INDUSTRIAL MEDICINE PRODUCTION FOR THE ARMY DURING THE SPANISH CIVIL WAR (1936-1939)

Andrés Turrión, María Luisa de

School of Pharmacy, Complutense University of Madrid, 28040 Madrid, Spain.

E-mail: turrion@farm.ucm.es

1. Introduction. The Spanish pharmaceutical sector and some economic aspects in Spain during the Civil War.

The Spanish Civil War (1936-1939) is, with no doubt, an event of extremely relevance in the history of Spain. It has been the subject of a wide range of researches and publications that have deepened in the many aspects this war (political, economical, social, military, etc.).

However, there are still a lot. The aim of this research is to analyze the supply of medicines and the organization of the pharmacy services during this war, from a sanitary approach.

The pharmaceutical industry sector in 1936 [1] consisted in Spanish companies, traditional local factories [2] and branches of important European laboratories, which provided analgesics, sulfamides and hormones [3]. The fabrication and distribution of medicines with military purposes had a similar organization to the civil pharmaceutical industry. The center of production received raw materials and sanitary tools in order to develop those medicines or chemical-pharmaceutical products required specifically by the Army in a list called “petitorio”.

The civil war supposed the mobilization of a great number of civilian workers, with the consequential obstruction of commercial relationships among companies. It also involved the destruction of part of the distribution webs, and the evident supply and power blockage.

Under these circumstances (and taking into account the situation of the Central Military Pharmacy Laboratory, which will be analyzed) took place the coup d’état that degenerated into the Civil War. The military side went through an important lack of medicines during the war, which force the Army to restructure its own organization, despite the poor economic situation, in the spring of 1939 [4].

It is important to remark some economic aspects and their relation with the medicine sector when the military uprising took place. After a first phase of confusion and disorder, both sides started to organize themselves: pooling of foreign exchange, central regulation of foreign trade, and creation of offices in charge of buying materials for military purposes.

In July 1937, the republican government created Campsa-Gentibus, a company which was practically a government body that centralized all purchased made by high authorities. It worked as a truly commercial agent [5]. Purchases of chemical and pharmacy products were directed from Belgium.

The External Trade Executive Committee (CECE), dependent on the Industry, Trade and Supplies Committee, had competence in all import and export trades. This body was in charge of licensing for import trades for military needs and Franquist authorities.

Private operations in the Republican zone became increasingly harder. However, the situation of the National zone remained as usual. At the beginning, the Republican side took advantage of owning the Spanish National Bank's cash stockpile, as well as a more structured organization. Furthermore, it had the tools provided by the legal and bureaucratic system which, in principle, enabled to control all external trade operations. On the other hand, the Franquist troops had the support of the Axis powers, as well as the economic and financial Spanish elite, so the Army could reassure supplies.

The Bank of Spain, the most influential body in the government´s currency policy. North façade (Calle de Alcalá, street) of the Bank of Spain Building constructed between 1884 and 1891; extensions in 1930–35, 1969–75 and 2003–06.

All in all, the commercial situation in the 1930s shows the underdeveloped economy of Spain compared to its main commercial partners (the USA, Germany, Great Britain, France and Italy). Spain`s importations of raw materials, mineral fuels and capital goods were extremely high. The export trade consisted mainly in minerals such as iron and mercury, and Mediterranean food like citrus fruits and nuts.

The Civil War changed the products Spain needed to import. The purchase of raw materials and goods lowered and was replaced by military products. Chemical products and fuel imports remained the same. However, pharmaceutical products and medicine imports lowered during the war.

The great collaboration of Germany, Italy and Portugal was reflected in three types of imports. First of all, purchases of munitions and armament for the Franquist troops; secondly, shipping of troops and military advisers, and lastly, sending goods.

2. The Pharmacy Section of the Military Health Body before the Civil War.

At the beginning of the 20th Century, the Spanish Military Pharmacy had shown in many occasions disagreement to the treatment given by the Army. Due to budget cuts,

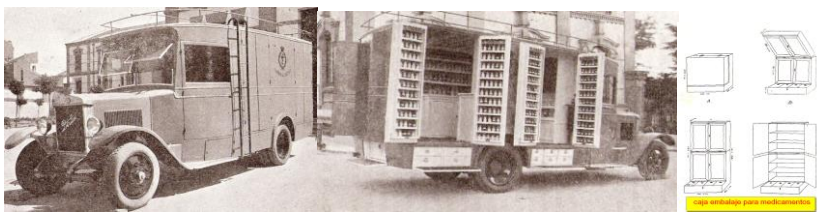
pharmacist working at the Military Pharmacy could only work as medicine producers, and saw themselves kept away from other fields such as chemistry, analysis or pharmacy industry. At the Central Laboratory, the procedures followed and the machinery used were obsolete. Even so, the Government, following strict economic patters, had no intention in updating them.

Pharmaceutical assistants (1927). Military Pharmacy Museum, Madrid (Spain).

Still, in 1931, there were complains concerning this situation. Another big problem appeared: how the autonomy if the Laboratory would be affected after the fusion of the medical and pharmacy services at the Health Service. Rafael Roldán, military pharmacist, wrote the article *"The Pharmacy Service in Case of War. Study concerning its organization structure and work".* (Madrid, 1931).

Rafael Roldan´s portrait. Military Pharmacy Museum, Madrid (Spain).

It was aimed to the senior officials at the Ministry Of War, and intended to warn about the poor preparation and means the military pharmacist would have in case of war. He also gave exhaustive details about how should be a Pharmacy Service in case of war.



Roldan´s designs: Delivery van "Campoy model" and Packing box for medicines.

Five years later, in view of the improvisation and lack of preparation and organization that reined over the pharmacy sector during the war, both sides of the conflict agreed on the correct forecast Roldán had made.

