

Zeitschrift: Ferrum : Nachrichten aus der Eisenbibliothek, Stiftung der Georg Fischer AG

Herausgeber: Eisenbibliothek

Band: 88 (2016)

Artikel: "What do we talk about when we talk about logistics?" : Logistics, transport and the problems of the last mile in the Belgian army 1870-1918

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DOI: <https://doi.org/10.5169/seals-587253>

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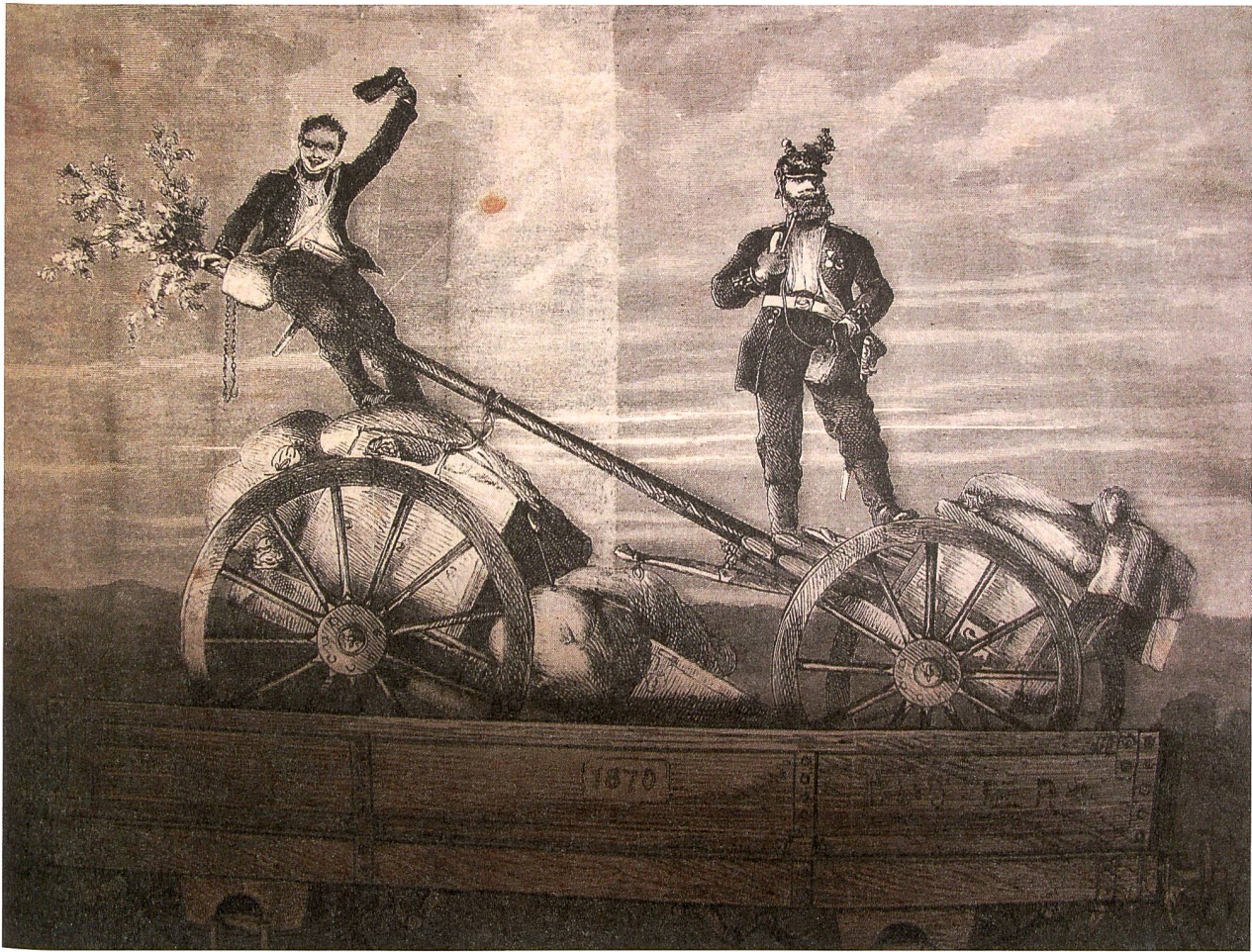
“What do we talk about when we talk about logistics?”

Logistics, transport and the problems of the last mile in the Belgian army 1870–1918

The new transport modes of the 19th century changed the logistic concepts of the armies dramatically. The main effects although were not perceived in the early years: armies used rail transport in the same way as they moved by road or waterway. It took years before planning and organizing of rail transport was internalized. The Franco-Prussian war formed a turning point for the Belgian army. All in a sudden was discovered that troops and freight moved at different speed. The general staff was confronted with the problems of the last mile to bring supplies from the rear with the troops. The logistic concept, rooted in the Napoleonic tradition was adapted in the ongoing years, but the organization of the services of the rear started only in 1904.

