

sous la direction de
LAMIA HADDA
SAVERIO MECCA
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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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**Cultures pour la
conservation et la
valorisation du
patrimoine à risque
d'abandon en Italie**



THE VILLAGE OF STRUMI NEAR POPPI, IN SEARCH OF THE REMAINS OF THE ANCIENT ABBEY OF SAN FEDELE

Giovanni Pancani, Giacomo Talozzi
Università degli Studi di Firenze-Italia


The village
of Strumi
seen from
the road
that comes
from Poppi.

The village of Strumi is located near Poppi, in Tuscany, on the northern border of the province of Arezzo, in Casentino. It was founded by the Counts Guidi, who were also decisive in the growth of the medieval village of Poppi, where, in the 12th century, they built the imposing palace-castle on the top of the hill in a highly strategic position for the control of the valley. The Guidi, who were already present in the area around Poppi in the 10th century, built their first castle on a hill in the location of Strumi, above the small village where the ancient Abbey of San Fedele a Strumi stood and whose remains are present in the hamlet of the same name. The abbey, which initially adopted the rule of the Cluniacs, passed from the end of the 11th century to the rule of the Vallombrosans. Strumi was a religious center of reference until the 12th century when the Guidi family, who were its protectors, decided to move it inside the building of Poppi. In 2011-2012 with a laser scanner survey it was obtained a conspicuous amount of data regarding the morphology of the site, especially on the exterior and to a lesser extent on the interior, particularly in the church and in the ex-apse area. With the latest research started in 2019, the data already acquired were implemented with a new survey project, carried out using 3D photomodeling. The new data enhances the many information related to the morphology of the site, however, it was chosen to integrate it with SfM techniques, by making photogrammetric surveys both terrestrial and aerial.

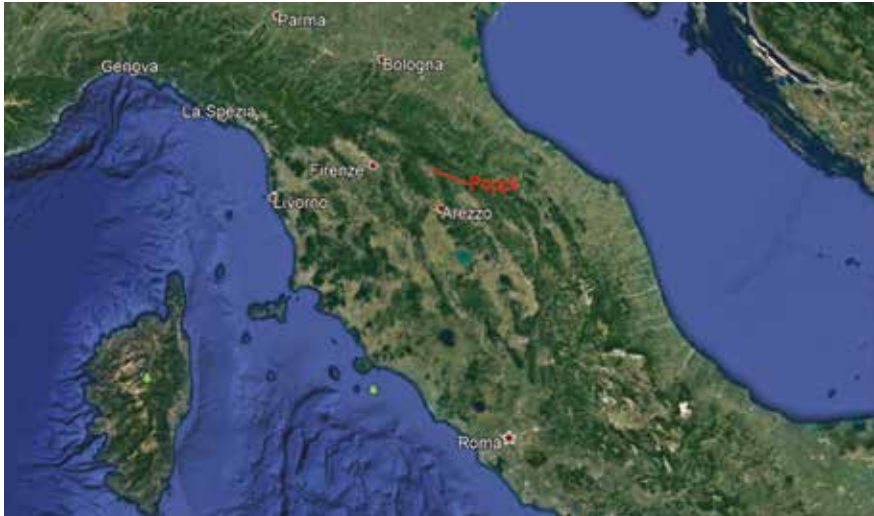
Keywords: Casentino, monastery, documentation, valorization, recovery

Overview

Reaching Strumi can be complicated; not because there are physical obstacles or problems with the road surface, however, even though it is only a few kilometers from the village of Poppi, arriving at Strumi is difficult because it is not marked. During the journey from Poppi, the road varies more than once, the route also crosses a small settlement, we travel relying on our intuition but above all on our navigator because there are no instructions. We realize that we have reached the small village only when, at a crossroads, in front of a stone wall, an expert traveler, who knows how to look for signs, is able to identify them placed almost at ground level, on a rectangular sign smaller than the others, we read the name Strumi. This singularity expresses very well the essence of this settlement. A village that can be found only in two ways: either you know its exact location, or you meet it by chance along the way (Fig. 1).



Fig. 2
Map of central
Italy (Google
Earth).



The hill on which Strumi rises is located in Casentino at about 2 kilometers, in a north-west direction, from the city of Poppi (Fig. 2). The hillock is surrounded on three sides by the plain of the valley bottom of the high Casentino, at the confluence of the Rovella ditch with the Arno river, just on the opposite side of the plain of Campaldino, known for the celebrated battle of 1289 (Fig. 3). The valley of Casentino represents the hydrographic basin from which the Arno river originates and crosses it from North to South, dividing the Apennine crests of Mount Falterona and Mount Penna de la Verna, from the massif of Pratomagno. The lands around Strumi are cultivated fields alternated to sporadic wooded areas; the settlement is developed along the low ridge of the hill and it can be reached by crossing a slope that from the west enters, going up, the heart of the built-up area. The area is very probably very different from what it was at the time of the first building. In fact the stream of the river Arno probably did not flow in the exact point where today it flows, and the area around strumi was probably swampy.