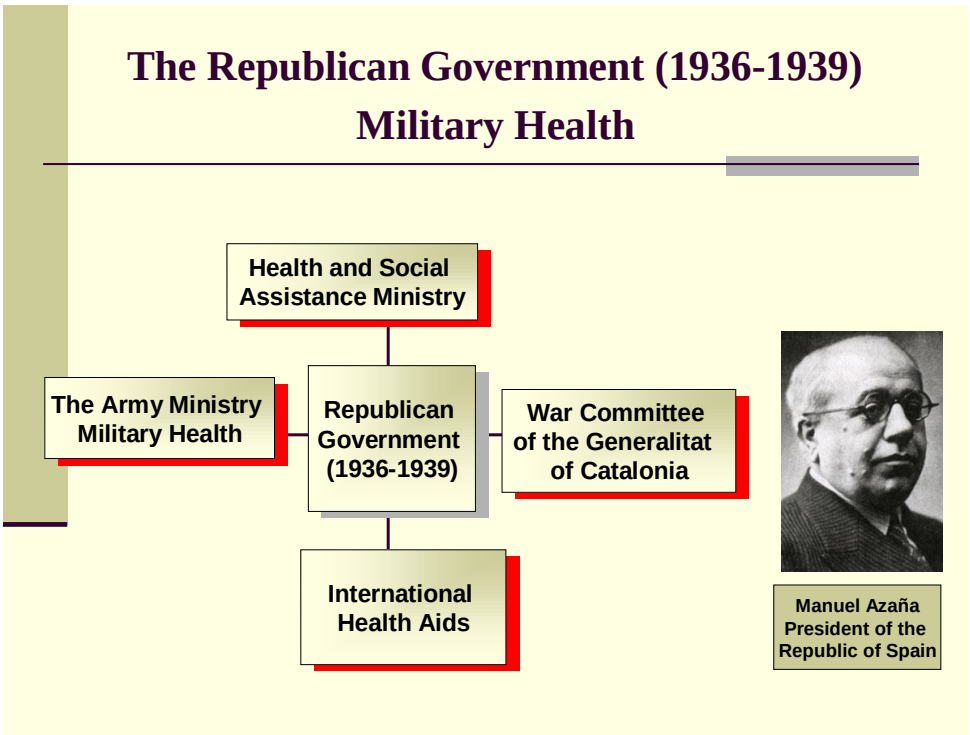
The Spanish Military Health Service had rules designed over the patterns followed during our wars in Africa, with some alterations made after the First World War. It included a Pharmacy Section with 131 military pharmacists: one first-class pharmacist sub-inspector, twelve second-class pharmacist sub-inspectors, twenty-eight pharmacy mayors, forty-nine first pharmacists and forty-one second pharmacists, that would have joined the Pharmacy Section through Civil Service examinations after finishing the Pharmacy Degree [6].

The Pharmacy Section had branches all of the Eight Organic Divisions of the Army, in Madrid, Sevilla, Valencia, Barcelona, Zaragoza, Burgos, Valladolid y La Coruña, and two headquarters in Baleares and the Canary Islands. Each of them had a Pharmacy Service Office [7], in charge of the establishments and units of its area, as well as the cost approval, inside the Army budgets.

The Central Military Pharmacy Laboratory was under the jurisdiction of the Pharmacy Section. It was a production center of medicines for the Army, also responsible for their storage and Army supply.

3. Services of the Military Pharmacy for the Republican side.

After the uprising took place, the Republicans reorganized the Health Service through the Ministry [8], taking into account the Health Service of the Generalitat in Cataluña, as well as the Military War Health Service of the Defense Ministry.

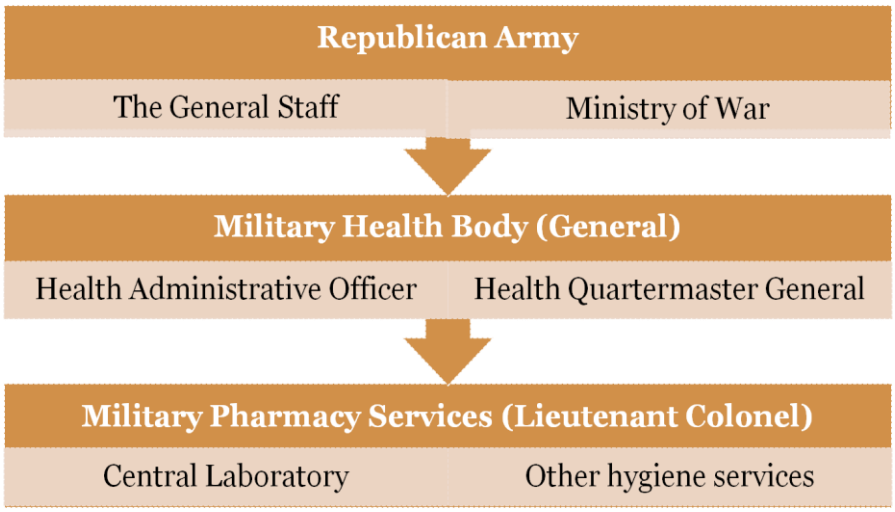


The Republican Army [9]was able to control only three of the eight Organic Divisions: 1st D.O in Madrid, 3rd D.O in Valencia, and 4th D.O in Barcelona.

The rule of the Health Military Body of the Republican Army [10] was in the hands of a General, under the orders of the Ministry of War and the Staff. He was responsible for the organizations of the following services: Special Services of Evacuation and Hygiene, Hospital Services [11], Veterinarian Services and Military Pharmacy Services. There were also a Health quarter-master general and a Health administrative officer.

The Military Pharmacy Services: a Lieutenant Colonel was in charge of material purchase, researches and statistics, storage of medicines, as well as hygienic services: water supply, anti-gas defense, food testing and the Central Laboratory.