From the opening of the first Belgian railway line between Brussels and Mechelen on May 5th 1835 – about 20 years after the battle of Waterloo – until the armistice ending the Great War in 1918, the transport systems evolved enormously. Besides the existing road transport and inland shipping, railways, combustion engines, bicycles and aviation developed. One would think that armies, and in particular the Belgian army, developed a clear vision towards these new transport modes which severely affected at least their logistic concepts. As a matter of fact, it took years before rail transport was considered as an interesting concept for strategy. There was, however, little discussion of its use in logistics and in supply. A turning point was the Franco-Prussian War in which the Belgian military mobilized an

observation army of 50 000 troops. The analysis afterwards pointed to a series of shortcomings. Transport of troops was on the whole successful but intermodal solutions for the supply chain failed and the army was cut off from all supplies for several days. The experiences of this campaign resulted in proposals to ameliorate the transport capacity of the army, the planning and operations of rail transport, the conditioning of food and packing, etc. The elaboration of these proposals and the organization, however, took several decades. No measures were taken before the early 1900s to regulate the supply services by rail. It was a light version, adapted to the Belgian strategic concept of armed neutrality and adapted to the supplies that a soldier was carrying with him: a limited number of rations in his backpack; as a result, daily supply trains had to be organized from the logistics base Antwerp. Or is it the inverse: the organization



1 Towards the border. Engraving, 1870.

of daily supply trains caused a reduced stockpiling within army circles, affecting the readiness of the army in case of emergencies? For a better understanding of the evolution of the logistics concepts for the Belgian army, we have to look back to the far older experiences of Napoleonic warfare. In the period 1835–1840, contemporary military authors and writers merely followed the example of Jomini, although Clausewitz had been translated into French rather early.¹ Road transport and living off the land (supplying by purchasing or claiming) remained far more important than faster modes designed to move goods and troops, for many different reasons. One was historical (officers of the Grande Armée serving in the Belgian army); the wartime situation from 1830 to 1839 explains also why the Belgian army wasn't interested in this new transport mode. There were ideological reasons with consequences for the modal choice that played a role on the political scene (Catholics, in favor of road transport with "etappe" versus liberals, in favor of railway transport). The changes in the organization after the Franco-Prussian war were rooted in a model in which the State Railways played a considerable role in planning and executing transport services, while all handling of food and beverages were organized on army level. We will first look at the logistic concept of the early Belgian army

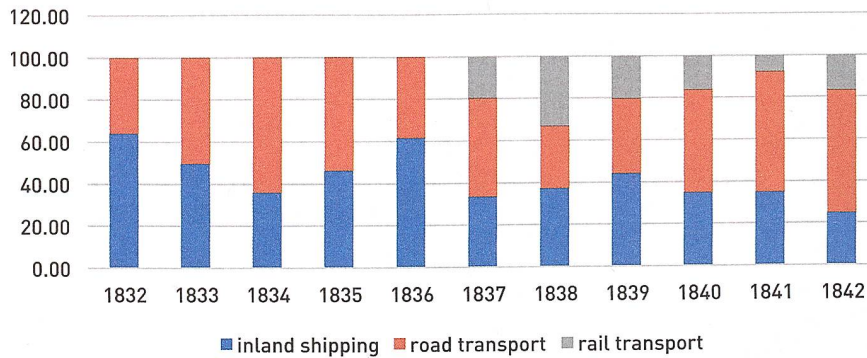
and the effects of it for the Belgian observation army during the Franco-Prussian war. Afterwards we will analyze the consequences and the evolution towards a better integration of transport services in the army. The ultimate test was the supply of the Belgian army during the Great War.

"Qu'on ne me parle pas de vivres." The origins of the logistic concepts of the Belgian army

The newly created Belgian army in 1830 consisted of volunteers, a kind of conglomerate of nationalists who had served on the barricades, what was left from the Dutch army or of officers of the Grande Armée. Some of them had no profound knowledge of the art of war, others were heir to an old tradition of Napoleonic warfare. A striking example of a veteran of the Grande Armée in the Belgian army was Louis Evain, general and minister of War. He had been an important driving force of the army reorganizations in the Napoleonic area. He was about sixty years old when the railway line from Brussels to Mechelen opened. In other words, he was familiar with the Napoleonic way of moving armies (*la victoire est dans les jambes*) and transportation of freight. The Belgian army was not a smoothly functioning machine; its equipment was deficient, its weaponry insufficient and it had a lack of horses. It was more or less one

Modal split army transport 1832–1842

2 The graph gives an overview of the modal split for army transport from 1832 to 1842.



of the important lessons Napoleon had given about thirty years before. Soldiers had to carry their own backpacks; five items could not be separated from the soldier or could not be left behind: the backpack, his rifle, the ammunition, the food and the engineering utensils. Why Napoleon insisted on this point was because of the savings he made in the baggage trains of the army by suppressing all the tents and the camping material for troops. What he expected to obtain was higher speed and greater efficiency of the cavalry. The shift from transported camping material and baggage towards a personal effort by the individual soldier resulted in the suppression of 6000 horses, necessary for the slowest part of his army: the transport section.

