

# Barbecue, Jerked beef, and Sardines: the logistics of Brazilian Army of the Triple Alliance


*Asado, Jabá y Sardinias: la logística del Ejército Brasileño en la Guerra de la Triple Alianza*

**Abstract:** The War of the Triple Alliance brought unprecedented logistical demands to the Imperial Brazilian Army. Before that, the largest land force employed in external operations had been the army corps sent to the Platine War (1851-52), composed of just over 16,000 men, in operations that lasted for five months, with the occurrence of just one battle. The War of the Triple Alliance lasted for more than five years, during which the Brazilian Army had to provide supplies and services to an army of almost 50,000 men, deployed thousands of kilometers away from the main support bases located in Brazilian territory and operating on a theater of war only accessible by sea and river. This article evaluates the organization and performance of Brazilian Army's logistic structure during the conflict, specifically in terms of war industry; supplies; transportation; and health services.

**Keywords:** Paraguayan War; War industry; Supplies; Transportation; Medical service.

**Resumen:** La Guerra de la Triple Alianza planteó demandas logísticas sin precedentes al Ejército Imperial Brasileño. Antes de ella, la mayor fuerza terrestre empleada en operaciones exteriores había sido el cuerpo de ejército enviado a la Guerra del Plata (1851-52), compuesto por poco más de 16.000 hombres, en operaciones que se extendieron por cinco meses, con la ocurrencia de una sola batalla. La Guerra de la Triple Alianza se extendió por más de cinco años, durante los cuales el Ejército Brasileño tuvo que abastecer de suministros y servicios a un ejército de casi 50.000 hombres, desplegados a miles de kilómetros de las principales bases de apoyo en el territorio del Imperio y operando en un teatro de operaciones al que solo se accedía por vía marítima y fluvial. Este artículo evalúa la organización y el desempeño de la estructura logística del Ejército Brasileño durante el conflicto, particularmente en las áreas de industria militar; suministros; transportes; y servicios de salud.

**Palabras clave:** Guerra del Paraguay; Industria Bélica; Suministro; Transporte; Servicio de Salud.

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*Osório gave us barbecue  
Polidoro, cassava flour,  
The Marquis gave us jerked beef  
And his highness, sardines.<sup>1</sup>*

## 1 INTRODUÇÃO

The War of the Triple Alliance (against Paraguay, 1864-1870) entailed unprecedented logistical demands on the Brazilian Imperial Army. Prior to it, the largest Brazilian Army force employed in foreign operations had been the army corps sent to intervene in the Uruguayan civil war in 1851 under Count of Caxias' command, in what became known as the Platine War or the War against Oribe and Rosas (1851-1852). Caxias army corps consisted of four divisions, 23 artillery guns, and just over 16,000 men. Its main column was accompanied by a convoy of more than a hundred wagons carrying ammunition, food, supplies, equipment, and more than 50 wagons of sutlers that followed the moving army (Alencastro, 1864).

All the operations in which the Brazilian Army Corps engaged from September 1851 to February 1852 took place in Uruguay (an almost geographical continuation of the province of Rio Grande do Sul) and Argentina, near Buenos Aires, a region easily accessible by Río de la Plata. Operations in Uruguayan territory against the *caudillo* Manuel Oribe lasted for a little more than a month—from September 4 to October 11, 1851, when Oribe surrendered—and produced no major battles. The brief operations against the governor of Buenos Aires, Juan Manuel de Rosas, involved only one Brazilian division, with a force of 4,022 men. They began on December 17, 1851, as this division embarked on ships of the Brazilian Navy bound for Argentina, and ended on March 1, 1852, as they returned to Uruguay after a single battle in Caseros, near Buenos Aires, on February 3, 1852 (Titara, 1852).

On the other hand, during the War of the Triple Alliance, which lasted for more than five years, Brazilian Army had to provide supplies and services to a force of almost 50,000 men deployed thousands of kilometers away from the main support bases in the Brazilian Empire territory and operating in terrain only accessible by sea and river. The challenge represented by a conflict of great magnitude in the heart of the continent required not only an enormous effort to mobilize personnel, in order to fill the ranks of an army with huge manpower, (by South American standards), but also to meet the logistical needs of that army.

This paper aims to evaluate the organization and performance of the Brazilian Army logistical structure during the War of the Triple Alliance, especially its military industry; supply of weapons, ammunition, equipment, uniforms, food, and fodder; transportation of personnel,

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1 In Portuguese: “*Osório dava churrasco / E Polidoro farinha, / O Marquês deu-nos jabá / E sua alteza, sardinha*”. An anonymous stanza recited by Brazilian soldiers that referred to menu changes throughout the War of the Triple Alliance as commanders-in-chief succeeded each other (Cerqueira, 1980, p. 112): generals Manuel Luiz Osório and Polidoro Quintanilha Jordão, the Marquis of Caxias, and the Count D’Eu, who, in marrying Princess Isabel, received the title of highness.

armament, and goods departing from the Empire to the theatre of war; transportation inside the area of operations; and health services.

## 2 MILITARY ADMINISTRATION REFORMS IN THE 1850s

The army that waged the war against Paraguay was deeply marked by a series of reforms that had been implemented in the 1850s, giving it greater administrative rationality and forming a markedly professional cadre of officers, unlike the military forces of the other countries in the Río de la Plata Basin.<sup>2</sup>

The military reforms of the 1850s stemmed from the political stability the Empire enjoyed after the end of the Farroupilha Revolution in 1845 and the suppression of the Praieira Revolution that agitated the province of Pernambuco between 1848 and 1850. This political stability enabled the Ministry of War administration to continue for prolonged periods, unlike previous governments, in which ministers of war succeeded each other every few months at the whim of political fluctuations. From 1848 to 1857, the Ministry of War had only three ministers: Manuel Felizardo de Sousa e Mello (from 1848 to 1853), Pedro de Alcântara Bellegarde (from 1853 to 1855), and the Marquis of Caxias (from 1855 to 1857).

One of the most forceful actions of Manuel Felizardo's administration was approving a law on the access and promotion of officers, enacted in September 1850.<sup>3</sup> Its purpose was to establish clear criteria and limits for access to Army Officer ranks and successive promotions throughout officers' careers, preventing the deferment and cronyism that enabled "well-connected" officers to reach high command positions at an early age. From the approval of the new law in September 1850 onward, promotions would be gradual and successive, always starting in the rank of ensign (or second lieutenant).<sup>4</sup> The new law also established a minimum age of 18 for obtaining an officer rank and minimum lengths of service in each rank before the officer could be promoted to the next rank. From its enactment, it was set that all officers of artillery branch, Corps of Engineers and Corps of General Staff, the first-class, must have completed the Military College course. Even for careers to which academic background was not mandatory, such as infantry and cavalry, promotions were preferably given to those who had completed the Military College.

