Natural Phenomena and Anthropic Interventions: Remarks on the Landscape South of Aquileia in the Light of the Historical and Modern Cartography

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Abstract. The comparison between historical maps and modern orthophotos can allow to better understand the evolution of the landscape and the territory of Aquileia, and to formulate some hypotheses and remarks about the origins of particular elements.

Keywords: Historical Geography, Landscape, Cartography, Maps, Aquileia, Orthophotos.

In the last decades, besides the use of other technologies, the increasingly aerophotographical documentation has allowed to highlight aspects and transformations of the geomorphological structures of the landscape, environmental evolution, forms of settlement and spatial organization on the territory of Aquileia [1,2,3,5,6]. The orthophotos, taken at different times of the year, thanks to different light exposure, changes in vegetation coverage or realization of recent agricultural works, allows to appreciate and highlight the existence of anthropic or natural elements otherwise invisible from ground level.

To achieve significant results, of course, it is necessary to make comparisons with similar records, as previous aerial or satellite images, historical and traditional cartography, but also to implement it with data achieved from other types of geomorphological, geomagnetic and archaeological surveys, or coming from the collection and study of archival documents relating to the concerned territory. Such comparisons are essential in order to understand whether the identified elements are the result of modern activities or they have to be connected to forms and phenomena dating back in time. Consequently the data can be used to establish the period they could have been ascribed to and which actions produced them.

By examining the orthophotos currently included in the Anteo project website, on the basis of the regional coverage carried out in 2003 and 2007 by the Cartography Service, Department of Territory Planning, Region Friuli Venezia-Giulia, some elements have been noticed that reveal interesting aspects when compared with other historical maps.

Fig. 1. Orthophoto of the area SE of Ca' Muson (aerial coverage 2007).

One element is identifiable W of the modern route to Grado, just SE of Ca' Muson, in the area of the Bonifica Boscat (Fig.1). It is a set of traces that cross each other in a dissonant way compared with modern agrarian planning lines. Two of these (Fig.1, A, B), consisting of a strip bounded by dark parallel lines, strictly resemble the trace of more or less ancient roads flanked by ditches. They intersect themselves forming a crossroad: an "X" shape with complementary angles respectively of 80° and 100°. The two axes seem to have a limited length to N, where, apparently, are joined by a further horizontal axis trending slightly curved (Fig.1, C). This is a characteristic that distinguishes it from some other lines nearby, perfectly parallel, which are evidently remains of the ditches alignment of a modern planning rotated 90° as compared to the current one, probably as consequence of a change in the cultivation. The NW vertex of the line set seems to coincide with the modern settlement of Ca' Muson (Fig.1, E), while a further alignment, oriented almost exactly NS, intersects the fields on the West side of the "X" shaped crossroad and links the branches (Fig.1, D). The axis that seems to leed to Ca' Muson extends instead further SE and rapidly disappears as a trace (Fig.1, A).
More interesting is the transverse axis from NE to SW (Fig.1, B), that toward the SW direction bends by a modern ditch and reappears further S.

A comparison with aerial photographs realized by the Italian Air Force and dating back to 1954 is illuminating, showing the change in the fields orientation which is the origin of the dark alignments corresponding to small lateral ditches, now abandoned. The two branches and their N connection element are present, but already at that time they were obliterated by the modern agrarian land planning. Its traces and origins must therefore be sought further back.

Important from this point of view are two maps from the thirties of the 19th century, both presenting the territory of Aquileia and the Grado Lagoon[1].