Clausewitz was a fine observer; he participated in the Napoleonic wars, as did Jomini. His writings were edited after his death in 1831 and thus he could not write about railways, the new transport mode that few years later was fated to trigger the dramatic change in the way armies mobilized and concentrated troops near the theatre of war, but he did not miss the opportunity to point out the results of the changes in the transport of baggage, with a certain nuance however:

"The mobility and the manageableness, if we may use the expression, of the parts of an army, both great and small, on the theatre of war have perceptibly gained by the diminution of baggage. Partly because with the same number of cavalry and guns, there are fewer horses, and therefore less often trouble about forage, partly because armies are no longer so tied to their positions, and there is no need to consider constantly a long train of baggage trailing in the rear [...] Generally the diminution of baggage tends more to a saving of energy than to the acceleration of movement."²

In terms of logistics, Clausewitz followed the Napoleonic way of conduct of war: He does not speak about logistics in a broad sense, the back office of warfare. He considers all these activities outside the conduct of war, combat and fighting and thus outside the theory: "Who would include in the conduct of war proper the whole catalogue of things like subsistence and administration? These things, it is true, stand in a constant reciprocal relation to the use of troops, but they are something essentially dif-

ferent from it."³ The analysis of transport and logistics by Clausewitz might have led to ignorance of the staff for the planning and organization of transport.

The Belgian army supplies followed the systems used by the Grande Armée and started from "on ne parle pas de vivres", a quote of Napoleon. The consequence was that strategic mobility and supplies were organized by the staff, but logistics and handling of goods were outsourced to the private sector. In that sense, logistics in the early years followed a kind of Clausewitzian paradigm. After a call for tender, all transport services for the year to come were adjudicated to the private sector. The question is to what extent the choice by Napoleon led to loss of experience in planning, handling, driving, etc., and leaves the domain of logistics open to definition almost on a case-by-case basis. There is no clear understanding of what logistics is, or of the way it relates to tactics and strategy in war.⁴

Until 1837, the modal choice was between inland shipping and road transport, depending on the regions where the army had its main activities. From this year on, the minister of the newly created department of Public Works, the liberal Nothomb, offered his colleague in the War department, the liberal Willmar, a 50 percent reduction on all transport of troops. However, the long-lasting wartime situation put the Belgian budget under enormous strain as a result of huge costs. The War department ate up almost 50 percent of the total budget of the Belgian state. One of the solutions was to reduce the costs of transporting troops. Supply and freight transport, however, continued to be shipped by the private sector.

We do not have data for a long term analysis. The modal part of inland shipping was considerable but road transport was gaining a more important part of the modal split. The transport efforts by rail were less substantial. The number of trips made by rail grew considerably from 1837 with peaks at each period of threat of war, but, compared to the total number of trips, the movements of troops were rather modest. During the Franco-Prussian war, about 261 000 trips were booked in the accounts.

Starting in 1837, the Belgian army began its long learning process in using rail transport and in understanding the systemic differences between road and rail trans-

port. This learning process affected not only strategic concerns, as will appear during the Franco-Prussian war, but also the drill. Owing to the design of the railway cars, for example, the army ordered soldiers to remove the bayonets from their rifles while moving through the railway cars in order to prevent possible accidents. As there was only one access to the railway cars, all the soldiers had to climb over the seats with their bayonets, possibly injuring those who had entered before them. Another example of design affecting the drill was the number of doors in each railway car. Belgian mobility during the 19th century was marked by commuter trains, and railway stock was built to allow quick boarding. Other types of rolling stock caused different procedures to embark and to debark, e.g. the use of rolling stock with platforms encouraged adaptation of the boarding drill.

Moving freight was a harder learning process. From 1846 on, freight could also be transported by rail. The government added rail transport in the call for tenders and stressed that it was to be used as much as possible wherever railway lines existed, but always with the cheapest solution in mind. Multimodal solutions continued to exist, because many locations were not linked to the railway network. The last mile problem was, however, well known from the experiences with inland shipping, but the overall idea was to look for door-to-door services, in which all transport was handled by one broker or service provider. Meanwhile, the velocity of the transport services did not change considerably. The time allotted to railways to bring the goods to the final destination was the same as for horse-drawn transport. For distances of 100 km, a transporter had four days; the Belgian State Railways had also four days to deliver the goods to their destination. The only advantage was the large amounts of goods that the railways could move in one operation, coupled with a lower price.