Their actions adapted to the combat structure, taking over the whole area, from the rear (where were the rear hospitals and the services of the central ambulance park, the Central Pharmacy Deposit, and the Central Laboratory) to first line zones, where were laboratories, mobile deposits and pharmacy vans [12].



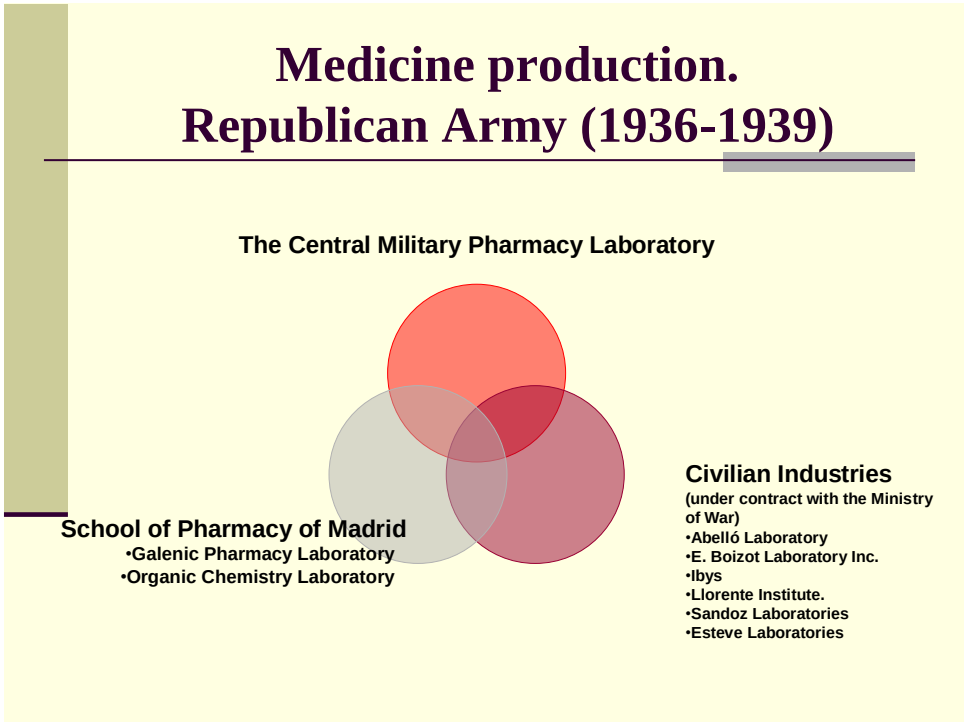
The staff of the Military Pharmacy was split in two between both zones; although it is important to remark that in Madrid, where the government headquarters were, were a lot of seniors, but almost no pharmacy officials [13]. For this reason, the Recruiting Office helped by the College of Pharmacists, mobilized doctors and graduated in Pharmacy, who were destined as pharmacy auxiliaries in hospitals or in sanitary formations in first line.

The pharmaceutical organization at the rear worked properly during the whole war due to the Central Laboratory supplies. Moreover, there were no problems in transporting medicines to this zone. This was not the situation at the combat zone. The troubles arose just as the conflict began, since there were no equipment devoted to the transport of medicines to the firing line, relief sites, blood hospitals and firing line hospitals. The solutions given were improvised vans for carrying medicines and cars that worked as mobile pharmacies. These cars carried two tables for the preparation of medicines and shelves on the sides to keep the bottles of medicines and chemical products. Heavier loads such as injections, saline solutions and curing material.

The School of Pharmacy of Madrid helped the Galenic Pharmacy and Organic Chemistry Laboratories in the medicine production. The government took over pharmaceutical corporations such as Abelló and E. Boizot Laboratory Inc., which were partially controlled from the Ministry of War.

Granulado de E. Boizot en el Museo Catalán y cartel publicitario del Laboratorio E. Boizot S.A., en Madrid.

Other companies like Ibys (Biology and Serum-Therapy) and the Llorente Institute contributed in the production of medicines. The Spanish branch of Sandoz (Swiss company that had been producing *Calcium Sandoz* since 1929 as a therapy through calcium) offered its product.



Foreign relief-efforts and health support were provided by The International Brigades [14] and the International Health Service. This last was a relief organization of the komintern Russia [15] that belonged to the Support to the Republic of Spain Coordination Committee, in charge of raising funds and medicines through the world. During the Civil War, Benicàssim (Castellón) had one of the most important hospitals of The International Brigades. It was located in The Villas area, between the "*camí nou"* and

the Voramar Hotel, and it consisted in over fifty buildings, some villas, a convent, a hotel and a parking lot. This hospital offered its services from December 1936 to April 1938. More than 7,000 wounded men were attended there, both Spanish and from foreign from the BI. Since August 1936, the International Red Cross Committee had taken care of the eventual material and supplies need the Spanish Red Cross would face.

