NEO-ASSYRIAN SIEGE REDOUBTS TACTICS: SOME ISSUES

FARRICE DE BACKER

Université de Strasbourg / Université Catholique de Louvain, Louvain-La-Neuve

Abstract: This paper deals with the neo-assyrian siege redoubts, although not as a decorative, visual motif, but more as a genuine military tactic put in use and depicted for its efficiency. Reading this paper, one will be provided with clues on the shooting discipline of the neo-assyrian siege-archers during the fights.

Keywords: Neo-Assyrian, siege, redoubt, tactics, shooting, mechanized infantry, infantry personal carrier, base of fire, military, cover, suppression.

INTRODUCTION

These are some thoughts which occur since the last few months about the neo-assyrian siege-archer and his redoubt. Since years, the neo-assyrian siege-archer redoubt has been a world-famous decorative item. Anyway, this also represents an actual military tactic, nowadays employed in any form as well, during the special interventions against hostages situation, or during the simplest military fire fights anywhere in the world. The essential aim of this paper is to provide the reader with some issues on the neo-assyrian siege redoubts deployments and fighting tactics, being the second part of a previous paper delivered at the 54th RAI at Würzburg, in 2008.¹

¹ De Backer (forthcoming c).

Further references to other previous papers, including some terms and definitions, will be mentioned as such in the footnotes. The reason for this is not the pride, but the need for cohesion among the discussion, the link between the contributions and the easier access to more exhaustive bibliography on the topics treated in the other papers.

In no case would the present author pretend to offer any kind of clue to a cultural heritage down from the neo-assyrian period until now, but he might rather show that some fighting principles can be quite the same for centuries, in specific conditions.

I. CATALOGUE

All the siege redoubts depicted on the neo-assyrian visual sources available are represented on foot, and thus, within the frame of this paper, will be considered as Infantry.

The employment of the chariot teams and/or vehicles as siege redoubts or their use as a kind of "mechanized-infantry" and/or "infantry personal-carriers" is not under debate within this contribution.

The respective levels of armour, fire power and choke power of each kind must have been used along the period, and according to the specific conventions or tactics of each reign.

In this paper, the siege redoubts will be classified according to their respective armour levels, as they appear to be in the neo-assyrian visual sources. Thus, they can be divided into four categories: Light, Solid, Heavy and Very Heavy. These categories appear on most of the visual depictions we have of neo-assyrian troops acting in a siege or pitch battle context, all along the period under study in this paper.

Anyway, as this contribution deals with a broader topic, the illustrations of this catalogue will only provide the basic requirements for the discussion:²

a) Light: lightly equipped archers and spearmen, acting in groups mixing both types in front of the heavier groups³ (Fig. A1-2; A5).

² For an exhaustive classification, and pictures, of the neo-assyrian soldiers acting in battle, see De Backer 2009.

³ These are the ACG's in De Backer 2009, 74, fig. B1-B2.

- b) Solid: archers and spearmen bearing a scale corslet, acting in groups mixing both types in front of the heavier groups⁴ (Fig. A8-9).
- c) Heavy: groups including one or more archers and at least one soldier bearing a huge shield⁵ (Fig. A6-7).
- d) Very Heavy: groups constituted of one or more archers, being protected by one man holding a huge shield on their front, and others bearing small ones on their flanks⁶ (Fig. A3-4).

Most of the neo-assyrian combat-related visual monuments display light, solid, heavy and very heavy couples of archers and spearmen, often depicted side by side and acting together. As the point is to progress, the lighter assault troops and solid reinforcements advance to the front, followed by heavy and very heavy siege redoubts (Fig. A1-A9).

Other depictions only present any or a mix of the four armour levels shooting from a static position, when others display the advance of the siege redoubt ahead, aside, on top, or behind siege-engines.

Finally, only Salmanazar III shows the siege redoubts used in a pitch battle, but this does not impede their possible employment in the same context before or after his reign (Fig. A4).