Fig. 3
map of the
northern
Casentino where
the route and the
distance between
Poppi and Strumi
are marked
(Google Earth).

History

Strumi, as already mentioned, is located near Poppi, in Tuscany, in the northern side of the province of Arezzo, in the middle of the Casentino valley which has been an important transit way since the transhumance of prehistory (Fedeli, 1995). It is believed that, on a hill near the present village, was located the first Casentino castle built by the Counts Guidi; some excavations conducted by Riccardo Bargiacchi suggest that it was



located a little further upstream than the area now covered by the town, just on top of the hillock overlooking the village built on the ruins of the ancient abbey of San Fedele a Strumi (Bargiacchi, 2015); as it is also visible in the aerial photogrammetric image, from a flight in 1954, where you can clearly see the traces of the castle on the top of the wood north-west of the village (Fig.4). It must be considered, however, that the comital family of the Guidi, who during the Middle Ages exercised dominion and hegemony over the upper Casentino, built, only later, the castle and the walled village of Poppi on the site of a previous settlement present since Etruscan times, as demonstrated by the findings in the early 2000s (Bargiacchi, 2008). The walled city was built at the foot of the Castle-Palace that, thanks to its position, guaranteed the strategic control over the valley; in fact, it represented since its foundation and for all the Middle Ages the barycenter of the Guidi's power system in Casentino. The first document in which the name of Strumi appears dates back to the tenth century, it is a donation to the monastery in 992 made by the Countess Gisla, wife of Tegrimo II, in turn son of the founder of the House of Guido I (Rauty, 2003). The documents found date the first settlement of the Guidi in the area between 982 and 992. However, a few decades earlier, in 960, a certificate conferred on Guido I confirms the presence of the family in Casentino (Bicchierai 2005). Subsequent documents, but one in particular¹, inform us that the

¹ Rauty N., *ivi*, doc. 21 “[...] Vuido comes, fili o bone memorie Tegrimi qui fuit comes, quia pro Dei timore et remedium anime mee et remedium anime genitore et genitrice mei [...] in ecclesia Sancti Fi-deli, que est posita in loco qui dicitur Strumi, que pertinentt de monasterio meo Sancti fideli, quod est constructo super fluvio Arno, in poio qui est iusta castello meo quod dicitur Strumi [...] illo monasterio meo Sancti Fidelis, quod est prope illo castello de Strumi[...].”



Fig. 4
Aerial photo, flight of 1954, on the hill you can see a lack of trees corresponding to the traces of the remains of the first castle of the Counts Guidi in the valley of Casentino.

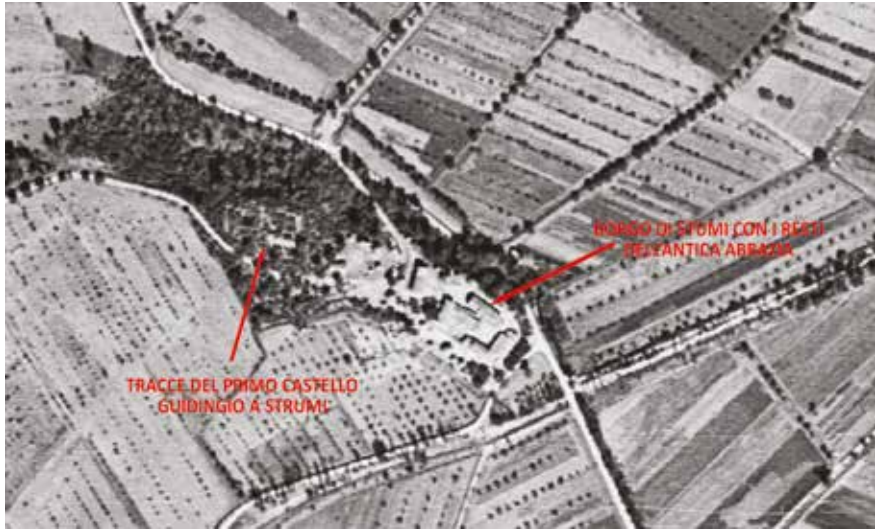


Fig. 5
Picture of the remains of the apsidal area of the ancient church, today reduced to a dwelling, on the right of the picture you can see the remains of the basement of the ancient bell tower.