3.1. Medicine production for the Republican Army: The Central Military Pharmacy Laboratory.

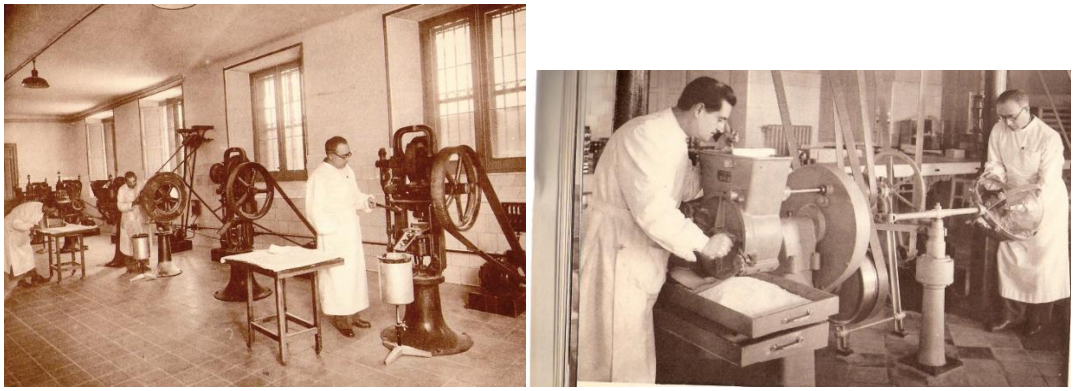
This pharmacy center had been for many years a key point in the health policy of the Army [16], since it provided medicines and curing material, in periods of peace and war, of an acceptable quality degree. It was also in charge of replenishing material when necessary, all at a relatively low price. It worked as a chemic-pharmaceutical factory, warehouse and logistic distributor to all military pharmacies in the Spanish territory: headquarters, military hospitals. It was also responsible for stoking the first-aid kits of the Armed Bodies, and military units, as well as the vans with pharmaceutical supplies that went with the ambulances [17].

The Central Military Pharmacy Laboratory.

The Army developed a form called “Petitorio Militar” that contained the medicines necessary for the Military Health Unit, along with the way they would be purchased. Some of these were bought outside the military environment, like civil pharmacies or laboratories. Others were produced at the Central Laboratory, and some preparations were made at the military pharmacies. There were especial medicines (called “special pharmacy products”, which came from the industry), that could only be found at these military pharmacies. These medicines had previously been authorized by the government (circular 2-11-1933). The Ministry of War introduced this new disposition responding to the medicine producers´ requests. Finally, those medicines that didn´t have a widespread use, could be solicited to the Central Laboratory, in minimal doses.

Following these lines, the Central Laboratory had always in stock enough supplies of 720 “simple medicines” (basic formula for common medicines), which enabled the production of the 129 medicines of the “petitorio”. These medicines were to be taken orally (pills, granules, capsules and tablets or liquid extracts), by injection. There were

also reagents, hollow suppositories made of butter as well as suture and curing materials.



Capsules' production room and Granulate machine in the Central Military Pharmacy Laboratory.

New measures and administrative changes were introduced during the Second Republic. These affected the structure of the Central Laboratory. The most important ones were the fusion of the Laboratory with the Military Hygiene Institute to form the Military Health Central Establishment (1932). Two years later this unit disappeared and both institutions went back to their previous independent organization.

After some cutbacks in spending, The Central Laboratory became the only military production, storage and distribution center of medicines of Spain. Under these conditions the Central Laboratory faced the outbreak of the war in July 1936. It is important to remark that the Laboratory was located in Madrid, a city under the Republicans ´control until the end of the war. The Laboratory continued with its work during the whole war, and it was regarded as the main health unit at the rear. The huge amount of supplies it stocked were enough to cover the needs at the beginning of the conflict. Production continued steadily despite air raids that destroyed part of the installations, and the Laboratory was able to send medicines to the Republican Army until communications were broken. The biggest damage inflicted upon the Laboratory was caused by the air raid of November 1936 [18]. After it, only the sections at the level ground floor (the curing material and tablets elaboration) could continue its activity. The rest were moved to a new location on Lopez de Hoyos Street (also in Madrid). Workers were organized in three shifts, so that the work would continue day and night [19].

3.2. The Military Pharmaceutical Service of the War Health Committee of the Generalitat.

Catalonia swore loyalty to the Republic and within a few days they developed a defensive structure. It consisted in "columns" of loyal civilian forces and armed militias that formed "The Front of Aragon", entitled to stop the coming troops toward the east, in order to protect "The Brothers of Aragon". Nevertheless, the leaders of these groups proved to be unable to coordinate their efforts and create a real Army with strong military discipline. And so, the Republican zone at the north of Spain, isolated from the rest, was conquered between March and August in 1937.

Regarding health and medical aspects, the Generalitat of Catalonia formed, at first, the Antifascist Health Committee of the Militias and later on, the Health in War Committee.

As the central government did, the Generalitat controlled the health professionals, doctors and pharmacists, and took over pharmaceutical companies [20] and pharmaceutical organisms [21]. For this reason, one of the most important pharmaceutical businessmen, Juan Uriach Trey, lost power over his own company, but the workers named him director of the company [22]. Half of the staff was relocated during the conflict. The difficulties that the war arose concerning distribution of medicines involved a decrease in the production´s company. However it continued to produce and sell Opobyl and Uraseptine [23].

Uraseptine rogier. Laboratorio preparador Uriach-Barcelona, España. Archivo fotográfico Fundación Uriach 1838.

In May 1937, a change in the Republican government and certain disagreements among members of the Generalitat and political parties made the government to restring the autonomic competences of Catalonia. These restrictions started with the government´s appropriation of the Public Order and Defense Services of the Generalitat [24].

The organization of the Military Heath followed the central Regulation, with little local modifications. It was based on a series of key points that covered the entire zone, from the firing line to the hospitals at the rear. There was a list with all the first-aid services points, starting from the firing line. From there, all the wounded were transported to the health unit of each battalion. At the relieve points, the soldiers receive basic medical attention thanks to the firs-aid kit each soldier carried. These kits contained gauzes, iodine and alcohol. A little farther, in more secure places but also well connected to the firing line, were the relieve points. In these points soldiers could receive basic curing. The wounded were classified and sent to the unit relief point by walking when possible, or in a stretcher. These units had serums and pain-killers and the cures were completed. There were records for every soldier that entered the unit, including a diagnosis for the wounds and the exact time these had been produced, the medicines used to treat them, the way of evacuation of the soldier and so on. The ambulances were available only from these relieve points.