In anyways, it seems there was a specific motivation for the ranking of the neo-assyrian siege redoubts in lines according to their armour level during the sieges, and according to the goal at hand.

According to the armour level, and to the situations depicted, the first two light categories represent the assaulting teams, although the scenes of sieges of Salmanazar III show no light soldier in a siege context. This maybe lies within the matters of visual conventions, as taking a city means more honour than killing an enemy, the victorious warrior must be clad in armour scale as an Assyrian stereotype for symbolical reasons.

⁴ These are the AACG's in De Backer 2009, 75, fig. B3-B4.

⁵ These are the ASCG's in De Backer 2009, 75, fig. B5-B6. ⁶ These are the HASCG's in De Backer 2009, 75, fig. B7-B8.

⁷ De Backer (forthcoming c).

The two heavier ones certainly represent the siege redoubts, and this is one of the main, widespread and common topic of the neo-assyrian siege scenes.

But then comes the problem of the three dimensions: how were they managed in the space?

II DEFINITIONS

- a) Base of Fire: this tactic lies on the creation of a point from which some soldiers will shoot at the enemy, forcing him to bend his head, and allowing their colleagues to go somewhere else, to take cover or to outflank the target (Fig. B1).⁸
- b) Cover: this notion is nowadays to be differentiated between concealment, a type of place allowing one to hide but without protection from projectiles, and cover, a place allowing one to hide and providing protection from projectiles.

Within the frame of this paper, cover will be understood as both. It will also be constituted of two essential aspects: direct cover, issued by the fast delivery of missiles on an enemy target, and indirect cover, provided by attracting the enemy fire on one rather than on a friendly element nearby (Fig. B15-B16).

- c) File: the files are the horizontal lines depicted on the neo-assyrian visuals with an attempt to perspective, which roughly correspond to longitudinal deployment in reality (Fig. B2).
- d) Fire Way: within the frame of this paper, the fire way will be the three dimensions room situated in front of a base fire, where the missiles provide a direct cover to the parties moving in front of it (Fig. B9-B10).
- e) Flank: the flanks are the sides of one's position, where he is weaker than to the front (Fig. B2).

_

⁸ HQ, FM 7-7, 4) Movement, Figure 4-30. Base-of-Fire Element.

- f) Outflanking: outflanking is realised when one has reached a position from which he can command the flank of an enemy, and therefore threaten or inflict casualties on him⁹ (Fig. B12).
- g) Front: the front is that direction directly opposite of one's position, where the enemy is situated (Fig. B2).
- h) Order: within the frame of this paper, the order will be the tightness of the formation. This can be very close, in which case this would be called a "close" order, where all soldiers are side by side (Fig. B5).

On the other side, it can be wide, in which case this would be called an "open" order, so to allow soldiers to move quite freely around their surrounding colleagues and in their own personal room (Fig. B6).

- i) Ranks: in this paper, the ranks are the vertical lines of the depictions of the neo-assyrian visuals, comprising an attempt at perspective, roughly corresponding to the lateral deployment of troopers in reality (Fig. B2).
- j) Shoot and Move: this is the basic requirement to move during a fight including missiles or projectiles-sending weapons: one shoots some projectiles in the likely direction of the enemy, then swiftly and quickly moves to another cover (Fig. B1; B7-B8).
- k) Suppression: Within the frame of this paper, the suppression will be understood as the function of locking or eradicating an enemy from his position by harassing him under constant and full shooting until his total annihilation, flee or surrender.¹⁰

III. PROPOSAL FOR A MODEL OF TACTIC

Some ideas, according to the goal usually targeted when siege redoubts are involved, during sieges or pitch battles, can be presented in two essential ways: simple and complex.

⁹ HQ, FM 3-90, Chapter 5 Attack, 5-17; 5-18; 5-92.

¹⁰ HQ, FM 7-8, 1-2 Combat Power, b. Firepower.