The day-school regime in force at the Military College up to the early 1850s and its focus on mathematical and physical sciences were far from instilling a professional military ethos into students. Its facilities were cramped and offered no accommodation to students. As a result,

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2 The Royal Military Academy, created by the Prince Regent D. João in Rio de Janeiro in 1810, was one of the first schools for training land force officers in the Americas, preceded only by the Royal Military College of Canada, established in 1776, and the United States Military Academy (West Point), established in 1802. In the neighboring countries of Río de La Plata Basin, the Argentine Army *Colegio Militar de la Nación* was founded in 1869; the Uruguayan Army Military College, in 1885; and the first military course for training officers of the Paraguayan Army, in 1915.

3 BRASIL. **Lei nº 585, de 6 de Setembro de 1850.** *Regula o acesso aos postos de officiaes das differentes armas do Exercito.*

4 In 19th-century Brazilian Army, the first rank of officer in infantry and cavalry branches was that of ensign (*alferes* in Portuguese). In artillery and in the Corps of Engineers, this rank corresponded to that of second lieutenant.

vacancies were limited, and students who did not have residence at the Court of Rio de Janeiro had to stay in boarding houses and student dormitories close to the College, located in Largo de São Francisco de Paula, in the central area of the city. As Manuel Felizardo observed, “our college has all the elements to make wise men; few, however, to form Officers” (Brasil, 1851, p. 9; our translation). Another shortcoming of military education at the time was its limited reach – the Military College was located in the Court of Rio de Janeiro, very far from the Southern and Northern provinces, where many units were based, and whose officers, cadets and soldiers saw the course from that institution as the best option for a career as officer. The Minister of War clearly deemed that the government had to facilitate the education of the military personnel once the law recognized the need for military education.

The solution to the first problem was splitting the Military College into two establishments at the Court. The Military College (later renamed Central College) continued to operate on Largo de São Francisco, focusing on physical and mathematical sciences; whereas a new Application College (later renamed Military and Application College), installed at the old Praia Vermelha fortress, offered practical education.<sup>5</sup> The second problem was solved by establishing an Infantry and Cavalry Course in Rio Grande do Sul in 1853.<sup>6</sup> This new course would avoid the expenses of transporting military students to the Court and would make it easier for them to rejoin their units during emergencies.

Manuel Felizardo administration also created an office for the material administration of the army. At the time of the concentration of Imperial Army forces in Rio Grande do Sul in 1851, the Ministry of War had already become aware of the disorganization of the military administration. When the Count of Caxias arrived in Southern Brazil to take command of the imperial forces, he was unable to find the weapons, ammunition, and equipment necessary to supply the Army of the South, hindering the beginning of the campaign (Brasil, 1852). The creation of the Quartermaster-General Office in 1853 solved the problem of the material administration of the army. This new body was responsible for maintaining the records, control and supervision of weapons, equipment and supplies distributed to units in times of peace and war, as well as all barracks, fortifications, arsenals, hospitals, and other military establishments.<sup>7</sup>

The setting-up of the Quartermaster-General Office was complemented by the creation of a corresponding body to control the management of army personnel in January 1857 during the Marquis of Caxias term in charge of the Ministry of War. The Office of the Adjutant-General of the Army was in charge of matters such as discipline, promotions, health service, recruitment, officers’ almanac, personnel statistics, etc. Furthermore, it was responsible for supervising the movement, discipline, supply, and administration of all army units. Its holder, the Adjutant-General of the Army, became the

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5 BRASIL. **Decreto nº 1.536 – de 23 de janeiro de 1855.** *Crea huma Escola de Applicação do Exercito, na conformidade do Regulamento, que com elle baixa.*

6 BRASIL. **Decreto nº 634, de 20 de Setembro de 1851.** *Sancciona a Resolução da Assembléia Geral creando na Provincia de S. Pedro do Rio Grande do Sul hum curso de Infantaria e Cavallaria.* Although the course had been created in 1851, the Platine War (1851-52) delayed its effective installation, which would only happen in 1853.

7 BRASIL. **Decreto nº 1.127, de 26 de fevereiro de 1853.** *Crea a Repartição de Quartel-Mestre General, e regula as suas funções.*

first military authority of the Army, and, as such, the immediate executor, promoter, and supervisor of the execution of orders from the Minister of War regarding the organization, discipline, and administration of the Army.<sup>8</sup>

The following November, Caxias ordered the creation of offices of Quartermaster-General and Adjutant-General in the army corps to be organized as observation or operation forces.<sup>9</sup> These offices would be headed by a deputy (representative) of the Adjutant-General of the Army and a deputy of the Quartermaster-General of the Army, both with the rank of general or senior officer. The offices of the adjutant-general and quartermaster-general in the army corps would be understood as “branches” of the corresponding offices existing in the Ministry of War. Replicating the precedence of the Adjutant-General of the Army, his deputy would exercise the function of Chief of Staff of the army corps. Finally, in the headquarter of each division and each brigade that was part of the army corps, there would be an assistant to the deputy of the adjutant-general and an assistant to the deputy of the quartermaster-general. These assistants could be senior officers or captains.

Notably, the Army preferred officers from the Corps of Engineers and from the 1st Class General Staff to occupy functions related to logistics and senior management of forces in operations. This preference considered that the officers of these special corps had graduated from the longest and most rigorous courses in the Military College in terms of scientific studies, being considered the most qualified officers in the army.<sup>10</sup> As an example of this preference, when the office of the Quartermaster-General of the Army was created, it was established that the heads of its three sections should be held preferably by engineers or 1st-class staff officers. Similarly, the Marquis of Caxias appointed three engineer officers to his staff when he took command of the Brazilian forces in Paraguay, two of whom would be his secretaries (*Exercito em Operações*, 1877b).

All these reforms in the 1850s institutionalized the Imperial Army with a leadership composed of professional officers with adequate academic training. Although during the War of the Triple Alliance the army had to rely on the help of many improvised officers in the numerous units of National Guard and Homeland Volunteers that increased its manpower, its command structure was always made up of professional officers, most of which received training at a military college.<sup>11</sup>

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8 BRASIL. **Decreto nº 1.881, de 31 de Janeiro de 1857.** *Approva o Regulamento para a Repartição do Ajudante-general do Exercito.*

9 BRASIL. **Decreto nº 2.038, de 25 de novembro de 1857.** *Crea as repartições de Ajudante e de Quartel-mestre-general nos corpos de Exercito de observação ou de operações que se organisarem no Imperio.*

10 Until the beginning of the 20th century, Brazilian Military College courses had a clear intellectual hierarchy: at the base there was infantry and cavalry course, lasting from one to two years according to the changes in the Army teaching laws; then came artillery course, lasting from three to four years. Above artillery course, there was the general staff course, which spanned over four to five years of studies. The engineering course was at the top of the pyramid, lasting from five to seven years. Engineer officers were seen as the intellectual elite of Brazilian Army.

