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# When yesterday's war generates life today: example of the ecological and territorial resilience of polemoforms in Reims sector (France).

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After the defeat of 1870 against Prussia, France erected a defense organization of 450 forts and fortified batteries, consisting of 3 curtains of detached forts equipped with artillery guns ("Séré de Rivières" system). Reims region is part of the second line with a belt of 13 fortified structures built and modernized between 1875 and 1892.

During World War 1, some of these fortified were integrated into the defense networks and exposed to artillery fire leading with time to different states of preservation. After the conflict, many structures fell into disaffection. Some were assigned to municipalities and decommissioned, turned into stone quarries to provide geomaterials for reconstruction, or even deconstructed in order to take advantage of their land reserve.

Other fortifications took advantage from reconversion (museography, wine tourism, storage, reappropriation by associations). The presence of these forts, often unsuspected due to concealment forest and vegetation cover, thus has constituted a parallel vector of territorial dynamism for a century. It is no longer a question of observing the hot and steaming ruins, as they can still appear in the testimonies and archives, it is about analyzing the trajectories of resilience, and remanences acquired by these cooled fortified ruins by the peace. The resulting social uses reflect an appropriation, a perception, which should also be observed and analyzed to consider their current and future trajectory. A spatial analysis using GIS from archival documents (GCTA master plans, aerial photographs), airborne Lidar and field surveys allows a synthetic diagnosis of the multiple trajectories developed by the forts of the Reims belt to be carried out.

Their study reveals a significant potential to boost the heritage valuation, through tourist vectors (remembrance tourism, wine tourism), and local associations. Moreover, like the former Champagne battlefields converted into military camps, they represent islands of biodiversity in an openfield landscape dedicated to agro-resources. Their existence thus contributes to the fight against the ecological fragmentation carried by the notion of Green and Blue Tram (TVB). In this sense, they can be classified as natural areas of fauna and flora ecological interest (ZNIEFF), and Natura 2000.



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**PhD title:** Morphologies and landscapes of the the fortified Séré de Rivières belt in Reims - contribution of multidisciplinary analysis (spatial approach GIS, lidar, historical, archaeometric).

**Thesis year:** 2nd

**Doctoral School:** SHS



## INTRODUCTION

After the defeat of 1870, France built an original and imposing defense system of hundreds of works, consisting of 3 lines of detached forts (Séré de Rivières system) carrying artillery. This system of linear fortified regions included curtain forts (along a front), stop forts, and belt forts (around the cities).

The Reims belt was part of the second line of the Séré de Rivières system, established after the defeat of 1870. It consisted of a belt of 12 fortified structures built and modernized between 1875 and 1892, including 7 forts reinforced by redoubts and annex batteries. Following the torpedo shell crisis (1886), this system became obsolete and the forts were disarmed in 1913. During the Great War, the forts in the eastern part of the belt were included in the defense networks and became centers of resistance. This integration into the trench and hose networks generated important surface and underground works ("17" works, shelters, galleries) and determined strong contrasts in the conservation of military heritage during the Great War. After the conflict, the future of the forts is very heterogeneous between disaffection, marginalization on the one hand and reappropriation and reconversion for leisure and tourism on the other.

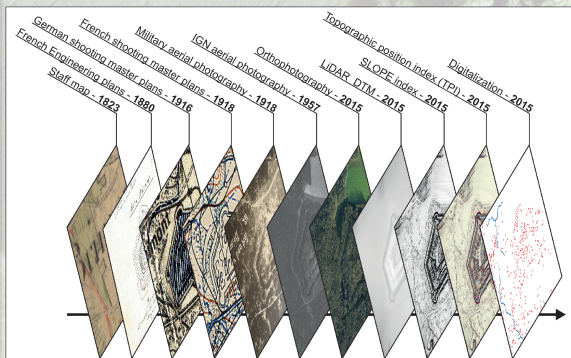


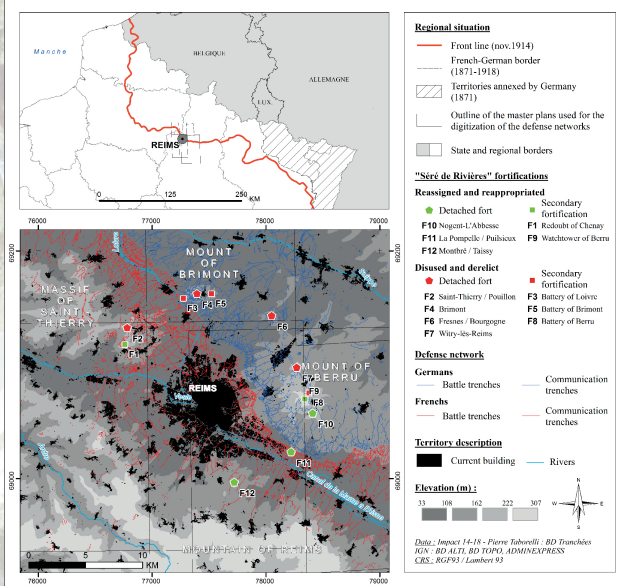
Fig.2 : Structure of the geographic information system (GIS)

## MATERIALS AND METHOD

A resolutely crossed method, with approaches of physical geography (spatial analysis, GIS, remote sensing, lidar), history (French and German archives) and geosciences (identification of geomaterials of the forts, vegetal dynamics, ecology) improves the knowledge of these fortified works.

This study, fundamentally multidisciplinary between human sciences and exact sciences, uses a multi-scalar (from the fortified work to the territory) and diachronic (from 1870 to nowadays) approach which allows to document the plurality of the trajectory of the fortified works of the fortified belt of Reims.