This goal, to its sharpest end, is to cover the approach of Infantry, either the assaulting parties, equipped with scales and towers, or the destruction parties, equipped with axes, picks, torches, daggers and battering-rams (Fig. B3-B4).¹¹

a) Simple: This kind of simple deployment has been taken in account as the basic, main deployment of siege redoubts depicted during a siege and/or, at least under Salmanazar III, during a pitch battle. 12

As it appears, the basic components of the siege redoubt are a shield-bearer and an archer, side by side on the same rank and, usually the same file, thus using both reciprocal abilities to reinforce both reciprocal weaknesses.¹³

The units are standing in open or close order, each rank doing the same task at the same moment when the previous and the following ones are preparing to accomplish the reciprocal part of their own. For example, as the first and third ranks shoot, the second and fourth ranks are advancing¹⁴ (Fig. B7-B8).

Every rank or file does his job one at a time, either in the same line or in alternating ones, which allows a slow but steady motion towards the objective.

As it appears on the neo-assyrian visuals, this motion needs a massive base of fire, providing fire ways and cover, to progress with the shoot and move tactic, and, most of all, it relies heavily on the siege redoubts's available ammunition supply.

1) The Base of Fire: This simple practice allows the assaulting parties to benefit from the missiles that their colleagues shoot on the enemy, from the same, static position, to move quite freely from their initial positions to their assigned ones (Fig. B1; B7-B8).

¹¹ See also De Backer 2007; De Backer (forthcoming b); De Backer 2009; De Backer (forthcoming d).

¹² King 1915, pl. X, Bd. II, 4.

¹³ For further discussion on the reciprocal abilities compensating the reciprocal weakness of the archers and spearmen when employed in mixed couples, see De Backer 2008, 70-76.

¹⁴ HQ, FM 3-90, Chapter 5 Attack, 5-17; 5-18; 5-92.

- 2) Shoot and Move: As the advance of the assaulting parties closes on the enemy fortifications, steps by steps, the siege redoubts have to advance as well so as to provide continuous cover and suppressive fires on top of the targets (Fig. B7-B8). To achieve this, they have to shoot on the enemy, then advance under the cover of their fellow siege redoubts, then shoot at their turn, in order to cover the following siege redoubts about to advance.
- 3) Fire Ways: As the bases of fire shoot, the assaulting parties are virtually running between, or under, fire ways. These prevent the enemy from seeing or reaching the friendly forces, by pressing him in certain areas covered with arrows, and pushing him out of areas targeted by the assault teams (Fig. B7-B10).
- 4) Direct and Indirect Cover: As the bases of fire shoot, they keep the enemy busy with their arrows, thus providing direct cover to the friendly assault teams.

In the meantime, as the bases of fire threaten these same enemies, they also attract the enemy arrows, which provides indirect cover to those same assault teams (Fig. B15-B16).

5) Ammunition Supply: The only problem with this simple mode of deployment lies in the difficulty the commanding officer might encounter when trying to resupply his siege redoubts. As the units slowly advance, the delivery of missiles is surely very high, and thus the shooting time-span must be reduced in order to keep things going on (Fig. B11). More than that, quiver-bearers might find it quite hard to reach the front line, when they have to stop behind each rank for cover, and give ammunition to everyone (Fig. A3).

Although the quiver-bearers only appear on the visuals of Assurnasirpal II, Salmanazar III, Tiglath-Pileser III and Sargon II, for the siege context, one can be sure they worked during the following reigns as well.¹⁶

¹⁵ HQ, FM 3-90, Chapter 5 Attack, 5-92.

¹⁶ De Backer (forthcoming c).

Indeed, a battle hardly lasts an hour, and all missile-sending weapons need to be reloaded, or replaced.

B) COMPLEX

This second possibility relies on the first one, but with a wider range of variations for the rhythm, the speed, the positions and the timing of the activities realised by the different actors. It seemed interesting, as the neo-assyrian commanders, having certainly a huge and broad experience of this tactic, could employ and adapt it to any kind of situation they might encounter on the field.