11 All general officers who held the position of Commander-in-Chief of Brazilian land forces and commanders of army corps during the Paraguayan War were regular officers of the Imperial Army. The same can be said about division commanders, with the very few exceptions of National Guard officers with great military experience, such as honorary brigadiers José Joaquim de Andrade Neves and José Gomes Portinho. Out of the six officers who held the positions of commander-in-chief and effective commander of army corps in the Paraguayan campaign (Marquis of Caxias, Count D’Eu, Manuel Luiz Osório, Manuel Marques de Souza, Alexandre Gomes de Argolo Ferrão Filho, and Polidoro da Fonseca Quintanilha Jordão), only Generals Osório and Marques de Souza had failed to attend an officers training college.

### 3 MILITARY INDUSTRY

The War Arsenal of the Court (Rio de Janeiro) configured the main logistical support mechanism of the Imperial Brazilian Army. In January 1867, it had 662 workers in 13 workshops: tailors; cartwrights; saddlers; blacksmiths; tinkers; tinsmiths; machine builders; mathematical instruments; fine carpenters; painters; locksmiths; turners; and cooper (Brasil, 1867).<sup>12</sup> There was also two companies of military workers, with 306 men (Brasil, 1867).<sup>13</sup> The Court Arsenal also controlled two external facilities: the Weapons Factory at Conceição Fortress, and the Pyrotechnic Laboratory of Campinho.

The War Arsenal of the Court worked not only as an industrial facility but was responsible for the acquisition and supply of all military items for the army: weapons, ammunition, wagons, uniforms, shoes, rucksacks, belting, tents, harnesses, tools, etc. Within its facilities, a procurement committee was in charge of evaluating the proposals from interested companies and concluding contracts for the supply of finished products, raw materials, and machinery. Newspapers in Rio de Janeiro often published notes on the submission of proposal for supplying various materials for military use.<sup>14</sup>

Conceição Fortress housed a Weapons Factory set in central region of Rio de Janeiro city. It had been established in 1811 as a musket barrel factory<sup>15</sup> but had been decommissioned in 1831 due to its low productivity.<sup>16</sup> In September 1844, given the high demand for armaments during the Farroupilha Revolution (1835-45), Conceição Factory was reactivated as an external branch of the War Arsenal and a weapon repair workshop (Brasil, 1845).

The Pyrotechnic Laboratory of Campinho had been created in 1851 at Fort Campinho, located in western region of Rio de Janeiro, as a workshop to produce war rockets and percussion caps for new firearms (Brasil, 1852), but began to produce cartridges for portable weapons, artillery fuzes, and various pyrotechnic devices. From January 1862 to March

12 *Mappa demonstrativo do numero dos operários das diversas officinas deste arsenal existentes no 1.º de Janeiro de 1866, e das alterações ocorridas até o 1.º de Janeiro do corrente anno.*

13 *Companhias de operarios militares do Arsenal de Guerra da Corte. Mappa demonstrativo dos movimentos das praças das mesmas companhias do 19 de Fevereiro a 31 de Dezembro de 1866.*

14 As examples, I cite some of these notes. The December 17, 1867, issue of *Correio Mercantil*, p. 3, reports that the War Arsenal of the Court was to receive, on the appointed date, proposals to supply 20,000 threaded nozzles for La Hitte model fuzes, 1,000 shells for 1-lb Whitworth guns, 1,000 cast shells for French rockets, and 100 iron curb bits for horse headstalls. An issue of the same newspaper dated March 9, 1868, p. 2, reports that the War Arsenal of the Court was to receive, on the same day, proposals to purchase 2,000 pairs of stirrups, 1,685 pairs of spurs, and 5,000 32-lb shells for Whitworth guns. *Diário do Rio de Janeiro* of May 22, 1867, p. 3, reports that the War Arsenal was to receive, in the next few days, proposals to supply 60,000 cast-iron balls for canister shots; 7,000 shells caliber 4, 4,000 caliber 6, and 2,400 caliber 12 for La Hitte cannons; 3,000 spherical shells caliber 5 ½-inch; and copious quantities of cloth and trimmings for uniforms. The same newspaper, on August 24, 1867, p. 4, reports that the War Arsenal of the Court was to receive, on the 26th of that month, proposals to supply 4,800 ogival shells caliber 4 (La Hitte) and 6,000 brass tubes for time fuze.

15 BRASIL. **Alvará de 1º de março de 1811.** *Cria a Real Junta de Fazenda dos Arsenais, Fábricas, e Fundação da Capitania do Rio de Janeiro e uma Contadoria dos mesmos Arsenais.*

16 Installed on high ground without a reliable source of running water nearby, the Conceição Factory was unable to rely on machines powered by hydraulic power, which was the main source of mechanical energy before the emergence of steam engines. Its artisanal operation resulted in low productivity and high running costs.

31, 1867, Campinho Laboratory produced more than 35 million cartridges for various light weapons; over 19 million percussion caps; 4,416 war rockets of various models and calibers; 112,401 artillery fuzes of several types; 260,500 friction primers for artillery guns; various other types of pyrotechnic devices; and 29 rocket stands<sup>17</sup> (Brasil, 1867).<sup>18</sup>

The Estrela Gunpowder Factory produced all the gunpowder the Brazilian Army consumed during the War of the Triple Alliance. The factory had been established in 1831 in Raiz da Serra dos Órgãos, in the province of Rio de Janeiro, replacing the Lagoa Rodrigo de Freitas Gunpowder Factory, which had reached the limit of its production capacity. The Estrela Factory produced gunpowder for light weapons, artillery, pyrotechnic devices, and explosive shell charges.<sup>19</sup> To showcase its capacity, in 1866, Estrela Factory produced 11,435 *arrobas* (168 tons) of gunpowder of diverse types (Brasil, 1867).

In addition to the War Arsenal of the Court, Brazilian army had five provincial arsenals installed in the provinces of Pará, Pernambuco, Bahia, Rio Grande do Sul, and Mato Grosso. The provincial arsenals were much more modest than that of the Court, but some played a key role in providing arms, ammunition, wagons, equipment, and uniforms for the troops within their provinces and in neighboring ones. In 1871, shortly after the end of the war against Paraguay, the arsenal of the city of Bahia was organized with nine workshops and a pyrotechnic laboratory to produce ammunition for small arms, fuzes, and other pyrotechnic devices. At the same time, Recife (Pernambuco) arsenal had 14 workshops and a small pyrotechnic laboratory. The Porto Alegre arsenal was the second most important within the Empire due to the province's strategic position and gained even greater relevance after the Farroupilha Revolution in 1835. In 1871, it had six workshops and a pyrotechnic laboratory, which significantly contributed to the war effort by producing ammunition for small arms and pyrotechnic devices (Brasil, 1872). From September 1865 to January 1866 alone, the Menino de Deus Pyrotechnic Laboratory in Porto Alegre produced more than 380,000 cartridges for Minié guns (Brasil, 1866),<sup>20</sup> reaching 1,700,000 Minié cartridges and 7,700 artillery primers in 1867 (Brasil, 1868).<sup>21</sup>

Pará and Mato Grosso provincial arsenals were the most problematic in the Empire. It was very difficult to hire skilled workers in these provinces given their distance from the main political and economic centers in the country. The difficulty of access to the province

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17 Tripod-shaped stands to launch 19th-century war rockets.