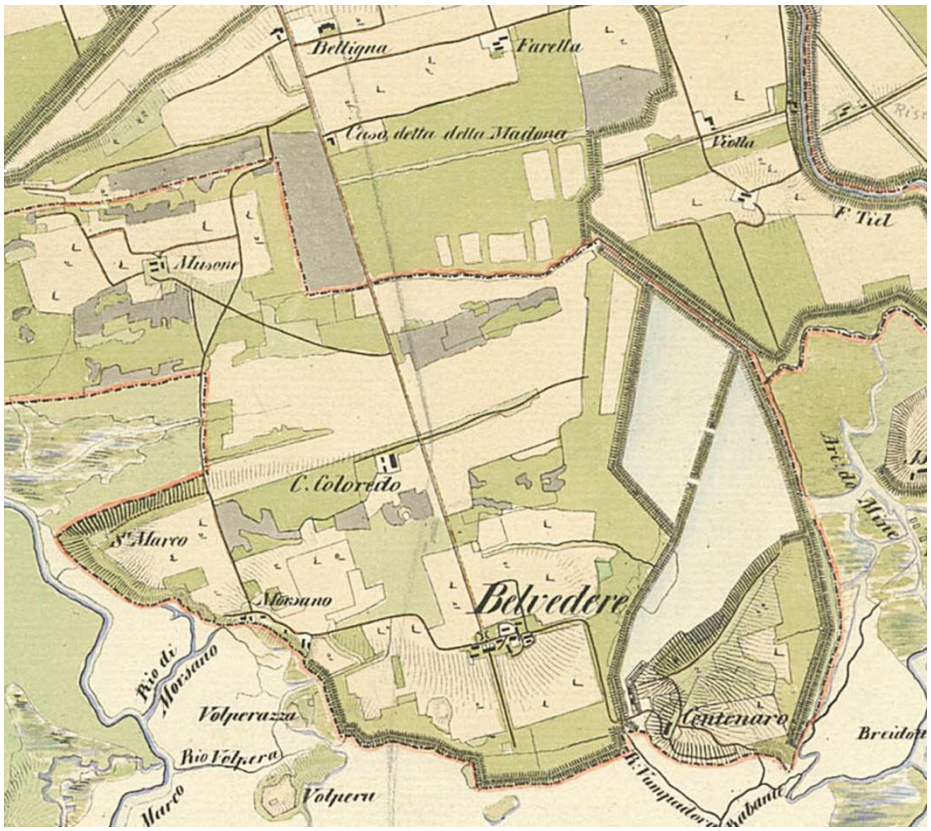

Fig. 2. Detail of the area S of Aquileia on the 'Mappa corografica del Litorale' (ca. 1830).

The second map is apparently a more accurate document that constituted the general plan of the cadastral registers (Fig.2), clearly showing the nature of the signs listed above: the two major axes and the transverse line connected to them were originally minor road tracks separated from the main road Aquileia-Belvedere and bypassing

[1] Respectively: "Carta Topografica del Regno Lombardo-Veneto", 1833 [4]; and Trieste State Archive, "Catasto di Trieste and Mappa corografica del Litorale", f. 19, s. 11, c. VI, Westlich.

what the 'Carta topografica del Regno Lombardo Veneto identified' as a wooden area. The branch from the NE to SW diverged from the main road just beyond Beligna and, with a series of curves, bypassed the wooden area and then continued to Morsano, following in the last stretch a regular direction parallel to the road Aquileia-Belvedere. From Morsano there was a path, probably along the paleodunes, linking up to Belvedere. The second branch instead, starting from Musone, crossed the first axis and then continued up to the road to Belvedere, bypassing the S part of the wooden area. From this map came up an extremely interesting element that deserves deeper examination and clarification. It is noteworthy, in fact, a sign that starting from Monastero of Aquileia, appears initially irregular, but then runs along a straight line E of the road to Belvedere, up to the Beligna monastery. This trace seems to surround and bypass the monastery to continue towards the road to Belvedere, that crossed soon after the orthogonal ditch near Casa Coloredo. Hence, the trace continues with a straight track marked by double lines up to Grado. It is unclear whether this sign has been traced later on the map. For sure, it does not correspond to the present-day road to Grado, neither to the old railway route linking Aquileia with the 'Scalo per Grado', because its roadbed, now converted into a bike path, flanked the modern road to Belvedere before turning SW, stopping at the Scalo anyway.

Having identified the nature of the "crossing lines", to which has been overlapped the modern agrarian planning, it may be interesting to establish when the routes have been achieved. Between the late 18th and early 19th centuries the regional mapping is quite rich and reliable, and it is therefore a good basis for our work.

A comparison is provided by the so-called "Catasto Napoleonico" (1811-1812)[2]. In particular, the maps concerning Aquileia and Belvedere show that the first branch, detached from the main road just beyond Beligna and prolonged to Morsano, was at the time more important than the second.

The area of Belvedere and the routes also appear in an earlier map, the Kriegskarte by Anton von Zach (1798-1805) [7], in which is evident the environmental and natural complexity of the territory, only partially subject to private drainages, still rich in forests and wetlands, crossed by irregular paths that are often grafted onto ridges and dunes following the course of streams and ditches, natural and artificial.