Being archers, the Neo-Assyrians surely also endeavoured to spare arrows and give privilege to accuracy and efficiency. Actually, it seems quite hard to think they would only "spray and pray" on the enemy all the time, and mostly when he is hiding behind fortifications. Even today, the ammunitions cost a lot, hence when you are in a bad situation, you want to neutralize the threat with the minimum amount of your projectiles, knowing that these will have the effect required on the target, using cross-fires and outflanking to avoid the direct confrontation.

Some might think this is going too far, but this is how the siege redoubts are represented, and simple good sense, as the people who use certain weapons are usually aware about the ways of doing so efficiently. More than that, the quiver-bearers disappear from the siege context after Sargon II's visuals, hence one might think this is a kind of symbolical token to enhance the ability of the archers at shooting.

1) Interlocking Pattern of Positions and Functions: When it comes to mind, the neo-assyrian siege redoubts are usually depicted in line on a horizontal set, which are the files, and on a vertical one, which are the ranks.

One has to think that siege-archers were intended to deflect the enemy missiles from the assault troops, harass the enemy with intensive and accurate fire, and close in to the target point to provide the best cover to other friendly units around. To do so efficiently, soldiers have to be able to cross successive friendly lines of battle ahead, without hampering their good array in combat, which could prove very

dangerous. So, it seems quite possible that the siege redoubts were disposed in an open order, so as to give room for the motions forward of the assaulters, and redoubts, to help them take their breath again before going further in their progression (Fig. A7).

In the meantime, archers need to reload their quiver and pull the string again, during which time they are very vulnerable. At that time, surely would the assaulting, friendly, units nearby provide assistance with a covering fire from all directions. These assaulting units would be the two light spearmen with round shields, disposed one on top of each other, followed by two light archers teams depicted on so many visuals of the neo-assyrian period (Fig. A5).

- 2) Wide and Multiple Mutual Cover: Once each element is set within a frame of cover and fire, it then becomes much more easy to advance towards the enemy fortifications when every base of fire is covering the surrounding ones, be they ahead, aside or behind.¹⁷ More than that, as there are multiple bases of fire, or "fire teams", on a wide front, it coerces the enemy to disperse his volleys of arrows on numerous, separated troops, rather than on a single, self-standing block. Cross-shooting on the enemy becomes easier as well, and this is the essence of outflanking (Fig. B11-B12; B13-B14).
- 3) Huge and Multiple Suppressive Fires: As displayed on the schematic associated with this paragraph, the interlocking pattern of positions allows a very huge amount of sources for suppressive fires, enhancing the chances for high attrition among the enemy elements (Fig. B12).
- 4) Wide and Multiple Fire Ways: The same picture shows quite well how the multiple bases of fire who constitute real alleys under the protection of missiles, not allowing a second to the enemy to sight what he does not have to: the approach of the attackers (Fig. B11).
- 5) Ammunition Supply: Finally, this type of complex deployment is also hard to supply, but the volume of fire doubles up with the assaulting

¹⁷ HQ, FM 7-8, 1-8 Defense, e) Mutually Supporting Battle Positions.

parties's potential for providing covering fire and protection as well to the siege redoubts (Fig. B12).

C) NOTE ON THE SLINGERS

As it appears on the visuals, slingers could be used to reinforce such or such a rank, line or position. Anyways, the depictions of these peculiar soldiers can only be observed on the reliefs of Senacherib and Assurbanipal, mainly this last one, which does not impede their availability and employment during the other reigns of the period. 18

CONCLUSION

What comes out of these few issues on the neo-assyrian siege redoubts might be quite interesting for a better understanding of the organisation of the army.

Firstly, anyhow these siege redoubts had to be organized, deployed and employed to ensure the highest chances of success. This leads one to the very idea that, then, the essential dynamics of the siege redoubts tactic had to be learned, thus practiced, even just once before going into battle, by those about to use them.