Contracting with the private transport sector for transport services came to an end in December 1860. The liberal minister of War (General Chazal) and the minister of Public Works (Vander Stichelen) came to an agreement in which the State Railways agreed to organize and execute all the transport services between all points of origin and all points of destination (so-called door-to-door system), even if it was along railway concessions or locations beyond railway stations, like destinations between Louvain and Diest, Hasselt or Herentals and the camp of Beverlo, or between Ostend and Nieuwpoort, between Recogne and Bouillon and between Namur and Dinant. Transport from the point of origin to the railway station and from the station to the final destination was included and organized by the railways. The payment of all transport was based on a fixed price for a one-year subscription. This was a logical consequence of the liberal policy, started in the late 1840s by the minister of Public Works Frère Orban; one of the objectives was to avoid subcontracting between the State Railways and transport customers. The former contracts took up several pages in the *Journal Militaire Officiel*, the new agreement only needed three pages, an administrative

simplification avant la lettre. It was also a firm reduction of administrative costs. The arrangement was to transport 3550 tonnes of freight at a fixed price of fr. 40000. But the unforeseen consequence was that the State Railways accumulated deficits; the system did not cover the cost for the use of private railway lines. In 1862 the deficit occurred and it accumulated year after year, until 1st January 1868, when the agreement ended. Two years later the mobility system was put to the test.

The 1860s were a turning point in more than one way: On the international scene Sadowa showed that the scales had tipped. At this moment, the knowledge of planning and organizing transport by rail was almost inexistent. Captain Louis Joseph Vandeveldé, one of the well-known Belgian Jominians, – “à un point tel que le maître s’effrayait parfois de la rigueur de son orthodoxie” – was a prolific writer, who had a very close relation to Jomini. He had influence, but he was not always followed in his opinion by the generals. At least on the question of transport and logistics, Jomini’s view predominated until 1866, when Vandeveldé became convinced of the effects of the acceleration of mobilization and of troop transport. He published his reflections in his book on the war of 1866:

“La promptitude que la vapeur est venue imprimer au rassemblements des armées, sans avoir rien changé aux grands principes de la stratégie et de la tactique des batailles, exige cependant qu’on apporte de grandes modifications dans l’ensemble des éléments qui constituent la force militaire des États. D’abord le rassemblement des masses et le ravitaillement des armées opérant avec beaucoup plus de célérité et de facilité, à l’avenir les invasions se feront plus promptement que par le passé et par conséquent, l’organisation des armées pour le temps de paix devra être combiné de manière à pouvoir passer sans la moindre entrave, immédiatement sur le pied de guerre. Les voies ferrées sont venues imprimer une telle mobilité aux armées, que les forteresses-frontières, et même les grandes positions fortifiées, situées dans l’intérieur du pays en dehors des grandes directions stratégiques, n’ont plus aucune valeur quant à la défense générale du pays.”⁵

Shortly after the publication of Vandeveldé’s book, military circles took greater notice of the issue, due to a publication by the civil engineer Body and to the lectures of de Formanoir, afterwards edited as a small booklet. Whereas de Formanoir focused his writings on strategy, Body also paid attention to logistics, but he stayed in the Napoleonic and Clausewitzian tradition: “Les dispositions usuellement employées pour le transport des marchandises alimentaires du commerce, sont intégralement appliquées au déplacement des approvisionnements de bouche des armées; nous n’en parlerons donc pas.”⁶ But he still provided useful examples and remarks for the transport and the conservation of foodstuffs. The so-called “pain de munition”, a loaf of bread, specially baked for the army, had a shape which enabled full loading of freight wagons, without losing space



Belgian soldiers of the "Régiment des Guides" on a railway truck of the railway station of Braine-le-Comte, August 1914.

3 Belgian soldiers of the "Régiment des Guides" on a railway truck of the railway station of Braine-le-Comte, August 1914.

4 Soldiers of the German artillery on a railway truck of the railway station of Braine-le-Comte, December 1914.

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between the breads, but it increased the risk of mould forming. Thus, either the form of the bread had to be adapted or the loading of the wagons with bread had to provide enough air circulation to prevent the loss of the supply. But the most important lessons – largely forgotten afterwards – were to transport together with the supplies a number of shelters and tarpaulins to create a temporary protection for the forage, bread and munitions. In this short notice on supplies, Body calculated the required capacity at six to seven trains of 116 700 kg, filled with rations for an army of about 100 000 men. These trains normally should run overnight and implied the supply of mobile ramps, lighting and men to unload the trains. The most important element for the service, however, was "d'avoir sous la main un nombre suffisant de véhicules de terre pour dégager successivement à destination ces approvisionnements et éviter en conséquence l'encombrement des gares."⁷ But it was all too little, too late. What Body wrote about in his book seems like fortune-telling. Why it took so much time to come to a certain level of "savoir faire" in railway matters was partly the outcome of the ideological choices made by Catholics or liberals. The Catholic party favoured road transport in the shape of an etappe service, in which troops were billeted on the population. This choice implied a transfer of funds from the War department to the agricultural sector. The liberals, for their part, opted for the use of the State Railways at reduced prices, creating a transfer of funds from the War department to the Public Works department.

