numerous factors that have influenced the differences between construction techniques. The initial classifications are expanded. The first repertoires are developed: masonry typologies distinguished by technique and their historical period (Caselli G. 2003). We can see the differences in the walls built by common workers, such as the ashlar that make up the “severed” tower and the defense walls (Fig. 2). Skilled specialists worked on the facades of the buildings overlooking the square using more or less costly construction techniques. The stone blocks are mounted a few at a time, arranged in rows or coursed. This allowed the mortar to harden. The mortar was prepared directly “on site” and was obtained by mixing lime with other thinning substances: usually crushed stone, pozzolans, sand or earth. The quantity of blocks that could be assembled all together depended on the strength of the mortar, the type of material, the skill of the mason. The ashlar, which can sometimes also consist of several USMs, are recognizable in the masonry and represent a construction phase. The skill of stonecutters is evident in the workmanship on the stone elements that reveal signs of the tools used. They shaped the block with a right-angle square to create perfectly perpendicular surfaces, and with a chisel sculpted, with the help of tape, the contours bands of the squared ashlar cornerstones (Fig. 3). Subsequently, with another tool, the central part of the ashlar was summarily adjusted, or leveled, a more precise process. The castle is the expression of power over the “micro territory”, and is built with techniques and materials appertaining to specialized workers traveling in the territories. Rustication seems to characterize all the castles of the Guidi in Casentino



Fig. 3
Wall facing of
a tower of the
town walls in
which there are
some examples
of finishing of
the ashlar.



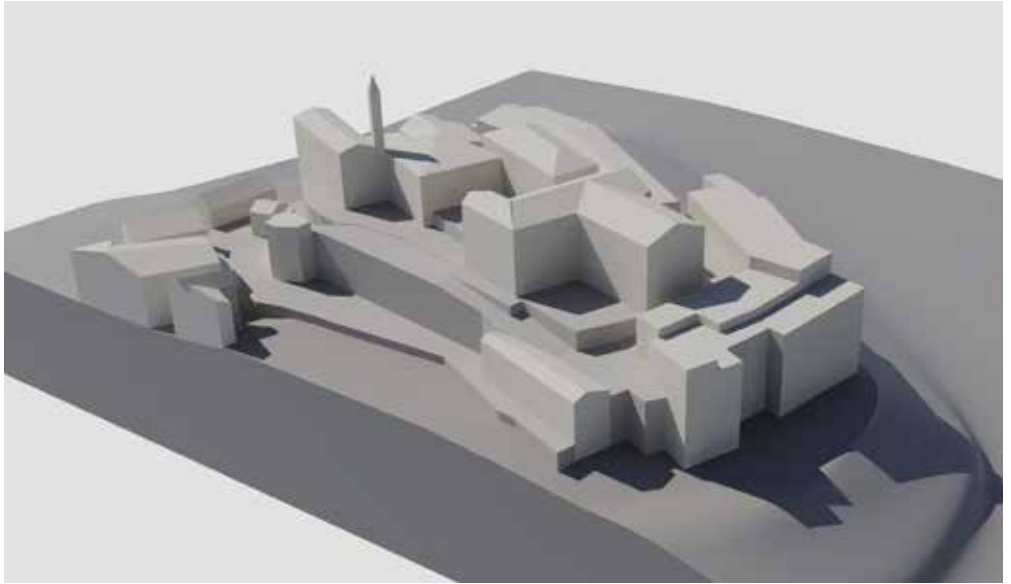
and Pratomagno between the 12th and 13th centuries. Castel Focognano is located on a hill the height of which was accentuated by anthropic intervention to improve its defense, and its plan divides into a polygonal keep, reminiscent of the Frederick dungeons in northern Italy, with the inhabited lower part closed off by a long external wall. The same topographical organization of the site was found in the nearby castles. From the post-Lombard period to the mid-fourteenth century, the area would be under the jurisdiction of Arezzo.



Fig. 4
3D model of the
village of Castel
Focognano.