This assumed flexibility of the formation, being a close or an open order, can also be observed as used by light spearmen during the attack, on open ground, of a hill on the reliefs of Senacherib. 19 Ranks and files formations are depicted all throughout the visuals we know. In the same way, it seems reasonable then to assume that some kind of training could have been undertaken, even with no traces of this in the sources known, and available, until now.

Secondly, the scheme also comes in handy to assume that somehow a "fire team" and some kind of "buddy-buddy" organisational system was present among the troops, at least during the fights. 20 As it appears on the

 $^{^{18}}$ Slingers were already used by Tiglath-Pileser III and Sargon II, $\it cfr.$ Deszö 2006, 106. 19 Barnett 1998, pl. 32-33, n° 20a-20b.

²⁰ De Backer 2008, 70-76.

neo-assyrian visuals, the mixed couples of archers and lancers used in combat thus create hundreds of redoubts.²¹

Thirdly, as the units were anyhow ordered to advance in an orderly fashion, the reader can guess that some kind of identification of the subunits was certainly spread, even only for the need of command. Only a deeper analysis of the imperial administrative texts could attest the presence of uniforms, as the visual depictions of the huge shield sometimes bear crosses on their front profile, with different patterns.

Finally, the siege redoubt tactic surely does not appear during the neo-assyrian period, and some decorative inlay shell element from the Early Dynastic levels of Mari would prove it.²²

One can reasonably assume that the siege redoubt tactic, and other considerations, might have led to the development of the armoured chariot principle, which is roughly a faster moving siege redoubt. As long as the materials were available, it seems possible that both could also be employed simultaneously at some period during a fight, including the pitch battles.²³

BIBLIOGRAPHY

Albenda, P., 1986: Le palais de Sargon d'Assyrie. Paris.

Barnett, R., 1962: The Sculptures of Aššur–Nasir–Apli II (883–859 B. C.), Tiglath–Pileser III (745–727 B.C.), Essaraddon (682–669 B.C.) from the Central and South-West Palaces at Nimrud. London.

Barnett, R., 1976: Sculptures from the North Palace of Ashurbanipal at Nineveh (668–627 B.C.). London.

Barnett, R., 1998: The Sculptures from the South–West Palace of Sennacherib at Nineveh. London.

Bleibtreu, E., 1993: "Der Alltag assyrischer Soldaten nach Darstellungen auf neuassyrischen Reliefs", in J. Zablocka / S. Zawadski (eds.): Šulmu IV: Everyday Life in Ancient Near East. Papers Presented at

_

²¹ De Backer 2009, 65-75.

²² De Backer (forthcoming c).

²³ For further discussion on the evolution of the chariot employed as a weapon in the ancient Near East, see De Backer (forthcoming a).

- the International Conference Poznan, 19-22 September 1989. Poznan, pp. 27-33.
- Bleibtreu, E., 2002: "Zum Schema der Kriegsdarstellungen auf Neuassyrischen Wandreliefs des 9.-7. Jahrhunderts v. Chr.", in M. Bietak / M. Schwarz (eds.): Krieg und Sieg: Narrative Wanddarstellungen von Altägypten bis ins Mittelalter: Internationales Kolloquium, 29-30 Juli 1997. Wien, pp. 69-79.
- De Backer, F., 2007: "Notes sur certains sapeurs néo-assyriens", *Res Antiquae* 4: 45-64.
- De Backer, F., 2008: "Note sur les lanceurs de pavés", *Ugarit Forschungen* 38: 63-86.
- De Backer, F., 2009: "Some Basic Tactics of Neo-Assyrian Warfare", *Ugarit Forschungen* 39: 69-115.
- De Backer, F., (forthcoming a): "Notes on the Neo-Assyrian Siege-Shield and Chariot", in Sanmartín, J. (ed.): *Proceedings of the 56th Rencontre Assyriologique at Barcelona*.
- De Backer, F., (forthcoming b): "Notes sur les machines de siège néoassyriennes", in H. Neumann (ed.): Proceedings of the 52th Rencontre Assyriologique Internationale, Münster, 18-21 July 2006.
- De Backer, F., (forthcoming c): "The Neo-Assyrian Siege-Archers: Some Remarks", in G. Wilhelm (ed.): *Proceedings of the 54th Rencontre Assyriologique Internationale, Würzburg, 20-25 July 2008*.
- De Backer, F., (forthcoming d): "Some Basic Tactics of Neo-Assyrian Warfare: 2) Siege Battles", *State Archives of Assyria Bulletin* XVIII.
- Deszö, T., 2006: "The Reconstruction of the Neo-Assyrian Army as Depicted on the Assyrian Palace Reliefs, 715-612 B.C.", *Acta Archaeologica Academiae Scientiarum Hungaria* 57: 87-130.
- HEADQUARTERS, Department of the Army (1985): FM 7-7 The Mechanized Infantry Platoon and Squad (APC), Washington, D.C., 15 March 1985.
- HEADQUARTERS, Department of the Army (1992): Field Manual 7-8, Infantry Rifle Platoon and Squad, Washington D.C., 22 April 1992.
- HEADQUARTERS, Department of the Army (2001): Field Manual 3-90, Tactic, Washington D.C., 4 July 2001.
- King, L., 1915: Bronze Reliefs from the Gates of Shalmaneser King of Assyria B.C. 860-825. London.