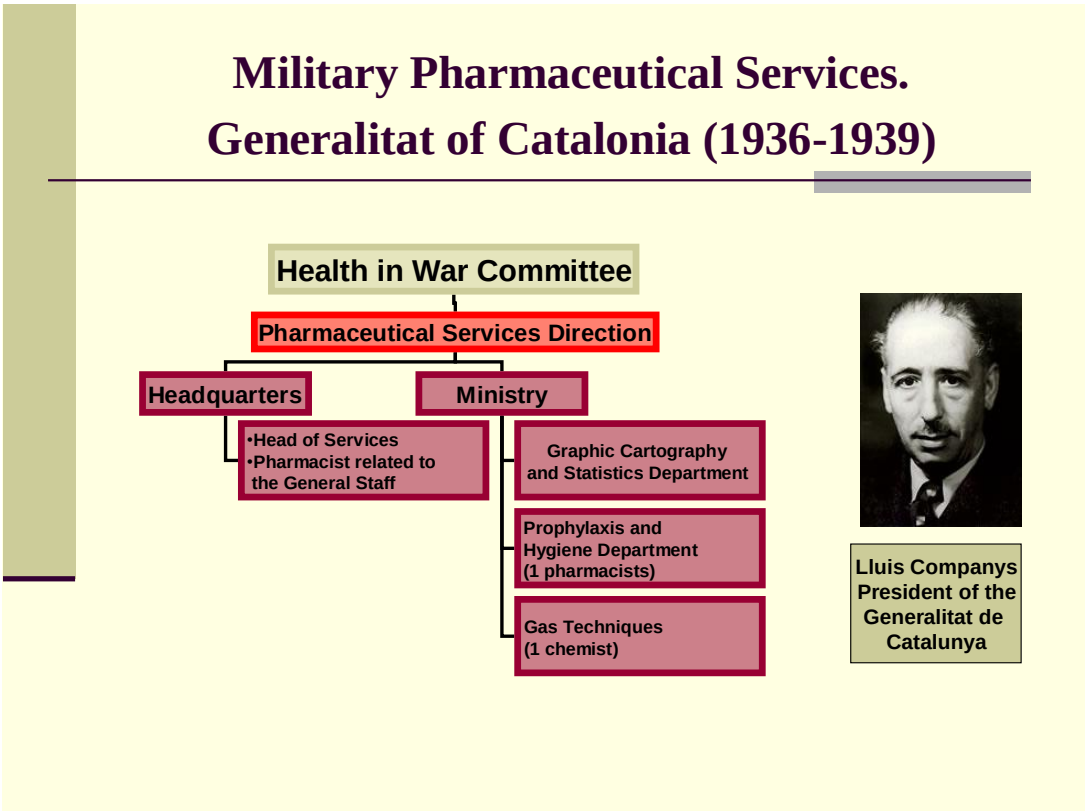
Hospitals at the firing line were less than 10 km from the front. They had “autochirs” (mobile operation theaters). Evacuations columns were sent to transport the most

serious injured in ambulances or buses. There evacuation systems also had hospital-train and operation theater-train.

The big hospitals and the blood hospitals (which were actual buildings) were located in bigger and well connected towns. Finally, there were the evacuation hospitals, at the rear, which were able to attend to a big number of patients.

The Military Pharmaceutical Service was structured through the Pharmaceutical Services Direction and the General Pharmaceutical Services Inspection, which were directly dependent on the Health in War Committee of the Generalitat.

The Pharmaceutical Services Direction, whose headquarters were at the Health in War Committee, controlled three sections: graphic Cartography and Statistics, Prophylaxis and Hygiene and gas Techniques; as well as the pharmaceutical accounting.



The General Inspection was responsible for the activity of the most important central military pharmacy, sited in Barcelona. It was also in charge of the other military units and pharmacy hospitals of the city.

The military hospital was in the Tallers Street, in Barcelona. This hospital didn´t modify its services, since all the staff remained loyal to the Republican government. The military pharmacy of the hospital [25] was open until 1938, when the building was destroyed and transferred to the new pavilions at Vallcarca.

The military hospital of Gerona also had a military pharmacy (those hospitals in Gerona dependent on the military health support formed an association called “The Military Hospital Association of Gerona”). There were no pharmacies at the military hospitals of Lerida and Tarragona. The creation and continuous broadening of a web of hospitals

devoted to attend injured or ill soldiers was a proof of the progressive militarization of the Health services [26].

This Inspection also controlled the Laboratories Section where all chemical-pharmaceutical studies and researches were developed. These laboratories were: at the Science School of Barcelona: chemical-industrial orientation laboratory, analytical control laboratory and physical-chemical laboratory; at the Pharmacy School of Barcelona: chemical-pharmaceutical industrial orientation laboratory, specialties control laboratory, anesthetics control laboratory and medicines control laboratory

Two more laboratories were created during the war in Barcelona and Valencia. The first one had a great amount of curing material, and the one in Valencia was devoted to the preparation of medicines to be taken by injection [27].

The Republican government moved its headquarters to Barcelona (31-10-1937). There, they took the decision of launching the strongest attack involving the largest military deployment at Teruel. This cruel battle was divided in two periods, and it ended with the retreat of the Republican troops in February 1938 [28].

One of the first measures concerning health services taken by the Generalitat was the medical care and evacuation of the injured men of the "Front of Aragon". This front was divided into two sectors: the northern and the southern sectors. The Pharmaceutical Deposit of Barcelona contributed by supplying medicines and curing material to the new deposits at Monzon and Caspe, one in each sector of the front. These deposits sent medicines to the smaller deposits of each Division [29].

At the second stage of the conflict, the Military Pharmaceutical Service changed its name to Pharmaceutical Service of the East, and became a body under the general headquarters´ authority of Sariñena (Huesca) [30].