The different nature of the last two cartographical instruments is therefore a mutual enrichment, and provides extremely interesting data for the reconstruction of environment and landscape of the late 18th and early 19th centuries. The road system that determines the crossroad near Ca' Muson, however, appears to be in any case earlier. This comes out also from some maps relating to the planning and preparatory stages of the Teresian drainage, dating back to the sixties of the 18th century.

The first one states what established by the Imperial Commissioners Franz Anton von Raab and Maximillian Emmanuel de Fremaut (1763)[3], at that time the engineers in charge for the drainage plan, and presents a very interesting situation regarding the

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[2] A digitized copy is now available at the web site of the Gorizia State Archive http://www.archiviodistatogorizia.beniculturali.it/.

[3] Trieste State Archive, "Imperial Regia Direzione delle Fabbriche del Litorale" Piani Archive, b. 121.

road system South of Aquileia (Fig.3). In particular, it is clear that the main road, passed the Beligna monastery, in the vicinity of Casa Fratta bent to the West, taking a tortuous route coincident with the path to Ca' Muson and its prosecution toward South. In this map are shown two branches that lead to Casa Lottieri, bypassing the Bosco Savorgnan. Unexpectedly, there is no trace of the existence of a direct road between Beligna and Belvedere.

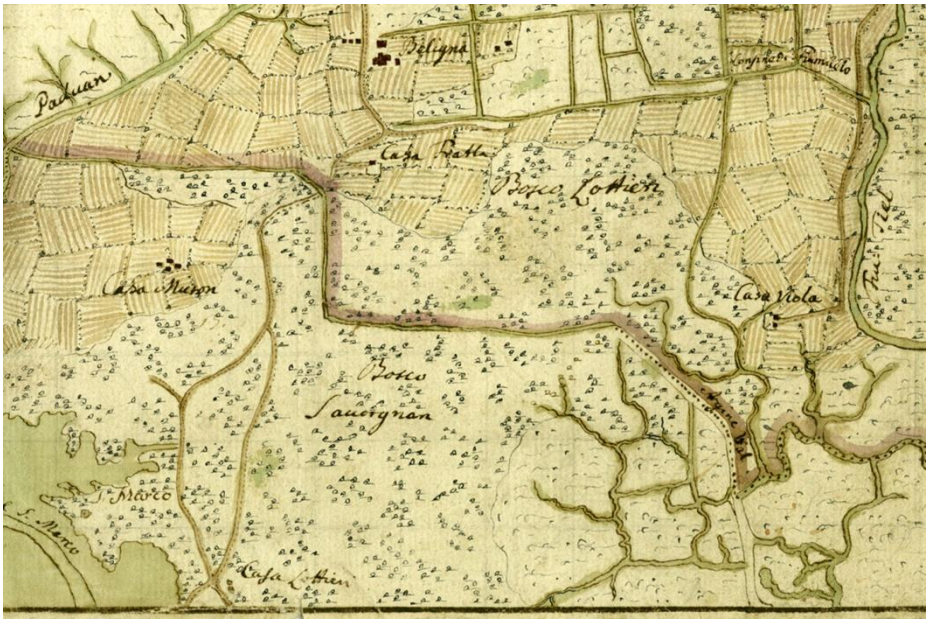

Fig. 3. The territory S of Aquileia on the map by F.A.von Raab and M.E.Fremaut (1763).

This fact is confirmed by a venetian map[4], where appears clear that the road, which leads from Aquileia to the lagoon, just beyond the Beligna turn W to Ca' Muson and then further S, up to an hamlet of houses without name that coincide with Casa Lottieri and the modern Morsano. Therefore, it seems that at the time of the maps achievement, the landscape was characterized by large wooded areas. The route between Beligna and Belvedere, created to connect the residence of the Savorgnan to Aquileia is still absent, even as a trail or ditch. It is a fact to think about, considering the ancient road system between Aquileia and Grado, to which a second geomorphological element is connected.

[4] Venice State Archive, "Provveditori Camera Confini", b. 333, d. 12.

Fig. 4. Orthophoto of the area NW of Belvedere (aerial coverage 2007).

Just S of the Bonifica Boscat, in the orthophotos of 2007 is possible to see a light-coloured strip detaching from the modern road to Belvedere and Grado, and crossing obliquely the fields to the lagoon (Fig.4, F). Probably, it is the trace of the Roman road that turned SW before the modern curve. This alleged road axis bent after passing an important element, identified by a broad light strip, about 60-65 meters wide (Fig.4, G). At a first impression, this may be interpreted as a river artificially adjusted, flanked by embankments and dikes. Indeed, this morphological element matches with the centurial axes, since it is aligned perpendicular to the road to Belvedere which is the SE extension of the *cardo maximus* of the Aquileia centuriation.