Methodology

This study of the historic village of Castel Focognano began in 2012, a result of the arrangement between the above-named municipality and the Department of Architecture of the University of Florence (DIDA). This survey was carried out to set up a metric morphological information bank and to establish a database on the inhabited area of the ancient village. We are witnessing what has been happening for several years now: a progressive abandonment of the historic centers in the mountain villages of the upper Casentino, a phenomenon which also concerns the other high-altitude villages in the entire municipal area. For this reason, the municipal administration decided to undertake a series of studies on the other villages in the area too. The survey of the small



historical centers is necessary to photograph a status quò, from which to begin further research to seek solutions aimed at enhancing and conserving the area (Fig. 4).

At the same time, the survey allows us to 'freeze' a given moment, not only with snapshots that can capture the landscape and even its hidden aspects, but also with precise morphological data and measurements that allow us to evaluate the true consistency and historical characteristics as well as the construction of the buildings examined.

The finishing on the wall joints consists of a thin groove engraved on the mortar beds (at the base or in the middle) using the trowel edge or a stylus (thin pointed tool or listel that gives its name to the workmanship), following a correctly aligned ruler. Styling was performed both after the removal of the excess mortar reflux from the joints, and after topping up the joints themselves with a small amount of glue by mixing putty-based plaster and mineral mixtures. In some parts of the surfaces there is also smoothing (flat, slide or concave) which, after topping up, involved aligning the joints flush with the outer surface of the ashlars (Fig. 5).

Stylature then was resumed in medieval times, in the 11th century (with the circulation of more skilled workers on the construction sites), and is found applied to stone embellishment, with rare examples, too, discovered on the vertical joints. There are examples of curtain walls with styled joints on both facades destined to remain visible and on walls subsequently covered with plaster; in this case the said indentures were traced to facilitate the

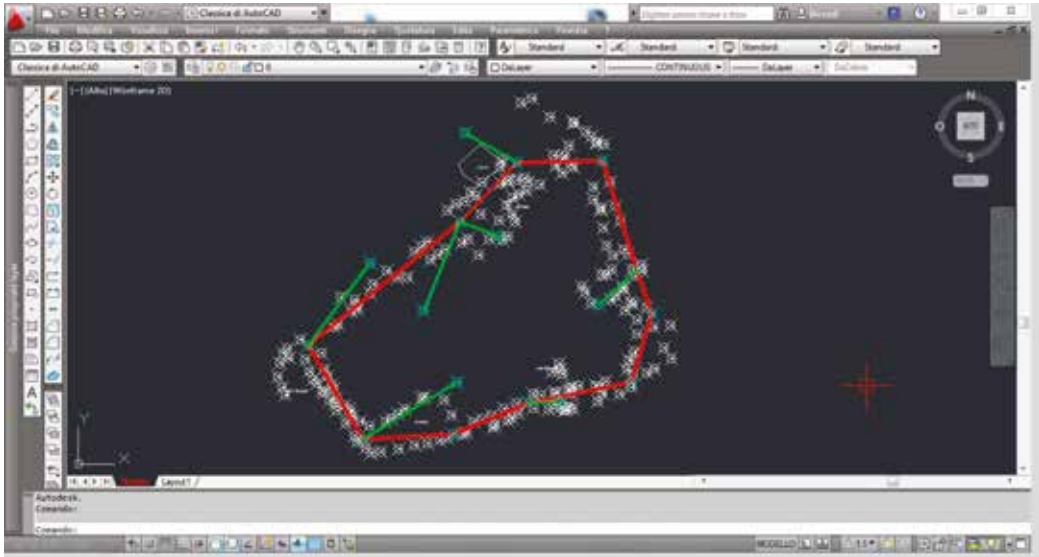


Fig. 6
Image of the polygonal made with the topographic survey to verify the correct recording of the cloud of points.