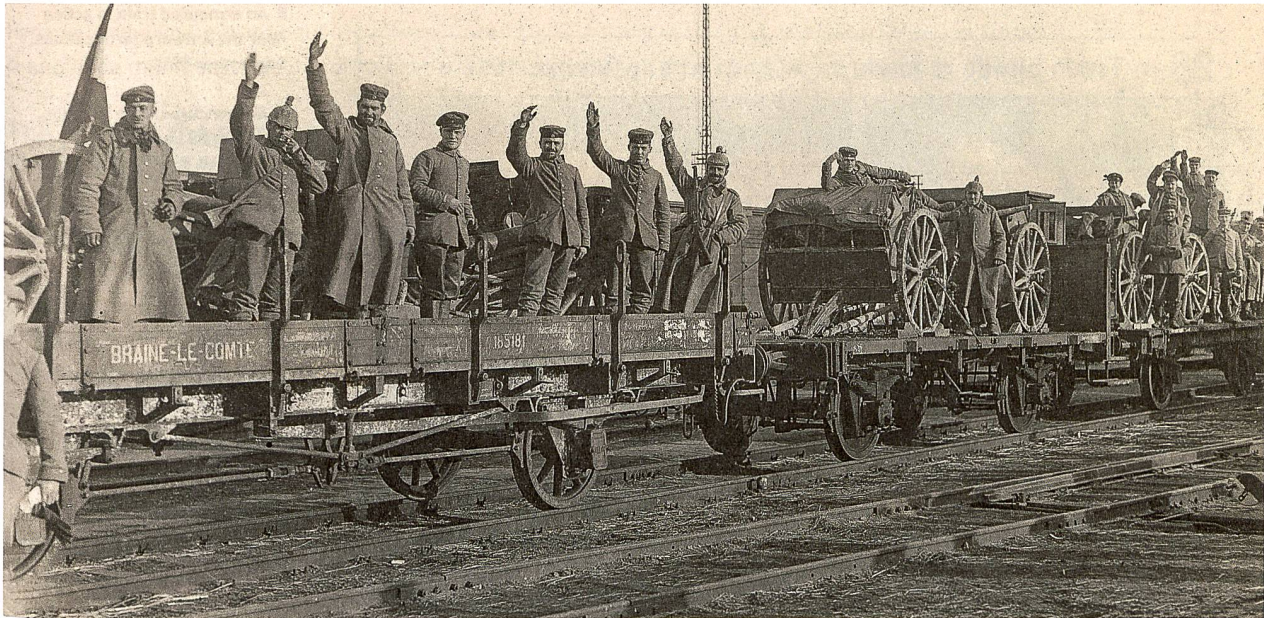
"On croyait le ciel politique parfaitement serein." The Belgian Observation Army and the Franco-Prussian War⁸

The Franco-Prussian war wasn't a bolt out of the blue, but the readiness of the Belgian army was affected by different elements, one of them being the political crisis after the dismissal of the liberal government of Frère-Orban, fol-

lowed by elections. A Catholic government was formed by Jules d'Anethan, who replaced Lieutenant-General Bruno Renard, the liberal minister of War, by Henri Guillaume on July 2nd 1870. Nine days later, the minister had to inform the military authorities that all furloughs had been cancelled. Four days later, on July 15th, the Belgian army was on a war footing. The Supreme command was in the hands of King Leopold II, and his chief of staff, Bruno Renard, former minister. Chazal became commander of the observation army. Both generals were well known liberals, while the minister was Catholic. It led to a certain imbalance between the decision-makers and it affected the logistics choices.

Mobilization took place and the Belgian army numbered 81 754 men on July 25th. The army took the field in August after long discussions on the crucial topic: supplies of food and fodder. The minister was in favour of temporary stockpiling along the railway lines to supply the troops on the move. Renard, however, did not agree. He maintained an older position: living off the land and sending supplies from the base in Antwerp. Chazal took an intermediate position: The troops were to live from their backpacks during marches and from the land during encampment – an approach that put a lot of leverage in the quartermaster's hands. As a result, "petits vivres" like dry food, biscuits, rice and other types of food had to be carried in the backpack so that they arrived on time.

It was clear that the solutions of Renard and Guillaume could not work. In August the army itself lacked about 80 percent of its horses for its own traction (artillery, different trains etc.). Once this problem was solved, a new one occurred as there was a tremendous lack of hay on the markets and it became difficult to feed all the animals. The final solution was suggested by the Quartermaster-General, who said that, with some improvisation, he could organize the supply of bread and meat for 25 000 troops in a short time. What kind of improvisation he had in mind was



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not communicated to the supreme commander. The major difficulty, he added, was to know where the army divisions were concentrated. All the supply lines ended up in the *etappe*, where troops had to haul their own supplies. The transport mode for the last mile was the rolling stock of the battalions. Therefore, the use of the artillery horses was necessary. It was the weakest link in the transport chain.