monastery in question had been founded by Teregrimo II, and that in 1029, as part of a donation of various territories and their tithes made by Count Guido II to the monastery, there was a castle, or the first of the Counts Guidi in Casentino. Of the mentioned castle there are unfortunately very few traces, just the position, in an oak grove on the hill present upstream of the current village, and some remains of worked stones and fragments of pottery. With the end of the XI century the destiny of the castle and of the monastery of Strumi is also outlined, in fact, in 1085 the abbot Placido and the Count Guido Guerra start the construction of the new Abbey of San Fedele, probably realized because the Guidi Counts wanted to have its own religious center inside the walls under construction of the Borgo di Poppi (Pasetto, 1992). In 1089, for the will of the monks themselves, the monastery passed from the Cluniacensis rule to the Vallombrosan one (Pasetto, 1992). The event that determined the definitive decline of the monastery of San Fedele a Strumi in favor of the new settlement of San Fedele a Poppi dates back to the 12th century, when in 1161, it found itself at the center of the quarrel between papal and imperial power. In fact, the abbot of Strumi Giovanni Ungari was appointed Antipope by the emperor Frederick Barbarossa, with whom the Guidi had a good relationship, also thanks to the support of the Vallombrosian congregation (Corsi, 1987), in his dispute with Pope Alexander III. Once resolved the issue between the contenders, Giovanni Ungari was deposed from his office and reintegrated in the ranks of the church, with the appointment



as Archbishop of Benevento. The 1169 is the year in which the presence of a castle in Poppi² is attested, a sign that the Counts Guidi had completed their transfer on the hill a few kilometers south of Strumi. Shortly afterwards, in fact, the construction of the city walls was completed, in 1262, the monks moved definitively to their new seat, leaving Strumi forever. After the transfer of the monks to Poppi, the abbey went through a period of substantial abandonment; the first information we know of dates back to the 18th century: in fact, there is a plate dated 1716 on the apse of the church, and the date 1719 is engraved on the architrave of the door of the chapel. These dates indicate restoration works carried out in the buildings of the village, especially the transformation of the back part of the church into a farmhouse. The abbot of Bibbiena Catanzi justifies these interventions as necessary to protect the health of the farmers who worked the fields around Strumi. The image of the old abbey church can still be found with the apse emerging among the forms of the farmhouse in the center of the village (Fig. 5) while on the right in the image you can see the remains of the bell tower.

² Bargiacchi R., *I castelli dei conti Guidi in Casentino. For the reconstruction of an archeological landscape (secoli XI/XIII)*, degree thesis at the Faculty of Letters and Philosophy of the University of Florence, supervisor prof. Guido Vannini, Firenze, a.a. 2002-2003 and the writings of Alberto Fatucchi, in particular Fatucchi A., *Le strade romane del casentino*, in *Atti e memorie dell'Accademia Petrarca, Nuova serie, Voi. XL, Anni 1970-72, Arezzo, 1974*.



Fig. 6
Aerial photograph of the hamlet of Strumi.

Fig. 7
View of the point cloud derived from the 2011-2012 laser survey.

Research

The present research that has been conducted on the village of Strumi has been aimed at the implementation of the data already acquired in December 2011 and August 2012 through a laser scanner survey project (Pancani - Tocchi, 2012). The above-mentioned survey was already able to guarantee a good amount of data related to the morphology of the territory and the buildings. The choice was to integrate it with techniques of structure from motion, through the combined use of aerial aerea (Fig. 6) and terrestrial photogrammetry. The models obtained allow to implement the quality and quantity of data obtained from the previous survey, and allow to produce detailed thematic maps on the conformation of the walls, on their state of degradation and stratigraphy. The purpose of the survey is to obtain a new data bank related to the most qualitative aspects of the village, in order to verify and identify with more precision what emerges from the historical documents, and to propose and support eventual campaigns of valorization of the village itself. In fact, it is believed that Strumi has a potential and significant value for the tourist vocation in the Casentino area, both for its location and for its historical relevance.