Fig. 7
Image of the cloud of points recorded for the relief of the village of Castel Focognano.

coating layers. Styling is a fundamental part in the realization of the curtain walls (a solution frequently adopted between the 11th and 13th centuries), a technique where a facing was designed on any type of masonry (from the roughest to the highest quality) very similar to a furled curtain (characterized by very thin joints); the masonry is covered with a thin layer of plaster where the brick courses were painted in bright red and the false joints traced with the stylus without any correspondence with the real joints of the masonry behind. The stylization is flush with the ashlar's surfaces which together make up the homogeneous side of a facade. Abundant is the mortar used for ashlar joints. The ancient construction techniques are revealed in the main elevations of the buildings in the center of the village¹. The quoins of the buildings are mainly made up of larger well-hewn squared ashlars to accentuate their architectural characteristics. Walls with small ashlars of *pietraforte* appear posed in isodomic and pseudo-isodomal rows or with ashlars, rusticated or otherwise, and always flawlessly from a technical point of view. These stones on the external surface are of different lengths but in each case the same height. They are squared roughly and without smoothing and are without plaster. The

¹ In the survey of the village of Castel Focognano are also reported the traditional techniques of construction of the buildings that still presold this type of construction, as reported in the thesis of Gianfilippo Valentini, *Survey of the historical village of Castel Focognano (AR), certification of the 3d laser scanner survey on the polygonal topography and assessment of the deformations on the facades*, Tesi di Laurea, Università degli studi di Firenze, A.A. 2015/2016, relatore Prof. Pancani G., corr. Minutoli G.



stone elements are all connected to each other with mortar made and mixed with sand or quarry sand. Analyzing the façades, it can be seen that the size of the ashlar in local stone in varying dimensions, are secured together according to their roughly hewed form, embellished with lime-based mortar.

The survey on the materials offers a sampling of stone elements of various kinds as well as pieces of different sizes. The 3D survey was mainly carried out in two seasons, one in 2012 and the other the following year. In 2012 a Faro Focus 3D instrument was used, with which the center of the village, the square, the church and the exteriors of what was once the praetorian palace were detected. The season the following year which was carried out with a Z+F 5010 tool concentrated on the marginal parts of the small village, including the portions of the walls still standing. To ensure the alignment and geo-referencing of the survey, in 2013 a topographic survey was used to create a closed polygon around the main route of the town and with 4 sides open to reach and connect the squares and internal points of the village (Fig. 6). Throughout the complete survey, the targets applied during the second 3D laser survey were measured, with an adequate number of verification points related to the laser

**Fig. 8a**

Testing of the point cloud, verification of the parameters of correct alignment of the various scans carried out on the horizontal plane, with control of the minimum acceptable tolerances on the distance between the various section wires.

**Fig. 8b**

Testing of the point cloud, verification of the parameters of correct alignment of the various scans carried out on the vertical plane, with control of the minimum acceptable tolerances on the distance between the various section wires.





scanner survey of the previous year. The entire project consists of over 117 scans and has generated a database of over 55Gb. Rigid roto-translation is the operation through which it is possible to combine all the scans performed for a survey into a single “cloud of points” (Fig. 7). The latter represents the file in which all the morphometric and qualitative information of the laser scanner survey are stored. By recording all the scans with the topographic survey, the complete point cloud is obtained.

The relevant surveys in question were carried out in 2012 and at that time there was still no talk of “Certification of a survey”. For this reason, the in-depth analyzes useful for carrying out any advanced appraisal were neither planned nor consequently achieved, although the aim of the study was to provide satisfactory results using the appropriate tools and methodologies to draw up a reliable survey. To carry out a 100% effective test, in fact, it would have been necessary to have a second topographic survey, called “testing”, performed on certain significant architectural points, which compared with the recorded point cloud would have verified the error. Unfortunately it was not possible to carry out this second check survey.