18 *Mappa demonstrativo das munições, artificios e artefactos remettidos por este Laboratorio ao Arsenal de Guerra da Côrte do 1.º de Janeiro de 1862 a 31 de Março de 1867.*

19 The gunpowder produced at Estrela Factory was classified into five types, in ascending order of grain magnitude: type A, very fine, used for pyrotechnic devices and shell bursting charge; type F, used in cartridges for rifles and carbines; type C, used as a projection charge for smoothbore artillery; the CC type, used on La Hitte rifled guns; and CCC type, for Whitworth guns (Brasil, 1858, p. 21).

20 *Mappa demonstrativo do cartuxame confeccionado no Laboratório Pyrotechnico da Província do Rio Grande do Sul nos mezes de Setembro, Outubro, Novembro e Dezembro de 1865 e Janeiro de 1866.*

21 *Mappa demonstrativo das munições, artificios de guerra e balas fabricadas durante o anno de 1867.*

of Mato Grosso made it even more difficult to operate its arsenal. Both had five workshops and the one in Cuiabá (Mato Grosso) also had a pyrotechnic laboratory (Castro, 2017).

Brazilian arms industry could cast local copies of the new French rifled guns, a model which became known in Brazil as La Hitte system. In 1860, the Ministry of War had acquired 12 La Hitte caliber 4 rifled guns, made in Spain, for experiments. After the Commission for the Improvement of Materiel approved the La Hitte cannons, the Army acquired some French-made artillery batteries—12 guns of caliber 4 and six guns of caliber 12 (Luz, 1866). But the decision of the Ministry of War was to concentrate its efforts on the production of those bronze cannons in Brazil, determining the casting of 36 caliber 4 guns in 1862. Also in 1862, the army decided to groove some old smoothbore bronze cannons, creating the La Hitte cannon of caliber 6, an exclusively Brazilian caliber (Carvalho, 1866).<sup>22</sup>

In 1865, Brazil acquired two French La Hitte caliber 4 mountain guns and began to locally produce this type of light artillery gun, useful in rugged and pathless terrain, as was the case during the final phases of the War of the Triple Alliance. Throughout the war, at least 42 La Hitte mountain guns were manufactured in Rio de Janeiro (Brasil, 1870).<sup>23</sup>

At the beginning of the war, the War Arsenal of the Court was unable to cast cannons. This work was commissioned from the Navy Shipyard, with the War Arsenal being responsible for finishing and grooving the guns (Castro, 2017). At the end of 1867, the War Arsenal of the Court installed a foundry workshop with two furnaces that could melt 8,000 pounds (3,670 kg) at once (Brasil, 1868). This new workshop enabled the Arsenal to fully manufacture La Hitte rifled guns and bronze mortars.

Notably, due to the quality of the bronze used in Brazil, the La Hitte cannons cast in Rio de Janeiro had a different grooving from the French and Spanish models. The low quality of the bronze used to cast La Hitte cannons in Brazil resulted in the barrel grooves suffering a lot of wear due to friction with the shell lugs. To solve this problem, the War Arsenal of the Court determined that the rifling grooves of the cannons cast in Brazil should be deeper than those of the French guns. Likewise, the lugs of Brazilian rifled shells protruded more than those of the original shells and failed to fit French rifled guns (Orleans, 1872). Thus, Brazilian Army had to deal with two types of ammunition for each La Hitte caliber: one for Brazilian and one for French grooving. This difference represented an additional logistical problem to the already complex conditions of the ongoing war regarding the production proportionality of shells of different calibers and grooving and their correct distribution to the batteries on the field.

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22 Since France adopted the decimal metric system, the caliber of French guns was defined by the weight in kilograms of the solid bullet corresponding to it – caliber 4 referred to a solid 4-kg bullet; the 12-gauge, to a 12-kg solid bullet; and the Brazilian caliber 6, to a solid 6-kg bullet. The French 4 gauge corresponded to 84 mm; the 12 gauge, to 121 mm; and the Brazilian caliber 6, to 95 mm.

23 *Relação do armamento, equipamento e munições de guerra remetidos para o nosso Exército desde o principio da guerra até esta data.*



A significant part of the artillery ammunition used by Brazilian Army came from the War Arsenal of the Court and the Navy Shipyard. The War Arsenal report of 1868 states that in the previous year the foundry had produced about 60,000 shells of different calibers for modern Whitworth and La Hitte guns, spherical shells for old smoothbore artillery, and a large quantity of canister shot balls. Before the Arsenal began producing artillery ammunition in 1867, the Navy Shipyard produced thousands of shells for the Army. But, in addition to the production of the War Arsenal and Navy Shipyard, there was also a need to acquire shells, artillery fuzes and their components from private companies. The maps attached to the 1868 report of the Ministry of War show contracts with commercial houses to supply large quantities of artillery ammunition to the War Arsenal of the Court (Brasil, 1868). As an example, from January 1867 to March 1868, the War Arsenal of the Court acquired a supply of 20,800 shells for 32- and 12-lb Whitworth guns; 18,200 shells for La Hitte guns calibers 12, 6, and 4; and several items to locally produce artillery ammunition, such as canister shot balls, canister tins, fuze components, fabric for artillery gunpowder bags, etc. During this period, the entire supply of Whitworth shells and caliber 12 La Hitte shells was acquired from Widow Hargreaves & Co. foundry; the rest of the La Hitte shells came from Manoel Joaquim Moreira foundry. Both companies were located in Rio de Janeiro.

The participation of Brazilian military arsenals and private industry went beyond the production of cannons and ammunition. All sorts of military items, from uniforms and equipment to gun carriages, harnesses, and various wagons were produced by both the War Arsenal of the Court and private contractors. The War Arsenal also imported items, such as modern Spencer repeating carbines and ammunition, from the United States via import companies (Brasil, 1868).

#### 4 LOGISTICAL DEPLOYMENT IN CAMPAIGN

During the war, the main support stations of the Brazilian Army in La Plata Basin were established in Buenos Aires, Montevideo, Corrientes, Isle of Cerrito, Passo da Patria, and Tuiuti, in which military hospitals, infirmaries, war supply depots, a weapons maintenance workshop, and a pyrotechnic laboratory were installed. After the upstream advance of the allied armies to Humaitá and to the Paraguayan Highlands, some support facilities were transferred to Humaitá and Asunción.

Brazilian Army support base in Montevideo included two military hospitals, a war supply depot, and a convalescent depot. Brazilian station on the Isle of Cerrito (at the confluence of Paraná and Paraguay rivers) included a Navy forward shipyard and a temporary Army hospital. In the town of Corrientes, the Army maintained four hospitals, a war supply depot, a weapons maintenance workshop, and a small pyrotechnic laboratory, which produced La Hitte canister shots<sup>24</sup> of all three calibers in use in Brazilian Army and various pyrotechnic devices (Carvalho, 1866).