Fig.1 : Map of the integration of the fortified belt in the defense networks (1918)



## A MULTIPLICITY OF TRAJECTORIES - DISAFFECTION

### REUSE OF GEOMATERIALS



Fig.3 : Ditch of the fort of Nogent-L'Abbesse in 1918 (left) and today (right)



Fig.4 : Orthophotography of the facade of the barracks of the fort of Nogent-L'Abbesse



Fig.5 : Facade of a house in Brimont

After the First World War, some fortified works were partially dismantled in quarries. These sites provide geomaterials for the reconstruction of a Champagne territory cut by the front line (e.g. F2, F4, F10).

The walls of the ditches (fig.3) and the facades of the barracks (fig.4) are preferably taken in order to reuse the millstone used in the elevation and the limestone ashlars constituting the frames in the reconstruction of buildings in the surrounding communes (fig.5).

### TOPOGRAPHIC ERASURE

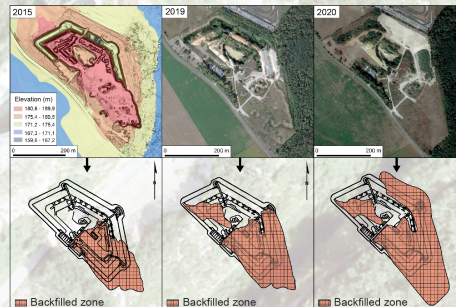


Fig.6 : Evolution of the filling of the Witry fort from 2015 to 2020

The analysis of digital terrain models (DTM) from the LiDAR acquisition "Reims north" (2015) and more recent orthophotographs document the ongoing filling of the fort of Witry-les-Reims (fig.6). As for the fort of Fresnes (fig.7) and the structures of Loivre (F3, fig.8) and Cran de Brimont (fig.9), the land value prevails over the heritage value for the benefit of the development of recreational activities (e.g. leisure park, F7; motorcycle cross circuit, F3, F6).



Fig.7 : Fort of Fresnes



Fig.8 : Battery of Loivre



Fig.9 : Battery of Brimont

Fig.10 : Geological section and vegetation transect of the Nogent-L'Abbesse mound (F10)



## ISLANDS OF BIODIVERSITY

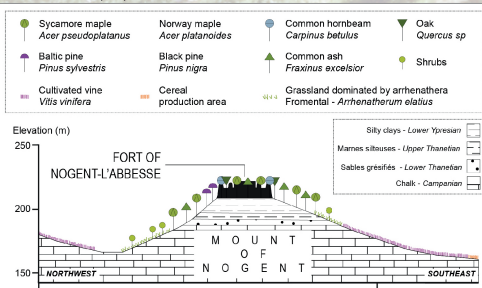


Fig.11 : Pompelle Fort



Fig.12 : Fort of Montbré

In the manner of the polemoforms in general, the fortifications of the "Séré de Rivières" type located within the Champagne openfield determine islands of biodiversity that resist the agricultural pressure. This makes it possible to attenuate the ecological fragmentation induced by the development of intensive agriculture (F5, F6, F10, F11, F12; fig.10, fig.11, fig.12). Their spatial isolation induces singular biogeographical conditions compared to the structures located inside or at the edge of the forest (F1, F2, F3, F4, F7, F8, F9).

## A MULTIPLICITY OF TRAJECTORIES - RECONVERSION - MUSEIFICATION - RECREATIONAL ACTIVITIES - WINE TOURISM

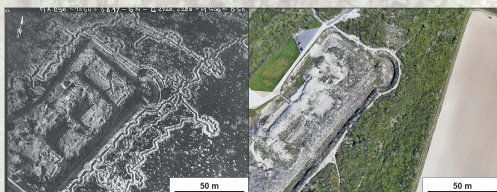


Fig.13 : Pompelle fort in 1917 (left) and today (right)



Fig.15 : Airsoft practice in the fort of Montbré (F12)



Fig.16 : Logo of the wine cooperative of Nogent-L'Abbesse

The Pompelle fort was musealized in the aftermath of the First World War (fig.14). Like the forts at Douaumont or Vaux, the patrimonialization of this fort, which was reconquered by the French Army during the conflict, was the result of a desire to exalt national sentiment rather than for architectural conservation purposes.

In addition to being converted into a museum, disused and dismantled as quarries to provide geomaterials for reconstruction, after the conflict, some forts were developed by the military (storage cells of the BA 112 at the fort of Nogent-L'Abbesse, transmission center of the Berru watchtower), bought by wine cooperatives (fort of Nogent-L'Abbesse, fig.16), or given to the communes. The latter are likely to leave them in a state of abandonment or to make them available to recreational associations (fort of Montbré, fig.15).



Fig.14 : Pompelle fort museum

## Sources :

- Fig.3 : Philippe Tourtebatte
- Fig.4 : Sébastien Laratte
- Fig.5 : Google Street View
- Fig.6 : Lidar «Reims north» 2015, Google Earth
- Fig.7, 8, 9 : Google Earth
- Fig.10 : Orthophotography LiDAR «Reims north» 2015
- Fig.11, 12 : Google Earth
- Fig.13 : Pompelle fort museum, Google Earth
- Fig.14 : Pompelle fort museum
- Fig.15 : Remes Brigade
- Fig.16 : Wine cooperative of Nogent-L'Abbesse

This study is part of the **SECRET project** (2021-2024) which concerns the establishment of an environmental diagnosis of the forts of the fortified belt "Séré de Rivières" of Reims.