The fascist troops reached Catalonia and the Mediterranean coast, with the result of the separation of the Republican zone. After the Battle of the Ebro, Catalonia was exposed to the threat of the powerful National Army, that kept moving on towards Lerida, Tarragona and Gerona (were government had set its headquarters) and finally, Barcelona. Catalonia had to face air raids, refugees, famine, and poor hygienic and health conditions of the population. After this separation, Catalonia and the East Army became allies. The Health body of this army installed its base in Manresa. It consisted in a group of buildings that were especially equipped for medical use. In Manresa was also the Esteve Laboratory, which prepared the first sulfamidas, under the direction of Antoni Esteve i Subirana. The internal medicine services of the military hospital had access to these medicines thanks to the Esteve Laboratory. In 1931, this laboratory, it developed the vitamins A and D (first modern vitamin specialties in Spain), which were included in the Esterocal and Esterisol preparations. In 1937, it achieved the synthesis and industrial preparation of the first sulfamida Amido-Sufol [31].

The health and sanitary services of the International Brigades arrived to Catalonia in April 1938, and started working in hospitals. The International Brigades also worked in Olot (May 1938), were they had their own infirmary. This infirmary would pass to the hands of the National Army: "we have found a huge warehouse of the International Brigades with narcotics".

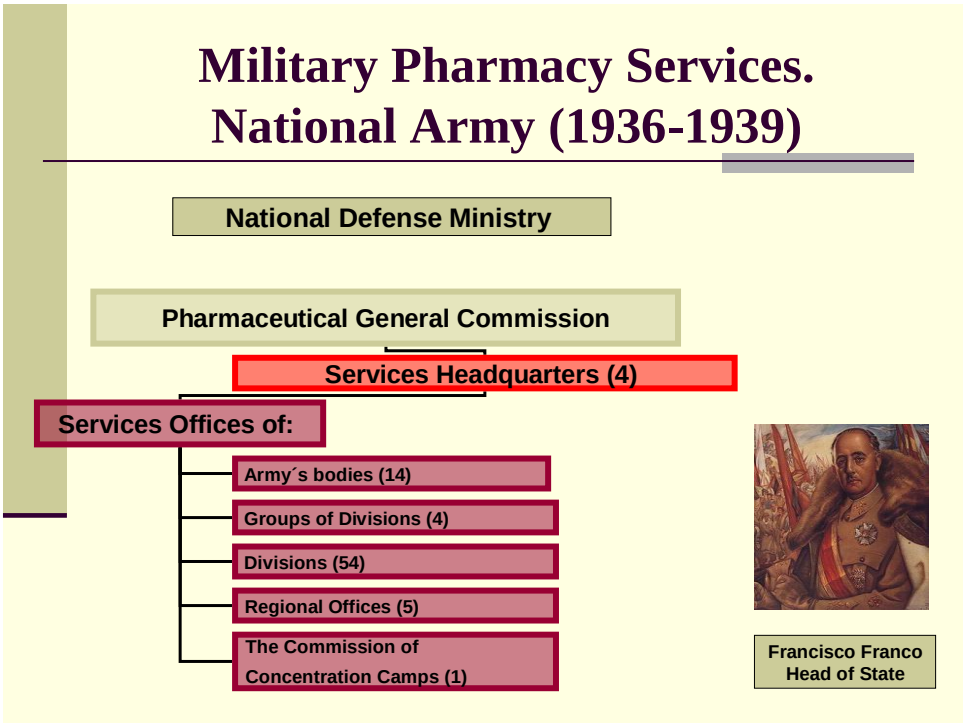
International Brigades´ Farewell Parade. Barcelona, 28-10-1938

France and Great Britain recognized the Franco´s dictatorship in February 1939, and the Central Army, in Madrid, surrendered. The Civil War ended officially the fist of April of that year.

4. Medicine production of the Pharmaceutical Services of Franco´s troops during the Civil War. Creation of five Military Pharmaceutical Complexes.

The lands conquered by the national troops were mainly farming lands, with little industry and almost none chemical-pharmaceutical production. There were five Organic Divisions, each one with a central pharmacy: military pharmacies of Valladolid, Sevilla, Zaragoza, Burgos and La Coruña. These pharmacies were the first attempt of supplying the pharmaceutical needs of the army. However, the pharmacies stopped receiving the medicine deliveries from the Central Laboratory and consequently, were incapable of continuing supplying the army. The Army ordered the militarization of the doctors and pharmacists (Decree 9-10-1936, National Defense Committee), took over civil pharmacies and centers and warehouses of chemical-pharmaceutical production of Valladolid, Palencia and Salamanca. The aim was to find anti-tetanus and anti-gangrene serums, but this measure proved to be insufficient. Fabric producers gave part of their material to make gauzes, and cotton fabrics produced hydrophilic cotton. The army also took seize of chemical and pharmaceutical equipment such as autoclaves, distiller vases, dehydration heater, compression, mixing, and cutting machines, vacuum chambers, gas blowing devices and others. In some places like Galicia, an important number “free samples” were collected. These were actually property of civil doctors.

The military uprising was supported by the Spanish economical and industrial elite, and countries like Italy, Germany and Portugal, and they gave donation, line free help or organizing fast deliveries of medicines [32]. German companies were benefited the most, and they created branches in Sevilla, at the beginning of the war. The general Queipo de Llano was responsible of the protection of these companies, and of the creation of a commercial web with the Nazi Germany [33].



In any case, these measures didn´t solve the medicines shortage the national army suffered. The medicines import always consisted in little amount of medicines. The central pharmacies of Valladolid, Sevilla, Zaragoza and Burgos became pharmaceutical laboratories, following the structure of the Central Laboratory of Madrid. The Pharmacy Schools of Santiago de Compostela and Granada became branches of these chemical-pharmaceutical laboratories.