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<sup>24</sup> Canister shot was a composite projectile formed by a thin cylindrical canister stuffed with metallic balls. When fired, the casing shattered as the projection charge exploded, launching a burst of projectiles at the target.

War supply depots were responsible for receiving and storing weapons, ammunition, and military equipment sent by the War Arsenal of the Court and for distributing them to units according to their needs. The forward Navy shipyard on the Isle of Cerrito also provided some repair services for army artillery guns.<sup>25</sup>

## 5 WEAPON, AMMUNITION, EQUIPMENT, AND UNIFORM SUPPLY

Regarding the supply of military items, the logistical support provided to the Imperial Army during the War was, overall, quite adequate considering the standards at the time and the enormous distance between the main Brazilian sources of military supplies, which were located at the Court in Rio de Janeiro, and the forces operating in Paraguay. During the first months of war, after the Paraguayan invasion of Rio Grande do Sul, difficulties in supplying uniforms and equipment arose due to the rapid expansion of army manpower. During the siege of Uruguaiana, troops of Baron of Porto Alegre's Second Army Corps received no payment and some units had soldiers marching barefoot with tattered uniforms. But this situation was resolved as the Quartermaster Office and the War Arsenal of the Court adjusted to the new demands.

The bulk of the supplies of weapons, ammunition, uniforms and equipment were provided by the War Arsenal of the Court. And the quantities were massive throughout the more than five years of war. To exemplify the logistical effort of the Brazilian Army during the conflict, see the transcription bellow for the amounts of the main items sent by the War Arsenal of the Court to the forces in operations in Uruguay, Rio Grande do Sul, and Paraguay, from 1865 to 1870 (Brasil, 1870):<sup>26</sup>

- La Hitte rifled guns: 54 field guns caliber 4; 42 mountain guns caliber 4; 18 field guns caliber 6; and 36 guns caliber 12;
- Whitworth System guns: twenty five 32-lb, three 12-lb, and four 2-lb guns;
- Small arms: 24,069 Minié rifles; 31,384 Minié infantry carbines; 582 Minié artillery musketoons; 1,459 Minié cavalry carbines; 2,702 Spencer repeating carbines; 5,857 pistols; and 1,250 revolvers;
- Small arms ammunitions (rounded numbers): 59,500,000 cartridges for Minié guns with corresponding percussion caps; 3,800,000 metallic cartridges for Spencer carbines;
- La Hitte artillery ammunition: 142,000 regular shells, 11,700 shrapnel shells, and 40,000 canister shots;
- Whitworth artillery ammunition calibers 12- and 32-lb: 264,000 common shells; 1,000 solid shots; 4,700 canister shots;

25 The 1867 *Diário do Exército em Operações* reports that an artillery gun had been sent for repair to the Cerrito shipyard because its touch hole was "busted" (Campanha do Paraguai, 1868, p. 125).

26 *Relação do armamento, equipamento e munições de guerra remetidos para o nosso Exército desde o principio da guerra até esta data*. These figures do not include the weapons, uniforms, and equipment that had been sent to the Uruguayan Campaign in 1864 and the material provided to the units that were heading to the theater of war from 1865 onward.

- Uniforms: 253,017 caps; 330,081 jackets; 529,651 shirts; 624,155 trousers; 118,012 coats; and 433,693 footwear;
- Equipment: 103,881 tents; 69,483 complete sets of individual equipment; 87,966 complete infantry harness sets; 6,405 full cavalry harness sets; 58,368 rucksacks; 70,191 tin mess kit plate sets; 46,434 canteens, and 138,016 wool blankets.

It is worth briefly digressing on a logistical problem due to the careless acquisition of armaments abroad. Since 1855, the Brazilian Army had adopted Minié rifled light weapons.<sup>27</sup> The first acquisitions of these weapons were made in Belgium, all in 14.8 mm caliber.<sup>28</sup> However, in 1858, Brazil acquired a large batch from the English company Enfield Light Weapons Factory. The Enfield model had some minor irrelevant differences from the Belgian models, but its caliber was 14.66 mm, slightly smaller than the Belgian models. This small difference in calibers had a gigantic logistical impact. Although the difference was of only 0.14 mm (14 hundredths of a millimeter), Belgian caliber bullets failed to fit the barrel of English rifles. For this reason (and to avoid the risk of mistakes in the distribution of ammunition), the Brazilian Army decided to only distribute the smallest caliber ammunition to all its units. This greatly decreased the range and accuracy of the Belgian guns, which were of a thicker caliber and accounted for most of the armament of Brazilian infantry. Throughout the War of the Triple Alliance, the British guns collected for repairs in the arsenals of Rio de Janeiro had their barrels widened to 14.8 mm, further increasing the number of guns firing bullets with inadequate calibers (Castro, [s.d.]).

The voluminous demand for uniforms required the facilitation of their mass production. Although the War Arsenal of the Court had a tailoring workshop, uniforms were sewn outside the Arsenal. The Arsenal acquired fabrics, buttons, threads, and other trimmings via public procurement processes, and the tailoring workshop cut the fabrics according to patterns of various models and sizes. However, the sewing service was entrusted to thousands of sewists living at the Court or its vicinity, who were paid per sewn piece. The Army saw this distribution of labor as a form of social action since it offered poor women one of the few jobs that were acceptable for them in the 19th century. During the conflict, the Minister of War prioritized the distribution of sewing to the widows and orphans of military personnel who died in campaign and to the families of those who were on duty in the theater of war in Paraguay. This sewing service distribution system probably made the War Arsenal of the Court the largest employer in the city of Rio de Janeiro at the time. However, most of those women were unqualified artisans, which delayed the delivery of contracted works and caused the rejection of a large number of poorly sewn pieces (Castro, 2017).

27 Minié bullets had a cylindrical-ogival shape with a conical cavity at its base. The pressure of the gases from the gunpowder explosion in the concavity forced the expansion of the bullet and its adhesion to the grooves, giving it rotation. The rotation of the projectile and the maximum use of the force of the gases gave a Minié rifle an accuracy and effective range unprecedented in the era of smoothbore and round ball muskets.

28 Brazilian Army acquired long rifles for line infantry; infantry carbines for “*caçadores*” (light infantry); short musketoons for artillery and engineers; pistols and short carbines without bayonet for cavalry.

To facilitate the sewing, speed up production, and reduce the rejection of poorly sewn garments, the Ministry of War published a decree that simplified the 1852 plan of uniforms at the beginning of 1866. The new plan eliminated the tailcoat jacket from the full-dress uniform, replacing it with the frock coat of the service uniform. In the full-dress uniform, the frock coat would be worn with epaulettes, instead of the chevrons or shoulder-straps of the service uniform.<sup>29</sup> However, the suspension of the distribution of shakos to the army corps before the Uruguayan Campaign of 1864 suppressed, in practice, the full-dress uniform.