The orthophotos taken in 2003 emphasize the presence of a channel or at least a structure which determines the different nature of the vegetation growth and the different color of the fields. At the same time, some specific elements stand out on the bank, perhaps related to a settlement, and S of the electric power station (Fig.4, H), where is possible to identify a number of lines forming a strange geometrical figure. This, in turn, is crossed by the road, on which can be highlighted certain elements, such as the presence of four dark lines probably delimiting the internal path and the

whole structure. There is also a series of dark spots arranged quite regularly but difficult to understand.

The examination of the 1954 aerial photographs reveals the great transformation occurred in recent years, with a radical change in the organization of the fields, due to their rotation of 90°. This has been most probably the origin of many dark lines visible in the othophotos and that only accidentally converge in a sort of quadrilateral shape. Among these, there are some marks with an orientation diverging from the current one and even with that perpendicular to it. It is a previous land planning. Its persistence is attested in the 1954 aerial photographs by a strip running along the old buildings of Casa Coloredo on the ancient bank. The modern 'Carta Tecnica Regionale' confirms the presence of a rise for about 50 up to 100 cm compared to contiguous areas[5]. The only structure visible today (Fig.4, I) coincides with the previous ones, which in 1954 constituted a much larger complex. It may be, therefore, that some of the minor traces noticed are due to the demolition remains of those buildings. In comparison with the current situation is clear on the map a strong variation of the local road system. In fact, the route which connected the modern road to the buildings runned North and not South of them, as it appears today. The change is related to the forfeiture or function loss of the system, resulting from the partial demolition of the structures, and to the creation of a power plant nearby. A further effect of that is the obliteration of a trail that runs SE, between the agricultural parcels, parallel to the modern main road. Also it left some marks visible on the orthophotos.

The S displacement of the route to Casa Coloredo implies the effacement of an important reference, given by the coincidence between the route and the ancient channel bank and by their superimposition to the lines of the Roman centuriation. One of the *decumani*, according to the reconstructive proposal made by Baggio [1] and Muzzioli [6], for example, ran exactly in this point[6]. In fact, it is clear that a geomorphological element as a bank or channel would be an important reference for the agrarian planning as that implemented in Roman times. This has been the case until recent times, as evidenced by the 19th-century cadastral maps. Regarding this, it could be questioned whether there is a correspondence between the road axis deviating from the modern road to Belvedere and the trace identified on the "Mappa corografica" of the 19th century, which in proximity of Casa Coloredo crossed the road to Belvedere running directly to S (Fig.4, F). The correspondence is striking especially by comparing the 1954 aerial photographs, where it seems even possible to locate the curve of the road, whose axis appears effectively shifted to the E of the modern road to Belvedere. The fact that the trace of the alleged road is visible on the 1954 photographs states that this can't be the ballast of the railway for the Scalo per Grado, since this line was dismantled only in recent years.

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[5] Region Friuli Venezia Giulia, "Carta Tecnica Regionale Numerica" 1:5000, item 109051: Belvedere, available at the URL address: http://www.irdat.regione.fvg.it/Consultatore/-cartografia/CartaTecnica/cercaElementi.jsp.

[6] Baggio 2000, 43-44, fig.1-3; Muzzioli 2008, 67, fig. 6. Bottazzi, Buora 1999, 62, Fig.1 and 67, Fig.2, point out the paleodune alignments, perpendicular to the prosecution of the *cardo maximus*.

At present, in the absence of further evidence it is not possible to formulate hypotheses, but certainly the analysis of the aerial photographs and the comparison with historical maps arise interesting questions regarding the ancient road system and communications S of Aquileia and the forms of its evolution until recent times. This is not a secondary issue, because upon the road network are based not only the exploitation of the agricultural and pastoral territorial capabilities, but also the trade axes.

Obviously, only an interdisciplinary research including geophysical and geological analysis, archaeological surveys and excavations, as well as paleobotanical and paleo-environmental analysis allow a wide reconstruction of the landscape transformation processes, and a better comprehension of the natural phenomena and human interventions involved. However, it appears also clear that the analysis and comparison between historical maps and aerial photographs provide suggestions and guidance in directing the investigations.

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