Guillaume was optimistic, Chazal was not at all confident in the proposals of the Quartermaster or the minister. He expressed his disappointment in a letter to the King's secretary, Jules Devaux: "an army", he wrote "is not a stone that can be launched whenever you want. An army eats, drinks, needs to rest or to be sheltered or it will (pardon me my rude language) fart in your hand. In anticipation of what will happen and the necessity to move forward in a very sparsely populated area without resources and food, I asked the general staff this morning by wireless if somebody had foreseen to supply our army with fodder and food. They had forgotten to give an order." After few days, it became clear that Chazal was right. The supply of the "petits vivres" did not follow the movements of the army. He wrote almost daily to the Chief of Staff that he had received more bread than asked for, but that there was a tremendous backlog of all other goods. There was no lack of bread, he even had not asked for it, the troops did not receive the "petit vivres" like rice, coffee, salt, biscuits etc., necessary to eat and drink during the marches. What was sent by rail was somewhere on the network, but nobody could answer the question where the trains were sent to. It could have been a good lesson to keep in mind: Armies on the move are very difficult to supply by rail.

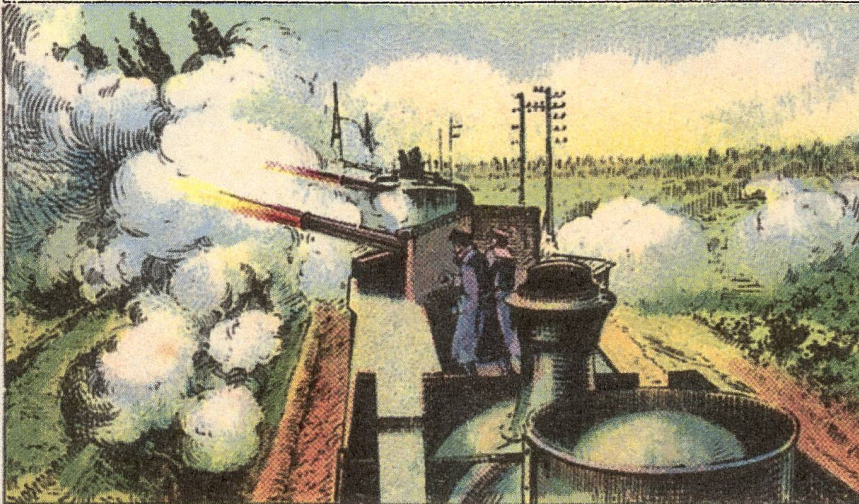
By the end of August, the observation army was near the Semois river and supply was organized from five temporary depots. The Quartermaster-General had nevertheless lost his confidence in the system and he informed the minister: There was not enough staff to supply the army

and there was not enough transport to bridge the last mile. To bring the supplies to the final destination was the real challenge. These destinations are far away from each other and the requisition of horses was almost impossible; there were hardly horses and wagons available for requisitioning. The discussion on the backlog ran like a common thread through the wartime period. The most serious problem was the lack of transport. The old system, contracting with the private sector, no longer worked, and the new one, rail transport, needed a transport effort to be organized by the general staff. Chazal wrote a strongly worded comment to Renard, the Chief of Staff, during the operations:

"Pour faire mouvoir une armée il faut avoir une administration outillée pour la faire vivre. On ne m'a pas envoyé un seul fourgon pour transporter les vivres qui arrivent par le chemin de fer et on blâme mon intendant d'avoir requis des charrettes de transport. Nonobstant ce blâme je maintiens l'ordre de ces réquisitions et je fais charger les charrettes de tout ce que les soldats déjà surchargés ne peuvent pas porter."⁹

The conclusion of Guillaume after the war was rather simple: Railways lent themselves much more for the transport of troops but not for volume transports like food and fodder. It seemed if passenger transport was much faster than freight. The opposition and the majority in the parliament asked for a parliamentary commission to investigate the shortcomings of the army on different levels, but Guillaume reacted with a report analyzing all the problems such as mobilization, though he did give some attention to army logistics and the problem of the last mile. He was astonished to see that it had taken about six to eight days to send 100 000 kg of hay to the army.¹⁰ The members of parliament decided to install a mixed commission, composed of military officers and members of parliament. A growing knowledge of rail operations was an immediate consequence of the war in itself and of the proceedings of the

28 Train blindé à Anvers. — Août et septembre 1914.



28 Gepantserde trein te Antwerpen. — Aug.-Sept. 1914.

5 An armoured train in action near the Antwerp fortifications, September 1914.

6 An armoured train in action, Hommage à l'armée belge, 1914-1918, Anvers, Calabro, s. a.

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commission. New publications were edited but the main question, the lack of transport, was hardly answered. The decision to create a transport corps was taken, the so-called train battalions, but it took several decades before any action was undertaken to make it function. This wasn't the case for rail transport.¹¹ Measures were taken for railway operations (operating steam engines, railway engineering, etc.) but not for transport planning. In 1874 the engineers' corps was reorganized and expanded with five specialized groups, including the Railway company. Planning continued until 1887, due to reorganization and creation of a general staff. In other words, the problem of the last mile continued to exist. The services of the rear were organized in 1904. It was the first step to create services dealing with supply on a larger scale, with integration of transport, but without decision-making capacities in planning, nor the functioning of the special services for canned food, dry vegetables etc.