## 6 TRANSPORTATION SUPPORT

The Army relied on the Navy to transport troops and supplies to the theater of war, but it also had to charter dozens of private ships. The Ministry of War chartered 50 cargo ships from Brazilian and some foreign shipping companies from the beginning of the war to March 1868. In the fiscal year of 1865-66—which was one with the greatest effort to transport cargo and troops—the Brazilian Army chartered 36 private vessels (Brasil, 1868).<sup>30</sup> Several of these private ships participated in the crossing of Paraná River in mid-April 1866, transporting allied troops, cannons, wagons, equipment, and animals to Paraguayan territory (Fragoso, 2010, p. 354-355, 445).

One of the main shortcomings regarding logistical support of the Imperial Army in the theater of war was the lack of transportation units that could provide operating forces with ammunition, food, and equipment. At the beginning of the war, the commanders of two army corps—General Osório and the Baron of Porto Alegre—created a squadron and a transportation company, respectively, to perform this logistical function in their division. These small transportation units consisted of personnel drawn from cavalry units (*Exercito em Operações*, [s.d.], p. 224-225; *Exercito em Operações*, 1877c, p. 35-36). When the Marquis of Caxias took command of all Brazilian forces in Paraguay in November 1866, he transformed a provisional cavalry regiment of Rio Grande do Sul National Guard into a transportation regiment, subordinate directly to the Commander-in-Chief. However, the lack of knowledge and experience with this new activity, and the *gaucho* culture of disregard for horse cares brought to these logistical units the same problems that existed in cavalry units—great loss of animals and constant need to acquire new mounts and beasts of burden (Orleans, 1872).

## 7 FOOD AND FODDER SUPPLY

Unlike the military supplies, which were sent by the War Arsenal of the Court, food supplies depended solely on civilian suppliers hired by the military authorities near the theater of war. This situation was made more complex by the fact that the Army lacked an agency that could procure supplies, riding and pack animals, and fodder for them. We know that the army corps

29 BRASIL. Decreto nº 3.620, de 28 de Fevereiro de 1866. *Altera o grande e pequeno uniforme dos corpos do exercito.*

30 *Resumo das quantias despendidas com o fretamento de cada um navio durante o tempo que tem estado ao serviço do Governo.*

sent to intervene in the Uruguayan and Argentine civil wars in 1851 had a commissariat with these functions in its organization. Few information exists about this department, except that the expeditionary division sent by Caxias to operate in Argentina with General Urquiza's army had five commissariat employees and 31 meat supply employees (Alencastro, 1864, p. 22).<sup>31</sup> This experience resulted that the decree of 1857, which created offices to a Deputy Adjutant General and a Deputy Quartermaster General in any army corps sent on operations, provided for the existence of a commissariat in these army corps.<sup>32</sup> But the fact is that, when the war against Paraguay broke out, this office was not initially created.

In the first few months of war, the absence of an office to centralize contracts with civilian suppliers produced a chaotic situation. Several authorities hired food suppliers for the corps and divisions that were hastily assembled in Rio Grande do Sul against the Paraguayan invasion. Contracts were signed by the Minister of War, who was in the province; General Baron of Porto Alegre, commander of the army corps that was gathering in Rio Grande do Sul; the President of the Province; and even some commanders of interim divisions (Orleans, 1872, p. 23).

This situation became less confusing as the two army corps gathered in northern Corrientes (an Argentine province) and in western Rio Grande do Sul. During General Osório's command, the supply of provisions to the 1st Army Corps (1st AC) was the responsibility of the Argentine firms Cabal (from Santa Fé) and Benitz, which satisfactorily met the demands of the Brazilian Army (Burton, 1997, p. 332). During this period, however, the practice of feeding animals with fodder was not adopted, as Gen. Osório supported the idea of exclusively feeding the horses with pastures. This practice was reasonably functional in small forces, but in gathering an army of more than 65,000 men, from three allied countries, on the banks of the Paraná River to invade Paraguay, the pastures were depleted, and thousands of horses were lost. When the Allies crossed the Paraná River on April 16, 1866, most of the Brazilian cavalry units were on foot (Cerqueira. 1980, p. 84).

The supply of food and fodder became more regular with the installation of a quartermaster office (subordinated to the commander-in-chief of the Brazilian Army in operations, the Marquis of Caxias) in November 1866. The office had been created by the War Ministry's Note of October 20, 1866, and was organized a few days after Caxias took command of the Brazilian forces in Paraguay. That office was responsible for signing contracts with food suppliers and for purchasing all that was determined by the Commander-in-Chief (*Exercito em Operações*, 1877b, p. 25-32).<sup>33</sup>

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31 The use of the term "employees" indicates they were civil servants.

32 BRASIL. **Decreto nº 2.038, de 25 de novembro de 1857.** *Crea as repartições de Ajudante e de Quartel-mestre-general nos corpos de Exercito de obsevação ou de operações que se organisarem no Imperio.*

33 *Instruções Reorganizando as Repartições de Fazenda do Exército.*

The newly created quartermaster office of the army in operations in Paraguay signed two contracts with private companies to supply food to troops on January 10, 1867. The supply of food for the 1st AC was handled by the commercial company Lezica & Lanús, headquartered in Buenos Aires; for the supply to the forces of the 2nd AC, the bidder of the contract was the Brazilian company of João Gomes Pereira, from the town of Cachoeira, Rio Grande do Sul. Although the contract with the Argentine firm Lezica & Lanús was to provide the 1st Army Corps, the document provided for its expansion to the 2nd Corps, should the two be brought together. Both contracts were for six months, but the one with Lezica & Lanús anticipated its extension if the war exceeded that period and if either party failed to state otherwise (*Exercito em Operações*, 1877b).<sup>34</sup>

The supply of fodder for riding and pack animals was the responsibility of the firm Cabal & Bravo (Burton, 1997, p. 332). The fodder distribution table provided rations for two circumstances: stationed animals and marching animals or in operations. In the first case, daily rations consisted of 6 lb. of corn, 6 to 8 lb. of alfalfa, and 8 to 9 lb. of pasture, depending on whether they were horses or mules and if they were for mounting, pack, or draft animals. For marching and operations, it was impossible to plan for grazing, so the corn ration was increased to 9 lb., whereas that of alfalfa was maintained (*Exercito em Operações*, 1877b, p. 271).<sup>35</sup>

In both food contracts, the rations to be supplied to the troops were limited to beef, in the proportion of one head of cattle for every 85 infantry soldiers or 60 cavalrymen, cassava flour, coffee for infantry or yerba mate for cavalry, sugar (for infantry), salt, and tobacco. By order of the general-in-chief, fresh beef could be replaced by jerked beef, and cassava flour could be partially replaced by hardtacks. It was also at his discretion to distribute sugar cane booze rations.<sup>36</sup> Shortages of any kind were to be supplied by a larger ration of meat or cassava flour to complete the value of the ration. Shortage of coffee would be supplied by yerba mate and booze in corresponding proportions. In addition to the daily provided food, enlisted men received a monthly ration of two bars of soap and 10 foolscap folios. Officers generally received no rations, but the general-in-chief often provided them with meat and, rarely, some cassava flour and salt. To supplement their rations, officers had to buy food from sutlers following the operating army (Cerqueira, 1980).