The first regulations concerning pharmaceutical organizations involved the creation of the **Military Pharmaceutical Complex of the Northern Army of Valladolid**. This center was the most important military body for the provision of medicines and it was responsible for supplying medicines to the intermediate centers, including these pharmacy-complexes of the Organic Divisions. From these intermediate centers, medicines were transported to the advanced centers, called Advanced Medicine Warehouse. The Pharmaceutical Complex also built mobile pharmacies (42), analyses equipment (20), Clorox index and clearness of water measure devices (88), gas escape protection equipment (100), emergency bags in case of gas escape (100), mask gas (65), emergency bags for the veterinarian field (40) and bags for relief points for the veterinarian field (50).

Three months later, the **Military Pharmaceutical Complex of the Southern Army of Seville** was created, and it was in charge of providing medical supplies to Andalucía, part of Extremadura, Baleares and Canarias Islands, Morocco as well as the **Pharmaceutical Complex of the fifth Army of Zaragoza**. **The Pharmaceutical Complex of the Northern Army of Burgos** was created in July, 1937. The Northern Army was split two; one part was assigned to this new military complex, and the other, to the Pharmaceutical Complex of Valladolid (that belonged to the Central Army). Finally, the fifth complex, **The Pharmaceutical Complex of the Eastern Army, in Calatayud**, was created in December 1938. It played a little role in the war, and it

distributed medicines, and pharmaceutical and curing material during the four months it was open.

Laboratories used in the Civil War (1936-1939). Military Pharmacy Museum, Madrid (Spain).

The following laboratories were affiliated to the five Military Complex: chemical-pharmaceutical laboratories of Santiago de Compostela (August, 1936), Granada (January, 1937), Cádiz and Burgos, as well as the "El Salvador foundation" at the military pharmacy in San Sebastián (October, 1936).

According to current regulations of that moment, the Pharmacy was section under jurisdiction of the Health Committee. In spite of this fact, the Pharmaceutical Services worked as an independent body during the whole war. Each one of the Operation Army had its own Pharmaceutical Services Direction. In addition, in 1938 was created the General Pharmacy Inspector, a body under the orders of the National Defense Ministery.

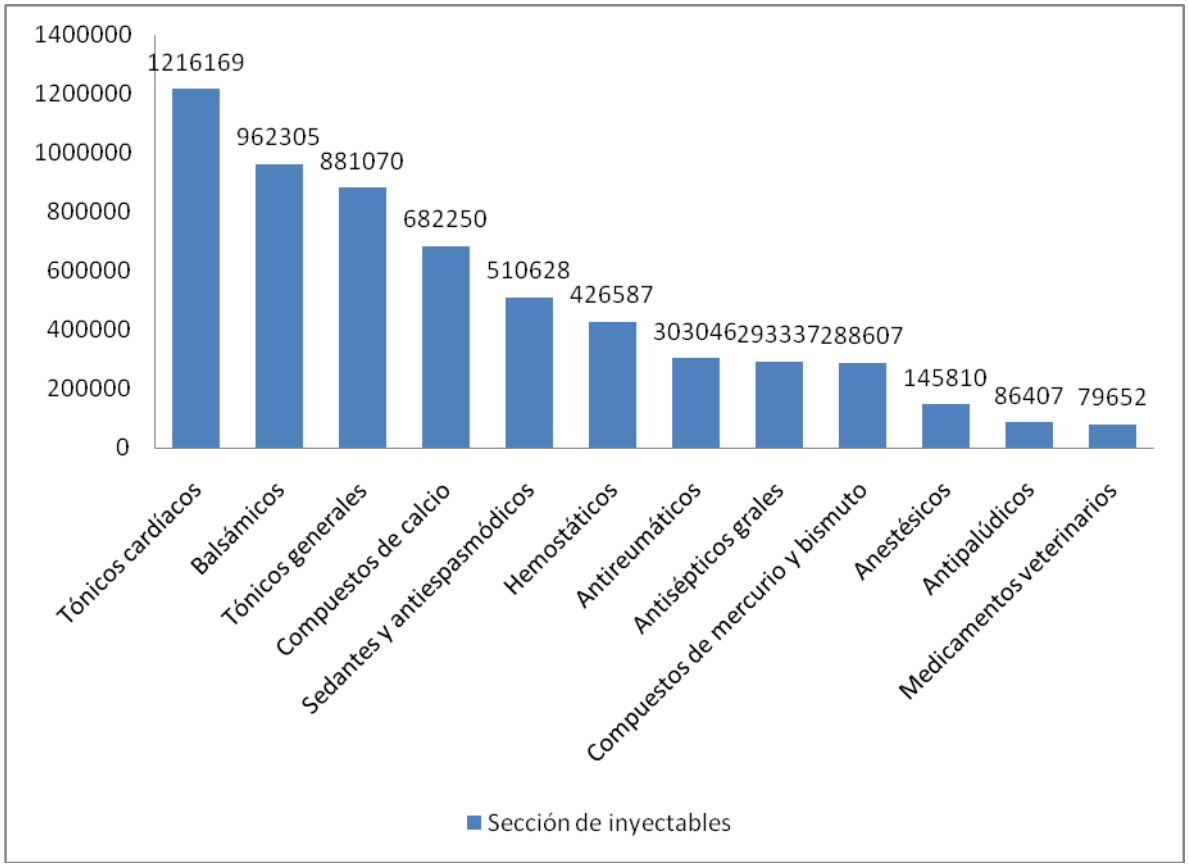
4.1. Pharmaceutical Complex of the Northern Army of Valladolid.