Observations on the conservation status

The masonry materials that make up the well-compacted walls are mainly posed keeping the original side for laying horizontal, which corresponds to the quarry bed. On the contrary, the stone lintels, to make them more fatigue-resistant, are mounted with the laying surface standing upright, vertical to the wall (Rodolico F. 1953). In the wall facades that are made of sandstone, typical degradation can be seen induced by the calcite veins that run close together through the stonework thus hindering substantial potential load strength (Rodolico F. 1953). Surface condensation has caused chemical-chromatic transformations of the surface of the segments leading to the formation of biological patina and stains.

The botanical risk is caused by weed vegetation: herbaceous perennial plants that grow profusely with either taproot root systems that are weak or robust. The precise presence of organic seedlings due to pollen dusts is negligible.



↑
Fig. 9
 Plan of the village of Castel Focognano, with digitization of the ashlar to the wire frame and deepening of the knowledge of some portions of the pavement through the realization of orthophotoplanes.

The presence of woody herb shrubs and bushes with medium to highly invasive root suckers with penetrating taproots affects the base of the walls and the tower where they proliferate between the ashlar joints. The paving stones present the same situation: sprawling roots have penetrated deeply, altering the layout of these paving stones. Un-channeled water is the main cause of degradation pathologies. The biological patinas are evident where there are signs of rising damp at a height imposed by Jurin's law. Stains, present in correspondence with the cornices and string courses of the facades of the buildings in the square due to the absence of water outlets, and incrustations alternate on all the surfaces of the facades. The architectural elements show pieces missing, and there is evidence of erosion caused by rainwater weathering the surfaces where *pietra serena* was found in use externally: an example is the deterioration of the capitals and the bases of the columns that form the portico. The same type of erosion is present in correspondence with the wall faces where there is no gutter system.

Final checks on survey techniques

In order to maintain rational supervision of the point cloud and optimize its management, a scan registration logic was drawn up. An initial empirical inspection was carried out on the wires of the sections operated on the point cloud. To be able to verify and check the point cloud (Pancani G. 2017) created in the partial recordings together with the one constructed in the final recording, the slices made by the same section planes that were considered for the necessary summary checks carried out on the new cloud were also evaluated on the latter (Fig. 8a and 8b). The composition of the point cloud emerges correct and the survey is certified. The upright images supported by a.txt document were then interpreted, imported into AutoCad and vectorized obtaining the geometric masses and the wire frame (Fig. 9). Then the photoplanes were made with Archis and worked in PS followed by the materials and decay tables (Fig. 10). The elevation-maps with measurement of the deformations on the façade highlighted alterations in the laying surface of the elements. The slices are set on Cyclone with a competent way of identifying the vertical projection planes.

Conclusions

From the survey it is possible to extract numerous facts relating to both material and quantitative as well as qualitative analysis, such as the Elevation Map (Fig. 11). This is part of the latter analyzes. The data collected give us the possibility to carry out different readings for further research into the study of the survey object in question. It is therefore possible to perform diagnostic analyzes that allow interaction with other disciplines. The elevations examined in the different environmental sections are the main ones in the historic center of Castel Focognano. Based on the analysis carried out using Elevation Mapping, we are in a position to affirm that only in the facades that project onto the street connecting the square to the church are there significant signs of deformation. Probably due to the numerous construction phases that have affected the entire village.