- Malbran-Labat, F., 1982: L'armée et l'organisation militaire de l'Assyrie d'après les lettres des Sargonides trouvées à Ninive. Genève.
- Postgate, J. N., 2001: "Assyrian Uniforms", in W. H. Van Soldt (ed.): Veenhof Anniversary Volume: Studies presented to Klaas R. Veenhof. Leiden, pp. 373-388.
- Reade, J., 1972: "The Neo-Assyrian Court and Army: Evidence from the Sculptures", *Iraq* 34: 87-112.
- Wallis-Budge, E., 1914: Reign of Ashur-Nasir-Pal, 885-860 B.C. London.



Fig. A1: Infantry Archer of Assurnasirpal II. Drawing by the author.



Fig. A2: Infantry Archer of Assurnasirpal II. Drawing by the author.



Fig. A3: Infantry Archer and Spearman / Shield-Bearer of Assurnasirpal II.

Drawing by the author.

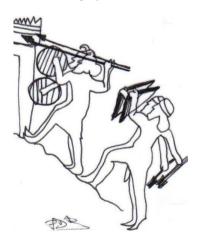


Fig. A5: Infantry Archer and Spearman / Shield-Bearer of Tiglath-Pileser III advancing towards the enemy during a siege. Drawing by the author.



Fig. A6: Infantry Archer and Spearmen / Shield-Bearer of Senacherib. Drawing by the author.

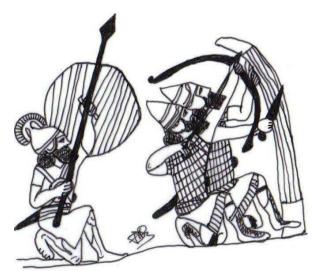


Fig. A7: Infantry Archer and Spearmen / Shield-Bearer of Senacherib. Drawing by the author.

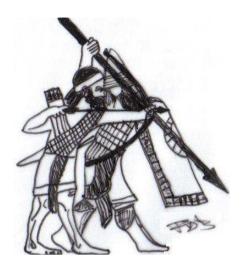


Fig. A8: Infantry Archer and Spearman / Shield-Bearer of Senacherib. Drawing by the author.



Fig. A9: Infantry Archer and Spearman / Shield-Bearer of Senacherib. Drawing by the author.

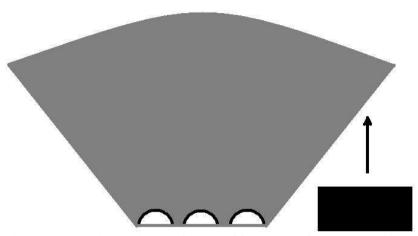


Fig. B1: Schematic description of a base of fire, as seen from above, with the siege redoubts as the three white spots, their angle of fire covered to the front in grey, and the assaulting element in black, the arrow indicating the direction of the enemy. Drawing by the author.