Methodology

The previous survey carried out in Strumi in December 2011 was performed using 3D laser scanner technology, using a laser with “phase difference” technology, which guaranteed excellent performance at the qualitative level despite not requiring a particularly long time to make the individual scans, a rather high performance technology especially in light of the years in which it was used. At the same time as the above-mentioned survey, a topographic survey was also carried out, which allowed the measurement of targets, appropriately arranged to be acquired with both survey techniques, in order to constitute the reference frame for an accurate recording of the scans (Pancani, 2017). The product of this work is quantified in several dozens of scans and in their registration that allowed us to obtain a dense cloud of points of the entire town (Fig. 7). Starting from a fundamentally already complete and reliable survey from the point of view of measurements and morphology of the settlement, we chose to support it with Structure from Motion (SfM) techniques (Håming and Peters, 2010), used both from the ground and from drone, so as to integrate it with information related to materials and degradation present in the buildings. We have chosen to rely on a succession procedure, taking shots from the ground moving parallel to the buildings; the basis of the procedure consists in taking photographs in succession, bearing in mind the need for a clear overlap in the framing between one shot and its preceding one. The technique allows to perform an almost total mapping of the walls, although it is more effective on the portions



Fig. 8
image of the point cloud of the model obtained by the aerial survey in which the points of shooting of the images are signed.

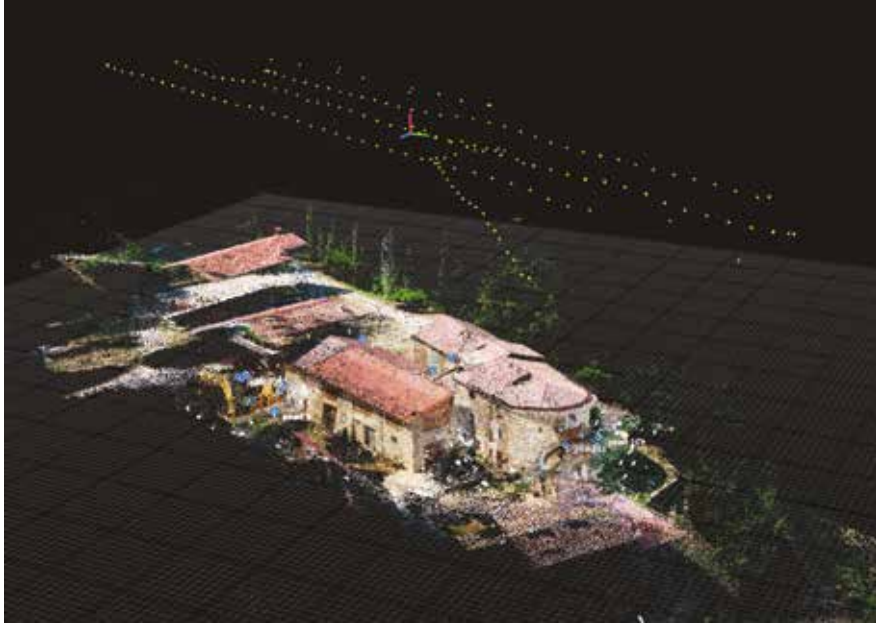


Fig. 9
Particular of the aerial orthophotoplane of the village of Strumi, taken from the 3DF Zephyr® software, in which the point cloud of the laser scanner survey, used for calibration and dimensional verification, has been used together with the point cloud derived from the 3D photomodelling with SfM techniques of the aerial survey performed by drone.

of the object less in foreshortening compared to the point of view of the photographer, or those that the photographer can frame without tilting the angle that connects the camera to the 'framed area' (Gaiani, 2015). The photos taken have been processed with a 3D photomodelling program, in this case the 3DF Zephyr® software (Fig. 8). The procedure, provides that through the recognition of the shooting position of the images used, it is possible to reconstruct, at first, a "sparse" point cloud model, through which it is possible to correctly align the images, to proceed with the realization of a point cloud much denser and richer in information, from which it is obtained a polygonal mesh surface, which can be considered in all respects a 3D model. On the surfaces of the obtained model, always strictly correlated with the images used for its realization, the texture of the framed subject is processed, which is directly derived from the pixels of the photographs. This technology, not only allows us to increase the information useful to formulate and represent the diagnostic aspects of the asset, but also allows us to operate at a graphic level with great precision of representation even at more accurate scales (Pancani, Ricci, 2020). The modern techniques of Structure from Motion, make possible the integration between the three-dimensional model reconstructed through photogrammetry and the cloud of points obtained from a laser scanner. The terrestrial photogrammetric