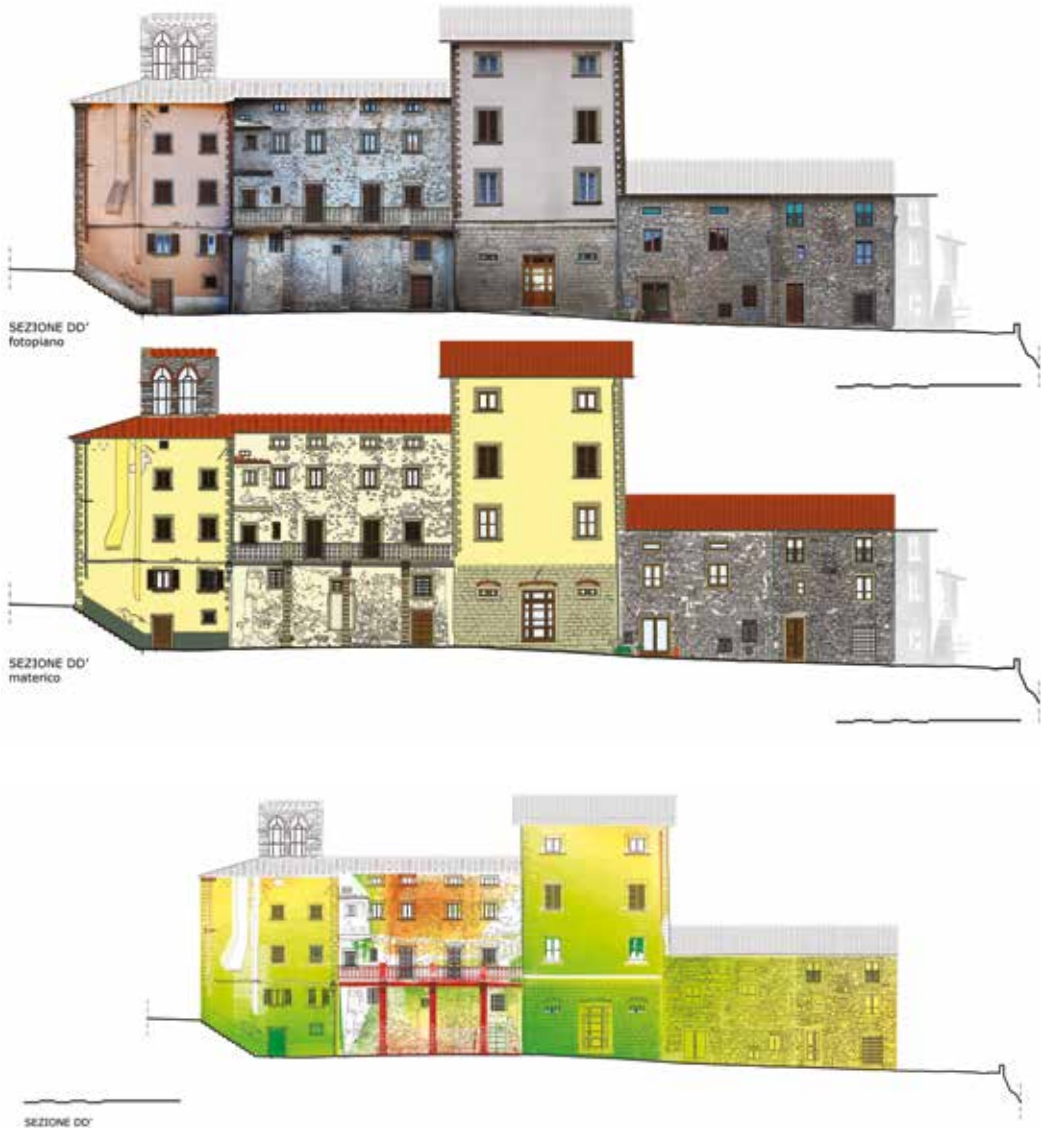


Fig. 10
Orthophotoplane of a road front with overlap of digitization to the wire frame.

Fig.11
Visualization of the displacements of the points with respect to a assigned parallel plane (Elevation-map), to evaluate the plastic deformation of the fronts.

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Villages et quartiers à risque d'abandon sont aujourd'hui une problématique commune à des nombreuses régions de la Méditerranée, considérée comme un point stratégique dans les nouvelles politiques européennes. L'abandon progressif des zones internes est une constante dans les pays caractérisés par le sous-développement économique, avec les phénomènes d'émigration et de fragmentation du patrimoine culturel. Cela entraîne des problèmes d'architecture et de gestion du territoire. L'objectif principal de ce travail de recherche est de créer un espace de discussion qui comprend l'étude du patrimoine architectural et du paysage ainsi que les témoignages démo-ethno-anthropologiques.