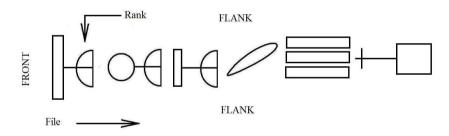


Fig. B2: Some useful terms used in this paper with the meaning intended by the author exhibited on the schematic of a neo-assyrian Multi-Purposes Tactical Group, as seen from above. Drawing by the author.

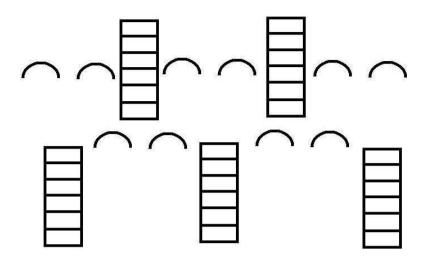


Fig. B3: Schematic description of the redoubts, as the circular spots, deployed in open order to cover the approach of a ladder assaulting unit, as seen from above.

Drawing by the author.

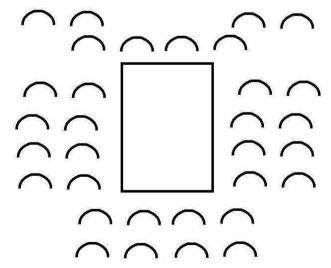


Fig. B4: Schematic description of the redoubts, as the circular spots, deployed in close order to cover the approach of a siege-engine assaulting unit, as seen from above. Drawing by the author.

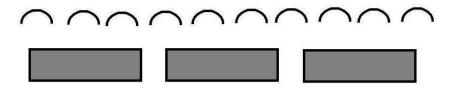


Fig. B5: Schematic description of the siege-redoubts, as the circular spots, deployed in close order to cover Infantry, in grey, as seen from above. Drawing by the author.

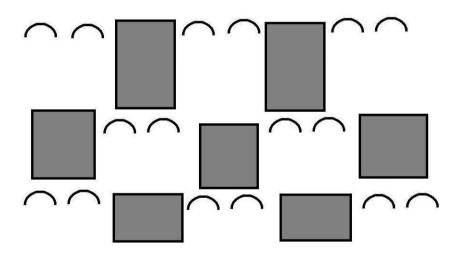


Fig. B6: Schematic description of the siege-redoubts, as the circular spots, deployed in open order to cover the approach of the Infantry, in grey, as seen from above. Drawing by the author.

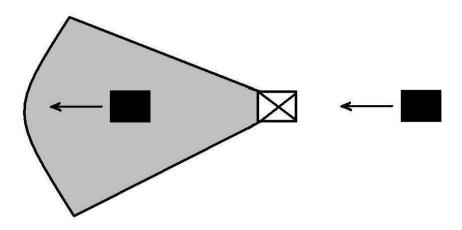


Fig. B7: Schematic description of the Shoot and Move Tactic, as seen from above. The siege-redoubts, as the crossed-squares, shoot missiles at the enemy, with the angle of fire in grey, while the assaulting units of the same file, in black, advance to the front. Drawing by the author.

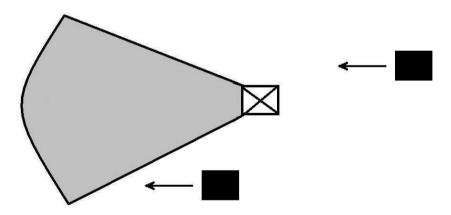


Fig. B8: Schematic description of the Shoot and Move Tactic, as seen from above. The siege-redoubts, as the crossed-squares, shoot missiles at the enemy, with the angle of fire in grey, while the assaulting units of alternating files, in black, advance to the front. Drawing by the author.