The slaughter and butchering of cattle and the distribution of foodstuffs were to be done by the supplier in the main army camps and in divisional camps located over a league (six km) away from those major camps. When a force was sent on some rapid expedition, it was to be supplied for the adequate number of days, replacing fresh beef with beef jerky.

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34 *Contractos para fornecimento de etapas e dietas ás praças do 1º e 2º Corpos do Exército.*

35 *Tabella aprovada para a distribuição das forragens que competem ás cavalgadas de pessoas e bestas de carga. Ordem do Dia No. 47, de 1º de março de 1867.*

36 In practice, *aguardente* began to be served regularly during Caxias' command. In his *Reminiscências* (Reminiscences), Dionísio Cerqueira records that, when the units gathered for the reveille at the Tuiuti camp, long before dawn, a dose of *aguardente* and coffee was served (Cerqueira, 1980).

The food was simple, but rations were generous.<sup>37</sup> Reports from the time evince that troops were always well fed during the Paraguayan campaign. As Richard Burton observed, in the Brazilian camps under Caxias' command, "even the dogs were plump like horses" (Burton, 1997, p. 290).

The value of the rations corresponded to the daily amount of 750 *Réis* per man, paid to suppliers.<sup>38</sup> This amount was valid for the supply of troops up to five leagues (30 km) from the banks of the Paraguay and Paraná rivers. If the troops were at greater distances from the banks of these waterways, the amount would be increased by 10%.

Food supply contracts also included special items for hospitals and mobile infirmaries. Hospital diet items were far more varied than troops' regular rations and included foodstuffs such as rice, wheat flour, lard, chicken, concentrated beef broth extract, milk, tapioca, bread, butter, candy bars, and Port and Bordeaux wines, among many other products.

Under the command of Caxias food was adequately supplied. However, when operations moved away from the banks of the great rivers, from June 1869 onward (Campaign of the Highlands), the supplying company proved unable to maintain a steady flow of cattle and foodstuffs by land as it had been able to do by river. In September and October, the supply crisis brought starvation to the camps of some allied units.<sup>39</sup> Faced with the supplying company's failure in providing, Count D'Eu (the new Commander-in-Chief) had to use all available transport resources—locomotives, railroad trains, and trains of army and private pack mules—to send food to his units. He also ordered the purchase of cattle from various merchants in Corrientes and Entre Rios (Argentine provinces) and in Rio Grande do Sul, regardless of the existing contract with Lezica & Lanús, which proved incapable of supplying the army (Orleans, 1872, p. 23).<sup>40</sup> Moreover, in the absence of a department in charge of supplying the army, Count D'Eu had to resort to combat units to drive cargo convoys and herds of cattle.

## 8 HEALTH SERVICE

At the beginning of the operations in Paraguayan territory, when the casualties at the great battles of Tuiuti and Curupaiti and a cholera epidemic required a significant effort from medical services, the Brazilian Army had 11 hospitals in operation: two in Buenos Aires, two in

37 The daily ration of infantry enlisted men totaled 1/85 of a neat (1.7 kg) (green meat) or 688 g of beef jerky, 1/60 bushel (382 g) of flour, 1 ounce (28 g) of coffee, 2 ounces (57 g) of sugar, 0.5 ounces (14 g) of salt, and 0.5 ounces of tobacco. For cavalry enlisted men, daily rations totaled 1/60th of a neat (2.45 kg), 1/80th of a bushel (287 g) of flour, 1 ounce of salt, 3 ounces of yerba mate, and 0.5 ounce of tobacco. The daily green meat ration for the cavalry could be reduced to 1/80th of a neat but it would be supplemented by sugar and wafers. The meat ration seems exaggerated, but it should be considered that its weight included inedible bones, tallow, and tendons.

38 Excluded from this amount were occasional booze rations, which would be paid separately at the price of 50 *réis* per man.

39 In his *Memórias* (Memoirs), Viscount of Taunay (2004, p. 445-446)—the secretary of Count D'Eu—attributes part of the responsibility for this supply crisis to the Count, who suspected what he deemed the exorbitant profits of Lezica & Lanús. Thus, he decided not to renew their contract in June 1869 and to call for a new competition. The competition unfortunately failed, and Lezica & Lanús had to hastily take over the previous contract, which temporarily interrupted the food supply.

40 See also *CAMPANHA DO PARAGUAY*, 1870.

Montevideo, three in Corrientes, one in the Isle of Cerrito, one in Itapiru, one in Passo da Pátria, and one in Tuiuti. At the beginning of 1867, the Marquis of Caxias closed the hospitals in Buenos Aires, concentrating the backup hospitalization in Montevideo, where he merged the two hospitals into one (Fragoso, 2011, p. 188-189).

In total, two buildings housed the Brazilian military hospital in Montevideo, the most important of which was in downtown Montevideo (where currently is set the *18 de Mayo de 1811* Military Museum). At the end of 1867, the Brazilian hospital in Montevideo was reduced to an infirmary, which remained housed in a wing of the same building.

Corrientes came to house four Brazilian hospitals, the most important of which was Saladeiro hospital, located near the Paraná River, with capacity for more than 2,000 sick and injured soldiers. The other hospitals were that of Avalos, housed in wooden sheds with 300 beds; Borano convent hospital, with 400 beds; and that of San Francisco convent, housed in three wooden sheds built around the convent, each with a capacity for over 300 patients. There were also two rented houses, which served as infirmary wards (Silva, 2012).

After the invasion of Paraguayan territory, the army set up temporary hospitals in Itapiru, Passo da Pátria, Tuiuti, and the Isle of Cerrito. When the allied forces overtook Humaitá, Cerrito hospital was shut down and its personnel and materiel were used to set up a new provisional hospital in Humaitá, using five large, thatched sheds that had been used as Paraguayan infirmaries.

The March 1857 decree which approved the new Army Health Corps Regulation, laid the foundations of a health service doctrine and its corresponding chain of medical care and evacuation of wounded and sick soldiers.<sup>41</sup> This chain began with mobile and field hospitals, was complemented by provisional or temporary hospitals and went back to permanent or stationary hospitals existing in the territory of the Empire or installed in important cities of allied countries. Finally, it included convalescent wards, intended to receive military personnel who had been discharged from hospitals but were yet unable to withstand the strains of a campaign. The evacuation to rear hospitals was carried out by the Navy, which had the floating hospitals Eponina, Cidade de Olinda, D. Francisca and Anicota (Fortuna, 2012). The Army Health Corps also included a small cadre of pharmacists, responsible for managing the pharmacies of military hospitals, preparing medicines prescribed by doctors and responding to requests to supply other pharmacies, medicine depots and ambulance kits.