The services of the rear were also responsible for reverse logistics, and thus had a large portfolio of tasks to manage. But with the Agadir crisis in 1911 it became clear that the Belgian army was not ready to face an international

conflict. Again, there was not enough food, fodder, ammunition etc. in stock. In calculating the demand for flour, the army reckoned a stock of one month's consumption, equal to 30 million kg. In early August 1911, only 2.6 million kg of flour was in stock. The backlog in the delivery wasn't the largest problem. Vandervelde, a member of parliament of the Socialist Party, pointed at two major problems: the stocks were distributed all over the country in 13 military bakeries, coupled with the false feeling of security, because a fast transport system and a smoothly performing railway network allowed the government to reduce the stocks to an extremely low level. The necessity of stockpiling was no longer felt as such, because rail transport made it possible to obtain an enormous flow of goods in a very short space of time. This statement, coupled with the discussion of daily supply by rail, create a certain sense of security: soldiers were carrying one day's rations in their backpacks; the second day's rations were kept in the battalion's "voitures de vivres"; the third one was stock on wheels, driven by the "equipage d'approvisionnement"; the fourth one came with the "colonne de vivres"; and the fifth day's supply was in the railway wagons of the "parc sur rails". This was one possible approach: The trucks with food (voitures de vivres) followed the battalion with the baggage train, but it was not certain that the other rations would arrive on time. A functioning railway network made supply within a reasonable time lapse possible, but that was in peace time. It was a kind of just-in-time delivery avant la lettre. But Vandervelde, MP, was right: the measures for fast transport were functioning in peace time: "Par suite de l'extrême facilité des communications en temps de paix, les provisions de farine et les stocks de blé sont toujours réduits au minimum et pouvaient tout au plus, [...], suffire, pendant quelques jours, à la consommation générale [...] au bout de quelques jours

l'armée mobilisée eût manqué de vivres, comme elle eût manqué de munitions. Pas de cartouches et pas de pain!"¹²

The proof of the pudding.

Belgian army logistics and the Great War

Transport has high visibility in the war efforts of armies, and in Belgium too. The mobilization required an enormous effort from the Belgian State Railways to bring all the troops to the concentration locations decided by the general headquarters. Less visible is the endeavour to feed the army. The demand for supplies is more or less constant and thus less visible than strategic and tactical moves of the army. We limit our analysis here to the efforts to supply the army divisions.

The quartermaster of Antwerp was responsible for the supplies of the entire field army and also of the army divisions in the fortresses of Antwerp, Liège and Namur. The quartermasters of the army divisions only had to ensure the supply of cattle to meet the demand for meat. The main tool for the supply was the daily train (trains journaliers), organized on the level of an army division. It was a rolling warehouse avant la lettre where the divisions came to pick up all the supplies necessary for one day. Army divisions with bigger stocks than allowed had to send back their stocks to the base with these daily trains. Trains ran from Antwerp to several destinations, and were sent back to the base to receive a new trainload for the next day. In addition to the daily trains, evening trains were temporarily organized. Rations in the backpack were hardly deemed necessary, due to the possibility of daily supply.

Railway operating was difficult during the first months of the war, but the Belgian State Railways board managed to fulfil the expectations. A weak link in this supply chain was the transshipment from the train to cars or trucks for the last mile to bring all supplies to the troops. Backlog prevention started from a series of additional services and warehouses to bring together all supplies needed. All the necessary steps in these processes were analyzed in regulations, orders and circular letters, but the knowledge was not widespread. A striking example: The man responsible for the special warehouse of oil and gasoline was informed about the way to organize the missing link between the supply trains and the army divisions when he received the order to be operational within forty-eight hours. Everything ran smoothly thanks to the engineers of the oil industry. A major threat to the supply chain, though, was that army divisions kept the petrol cans instead of returning them.