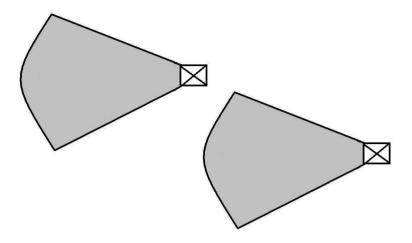


Fig. B9: Schematic description of siege-redoubts, as the crossed squares, with the successive fire ways alternating in the files, in grey, as seen from above.

Drawing of the author.

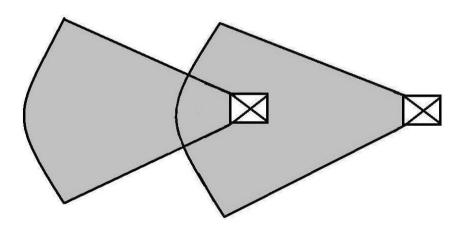


Fig. B10: Schematic Description of siege-redoubts, as the crossed squares, with the successive fire ways not alternating in the files, in grey, as seen from above.

Drawing by the author.

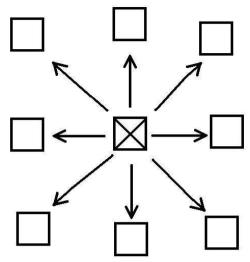


Fig. B11: Schematic description of a siege-redoubt, as the crossed square, with all the surrounding assaulting parties it can cover, as seen from above. Drawing by the author.

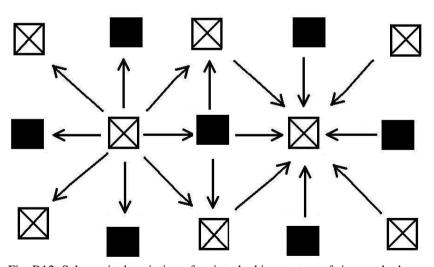


Fig. B12: Schematic description of an interlocking pattern of siege-redoubts, as the crossed squares, and assaulting parties, in black, and all the possibilities for mutual cover, as seen from above. Drawing by the author.

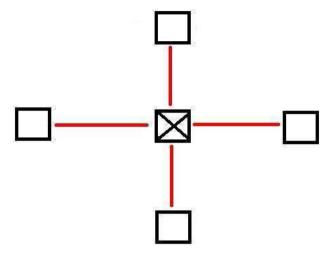


Fig. B13: Schematic description of a siege-redoubt, as the crossed square, and the surrounding assaulting parties with which it can create "fire teams", as seen from above. Drawing by the author.

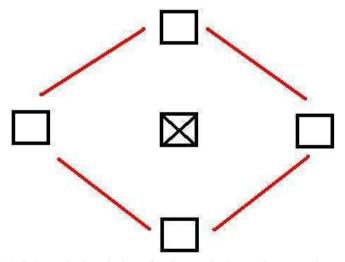


Fig. B14: Schematic description of a siege-redoubt, as the crossed square, and all the surrounding assaulting parties which can create "fire teams" to cover it, as seen from above. Drawing by the author.

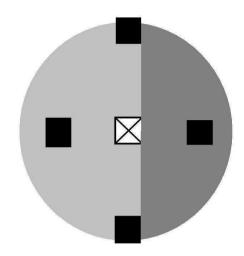


Fig. B15: Schematic description of the siege-redoubts cover, depicted as the white crossed-square, as seen from above. The covered assaulting elements are represented in black, with the Direct Cover in dark grey to the front, and the Indirect Cover in light grey, to the rear. Drawing by the author.

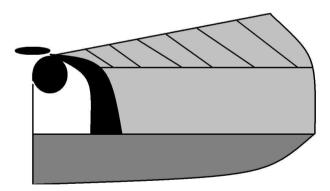


Fig. B16: Schematic description of the siege-redoubts cover, as seen from aside. The huge shield appears in black to the front, with the added smaller ones of the side and top as well. The angle of fire is depicted in grey to the right of the picture, with the direct shooting and the hyperbolique shooting angle, in striped grey. The dark grey under the horizontal line shows the possible lateral angle of fire of such a siegeredoubt. Drawing by the author.