Mobile hospitals tracked the movement of marching troops. They had tents and a set of “ambulances”—a term used at the time to designate chests, bags, and backpacks containing medicines, dressing material and surgical instruments. These mobile hospitals were transported by carts and mules, and had means for transporting the wounded – carts, stretchers, litters and cacolets.<sup>42</sup> During combat days, these mobile hospitals functioned as field hospitals, which were set up in available buildings on site or in tents on the battlefield, protected from enemy fire and

41 BRASIL. Decreto nº 1.900, de 7 de Março de 1857. *Approva o novo Regulamento do Corpo de Saude do Exercito.*

42 Litters and cacolets were pack saddles to transport the wounded on the back of mules using stretchers and chairs.



with access to a water source. According to General Polidoro da Fonseca Quintanilha Jordão's instructions on August 29, 1866, as Commander of the 1st AC, field hospitals offered first aid to wounded soldiers in combat until they could be transferred to temporary hospitals; they were identified by a red flag, which served as a rally point for the transport of the wounded (*Exercito em Operações*, 1877a, p. 81-84).<sup>43</sup>

Provisional or temporary hospitals were established to care for wounded and sick troops on operations or in camps. They were installed in existing towns or villages in the areas of operations and in major military camps. During the march of the 1st AC, from Uruguay to the rally region in northern Corrientes, temporary hospitals were established in Salto (Uruguay) and Concordia (Entre Rios). At the beginning of the 1st AC operations in Paraguayan territory, provisional hospitals were set up in Itapiru, Passo da Pátria and Tuiuti. When the 2nd AC arrived at the theater of war, it established a temporary hospital on the Isle of Cerrito, which was later transferred to Humaitá.

Stationary or permanent hospitals were set up in key locations outside the area of operations, offering treatment and convalescence care to personnel evacuated from temporary hospitals. The most important hospitals for supporting the army during the operations in Paraguay were the Court and Santa Catarina military hospitals, as well as those in Buenos Aires, Montevideo, and Corrientes. Despite their "permanent" nature, Brazilian military hospitals in Buenos Aires and Montevideo were eventually shut down. However, this was due to the decrease in demand and the lengthening of communication lines, making it more economical to concentrate backup services in the town of Corrientes.

The performance of the Brazilian Army medical service during the Paraguayan War was quite irregular. Although it had well-qualified physicians in sufficient numbers to serve troops during peacetime, the Army Health Corps had great difficulty coping with the demands of a large army on campaign far from the homeland. Faced with these new circumstances, the number of physicians and nurses proved to be insufficient to operate all the necessary medical facilities.

When Paraguay invaded Mato Grosso, the tabled number of personnel for the Army Health Corps was 149 doctors, 20 pharmacists and a company of nurses, which was to be organized with three sergeants, eight corporals, and 150 soldiers, with the functions of nurses and assistants.<sup>44</sup> The cadre of officers was almost complete, with 147 physicians and 18 pharmacists, but the nurse company only had one sergeant and 30 soldiers (Brasil, 1865).<sup>45</sup> Most of these few nurses were employed at the Court Military Hospital and, for them to be sent to the theater of war, the army had to resort to the Sisters of Charity of Saint Vincent de Paul to take over the nursing services in that hospital (Mitchell, 1963). Regarding the army nurses, it is enough to say that they were not qualified to perform their duties, being simple soldiers, with very little or no formal

43 *Instruções para regular o serviço do Hospital de Sangue, que tiver de funcionar nos dias de combate.*

44 BRASIL. Decreto nº 2.715, de 26 de Dezembro de 1860. *Altera o regulamento aprovado pelo Decreto n.º 1.900 de 7 de março de 1857.*

45 *Mapa da força dos corpos do Exército da Guarda Nacional destacada.*

education. To be qualified as a “head nurse,” the army only required the soldier to know how to read and write, the four arithmetical operations, the functioning of nursing service, and the names of the constituent objects at hospitals and ambulances (Silva, 2012).

Due to the shortage of physicians, the government had to hire civilian doctors and students from the medical Colleges in Rio de Janeiro and Salvador. Civilian physicians were assigned to temporary and permanent hospitals, and their hiring entailed very expensive salaries for the army. To complete the team, the imperial government hired 68 medical students (some of whom had only completed their second year of college) to work as army doctors and surgeons (Silva, 2012).

The lack of nurses was remedied by assigning soldiers from infantry units to attend hospitals and infirmaries. In April 1866, shortly before the invasion of Paraguayan territory, General Osório disbanded the Zouaves companies of the 1st Army Corps and ordered that their men be placed at the disposal of the health service (Kraay, 2012). Soldiers from other units were also diverted from their combat duties to serve as nurses in hospitals. Francisco Pereira da Silva Barbosa, who was a sergeant in the 1st Battalion of Homeland Volunteers, reported in his memoirs that he went to the hospital of Passo da Pátria on May 4, 1866, because he had been wounded in combat on May 2nd, but only received a bandage four days later, and even then, because he was recognized by a private from his company, who was employed as a nurse at that hospital (Barbosa, [s.d.]).<sup>46</sup>

All these shortcomings showed up in true magnitude during the major battles and when the cholera epidemic struck the army in operations in Paraguay in April 1867. Reports from that time attest to the chaos in medical care and nursing services in moments of crisis (Barbosa, [s.d.]; Cerqueira, 1980, p. 236-237, 284-290; Constant, 1999, p. 94, 96; Silva, [1924?], p. 113).

## 9 CONCLUSIONS

The army reforms during Felizardo and Caxias administrations gave a markedly institutionalized character to the Imperial Army, making the transition from a force that derived from the Portuguese army to a clearly Brazilian army. They also created a cadre of professional officers who were adherents of formal education. Even men such as Generals Manuel Luiz Osório and Manuel Marques de Souza, who had never obtained a formal higher education, sought and obtained assignments to the Military College, although their enrollment had to be canceled due to the wars in the South at the beginning of their careers (Silva, 1907).

The existence of a reasonable industrial infrastructure allowed most of the weapons, ammunition and equipment in use in the Imperial Army to be provided by Army arsenals and factories and by national private companies, significantly reducing the need to resort to imports. It is worth noting that some of the Army’s industrial facilities, such as the Pyrotechnic Laboratory of

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<sup>46</sup> Barbosa’s diary has no numbered pages. This report is in the section “*Combate de Estêro Belaco – Voluntário Barbosa Foi Ferido.*”

Campinho, were up to date with the best military technology in use in Europe during that quarter of the 19<sup>th</sup> century.

The ability to adequately provide for a large army (by South American standards) operating thousands of kilometers from national territory, testifies to the institutional maturity of the Army and of other institutions of the imperial state linked to the war effort. The negative note refers to the medical service, which tended to collapse under great demands due to excessive casualties or a significant increase in the number of patients.

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