The weakest link, however, was the staff responsible for executing all the tasks foreseen in the transport. The railway company of the engineers was hardly trained to run trains because basic knowledge was not internalized. Trains had to run in a standard composition, without changes, but nevertheless rolling stock was added and thus it happened that trains couldn't be unloaded at the railway station, assigned to the divisions, because the trains were longer than the length of the tracks. The so-called "Train Battalions", responsible for the road transport, were reor-

ganized in 1913 as "Transport Corps", composed of six to seven companies per army division. Discipline was also not respected in the road transport corps. Troops did not wear their battledresses, speed limits were not respected, cars and trucks were used for civilian purposes of their own, like bringing the girls back home: "notamment des dames ambulancières dont, je le répète, la place n'est pas au milieu des troupes. Toute infraction à cet égard, sera sévèrement réprimée de même que l'abus semblable fait de toute autre voiture automobile au service de l'armée."¹³ De Selliers, Chief of the General Staff of the Belgian army attributed these anomalies to the young age and the lack of experience of the troops. The number of car drivers was very high and the logistical knowledge more or less inexistent. Even with the repeated remarks by the headquarters in mind, the supply of the army divisions was effected at an acceptable level. At the end of September 1914 the decision was taken to evacuate the logistics base at Antwerp and to create a new one in Ostend. A few weeks later, the entire logistic services had left Belgian territory and were housed in Calais.

It took some months to get the service entirely organized, but from this moment, supply services ran faster and on a more regular basis. Army divisions hardly changed their locations due to the trench warfare, which made planning easier. The local distribution, the so-called problem of the last mile, was solved thanks to the use of narrow gauge railways, besides the existing transport companies of the army divisions. Every night, about 150 horse-drawn trucks were operated to bring all the necessary supplies to the front-line. About 10 000 troops served in the transport regiment. One element changed dramatically, however. There was a huge demand for engineering materials, which required a lot of capacity, on both sides of the front line. Nevertheless, railways had proven to be capable of moving enormous loads necessary for trench warfare. From September 1918 on, the allied armies moved forward and, again, supply by train became difficult. But the relative success of the supplies by railway made the Belgian army opt for railway logistics instead of road solutions. It became the ultimate solution for the Belgian army in 1940, but this was one war too late. ■

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- 1 August Snieders, *Gedenkboek van den oorlog in 1870 en 1871*, Antwerpen, Van Dieren, 1872
- 2 Paul van Heesvelde
- 3–6 Brussels, Coll. Paul Pastiels

Annotations

- 1 Antoine Henri Jomini: *Précis de l'art de la guerre, ou Nouveau tableau analytique*. Paris 1838, 2 vol; Carl von Clausewitz: *On War*. O. J. Matthijs Jolles translation. New York 1943; Id.: M. Howard and P. Paret translation. New Jersey 1984; Bruno Colson: *La première traduction française du Vom Kriege de Clausewitz et sa diffusion dans les milieux militaires français et belge avant 1914*. In: *Revue Belge d'Histoire Militaire*, vol. 26, 1986, p. 345–364.
- 2 Clausewitz, *On War* (like note 1), V, 11, p. 277.
- 3 *Ibid.*, II, 1, p. 63.
- 4 Dominico Proença Júnior and E. E. Duarte: The concept of logistics derived from Clausewitz: All that is required so that the fighting force can be taken as a given. In: *Journal of Strategic Studies*, 28:4, 645–677. See also Th. Bruscino: *Naturally Clausewitzian. U.S. Army Theory and Education from Reconstruction to the Interwar Years*. In: *The Journal of Military History*, 2013, 77 – 4, p. 1251–1275.
- 5 L. J. Vandevelde: *La guerre de 1866*. Paris 1869, p. 181. See for the growing knowledge of railway operations in military circles.
- 6 M. Body: *Aide-Mémoire portatif de campagne pour l'emploi des chemins de fer en temps de guerre, d'après les derniers événements et les documents les plus récents*. Liège 1870, p. 174.
- 7 *Ibid.*, p. 175.
- 8 The Belgian military intervention in the Franco-Prussian War is well documented by the records kept in the Documentation Centre of the Royal Army Museum in Brussels (KLM–MRA). See also W. Steurbaut: *De Belgische mobilisatie van 1870*. In: W. Klinkert, J. W. M. Schulten and L. De Vos (ed.): *Mobilisatie in Nederland en België 1870–1914–1939*. Amsterdam 1991; and C. Bechet: *Traverser la Belgique? De l'Indépendance au Plan Schlieffen (1839–1905)*. PhD, Université de Liège 2012.
- 9 KLM–MRA, 1870–1871, 108, Letter from Chazal to Renard, 31 August 1870.
- 10 Documents of the Parliament, Chamber, 1870–1871, 114, *Rapport du Ministre de la Guerre sur la Mobilisation de l'Armée en 1870*, 31 mars 1871, p. 30.
- 11 Paul van Heesvelde, M. Van Meerten, P. Pastiels and B. Vanderherten: *Destination le Front. Les chemins de fer en Belgique pendant la Grande Guerre*. Racine – Lannoo 2014.
- 12 *Annales Parlementaires*, 1911–1912, December 1st, 1911, p. 151, Intervention of MP Vandervelde.
- 13 Centre de Documentation Historique, Brussels, OJA 1914, *Ordre journalier* of 12 August 1914.