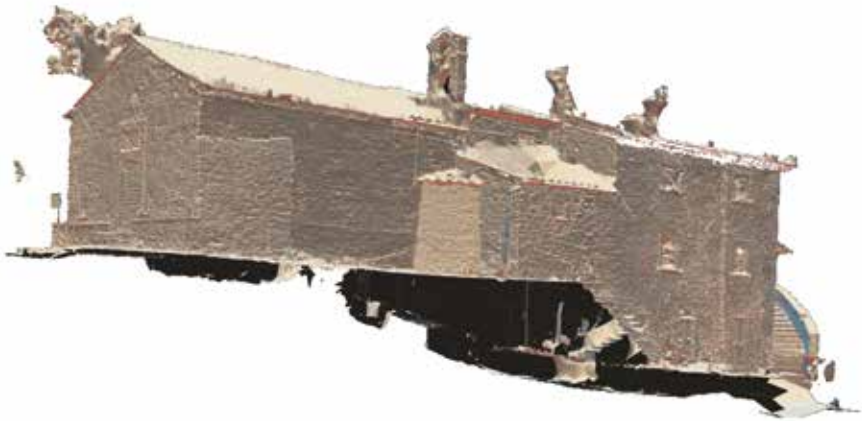


survey was carried out with the aid of two reflex cameras, maintaining a constant focal length of 24mm. This expedient is fundamental to keep constant the size of the area we are framing and the quantity and quality of the details photographed, provided that we move around the object remaining at a distance as fixed as possible (Bigongiari, 2019). The above acquisition methodologies, accompanied by the tricks described above have proven useful for a correct alignment of the photos, which unfortunately, often falls victim to small imperfections and misalignments in the detail. In the case of Strumi the problems are derived from a particular disposition of the various buildings and vegetation that has made complicated the photographic acquisition: in particular, during the photogrammetric acquisition it has been fundamental that the single fronts did not present shadows with excessive contrast, because they tend to make very complicated the alignment of the photos, however also in the texture they create problems of dissimilarity of colors, if not even of shapes. Other relevant issues have arisen in the next phase, at the time of integration with aerial photogrammetry.

Specifically, the techniques of aerial photogrammetry were used with a drone capable of producing good quality images, acquired on a preset grid while maintaining a constant distance from the ground and following precise lines previously prepared by the operator. In this case have been of particular help, the absence of significant foliage in conjunction with



Fig. 10
image of the
point cloud
of the model
obtained by the
aerial survey in
which the points
of shooting of
the images are
signed.



the roofs of the buildings and their substantially homogeneous height (Fig. 9), aerial images have allowed an effective reconstruction free of imperfections due to a mixture of light and shadow areas. Given the large amount of total photographs chosen for the reconstruction, a photogrammetry software suitable for the management of large amounts of information was used. The procedure was divided into several phases: the first was the insertion of all the ground photos in the software, followed by the alignment necessary to generate the point cloud and the 3D model of the images acquired from the ground. The same thing was done with the set of aerial photos. Finally, the two different point clouds were unified, using control points also called homologous points. In other words, clearly recognizable and identifiable points present in both the ground and aerial photo sets were chosen. By inserting targets in at least three of these points, through the photographs, the two point clouds were linked into one. On the product of this union, a mesh model was elaborated and then textured (Fig. 10), thus realizing the total photogrammetric model of the small village in question, which was appropriately scaled, compared and verified with the data of the point cloud of the laser scanner survey.

Conclusions

The 3D textured model obtained with the present work allows us to compare the results obtained with those of the previous survey. Moreover, the sections and the plans

obtained thanks to the management of the Point Cloud can be in turn texturized in order to perform investigations on the walls and floors (Fig. 11, 12 13). In the field of restoration and conservation, the photogrammetric survey can provide us with fundamental preliminary information, especially with regard to diagnostics. Especially when the data of the photomodelling are interconnected with the data coming from the laser scanner survey. The reading of the models produced in the survey campaigns, laser scanning and photogrammetric, can be important for the management of this small settlement, and of all the small villages with similar attributes. The past, but also the relatively recent history of Strumi confirms how the functions and the conditions of use of this settlement have deeply changed during the centuries, and how at the same time its aspect and its building configuration have also varied. However, the issues related to the massive abandonment that followed the second post-war period of the twentieth century bring us once again to the problem of conservation and revitalization of these settlements. Finally, it is interesting to note how the pandemic still in progress has further shuffled the cards at stake, raising some questions about a possible reversal of the destination to Holiday House and Residence that had outlined the intended use of the village in recent years.

**Fig. 11**

Cross section of the hamlet of Strumi, resulting from the digitization of the laser scanner survey, enriched by photogrammetric images. From the section it is very clear the hilly relief, on which the site stands, compared to the surrounding alluvial plain.

**Fig. 12**

Cross section of the hamlet of Strumi, resulting from the digitization of the laser scanner survey, enriched by photogrammetric images. From the section it is very clear the hilly relief, on which the site stands, compared to the surrounding alluvial plain.

**Fig. 13**

Longitudinal section of the village of Strumi, executed to highlight the rapport between the agricultural buildings and the house that arises on the remains of what was presumably the cloister of the old abbey.



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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.