In October 1936 was created the Pharmaceutical Complex of the Northern Army of Valladolid, in charge of providing medicines to all "military columns" and organizing the pharmacies of the conquered lands. In this Complex was edited the "Petitorio. Abbreviated form for the Medical and Veterinarian services of the Spanish Army" (Valladolid, May 1937). It was a basic tool for orientating doctors when it came to give prescriptions.

It comprised a huge warehouse with material and the Lope de Vega Theater, in Valladolid, were where installed the production centers, which elaborated injections, curing material, tablets, capsules and pills, as well as an identification and industrial checking laboratory.

Military Pharmaceutical Complex of the Central Army of Valladolid in the Lope de Vega Theater, in Valladolid.

The graphics below show the numbers provided by the *Official Memoire* elaborated by the Pharmaceutical Complex at the end of the war.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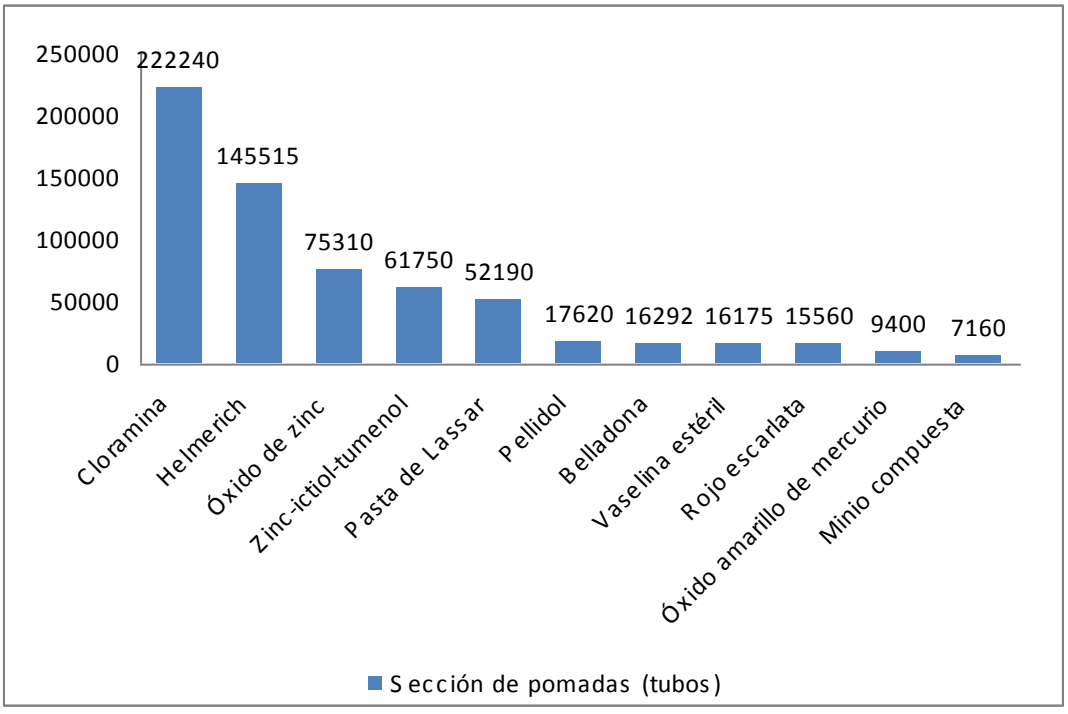
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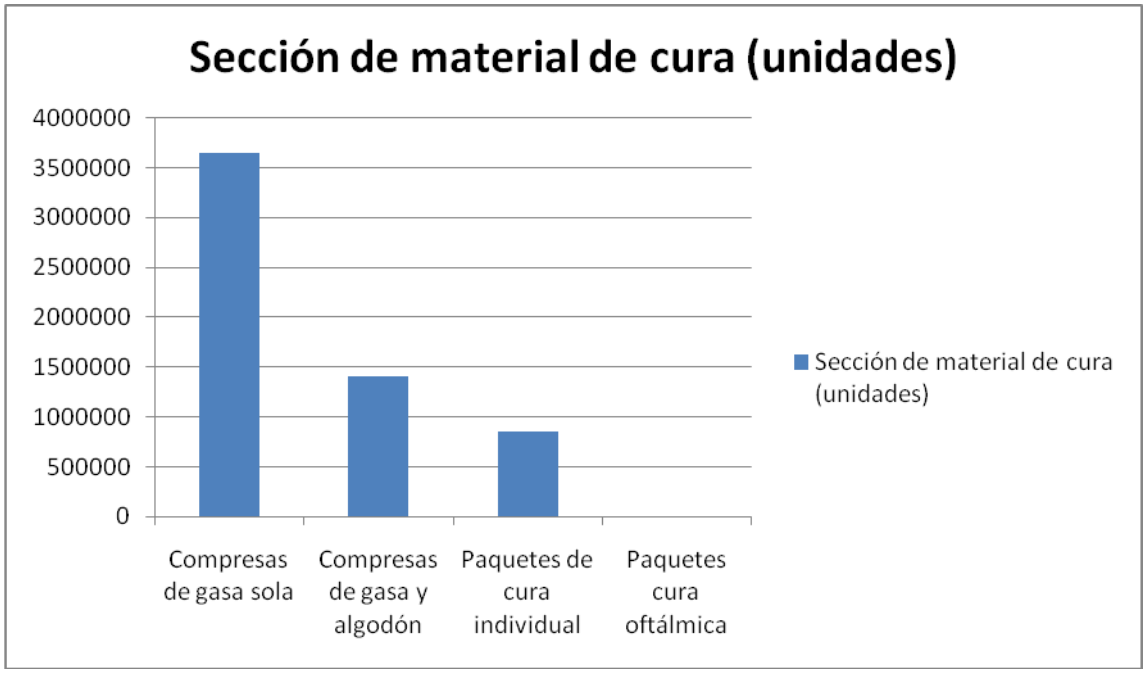
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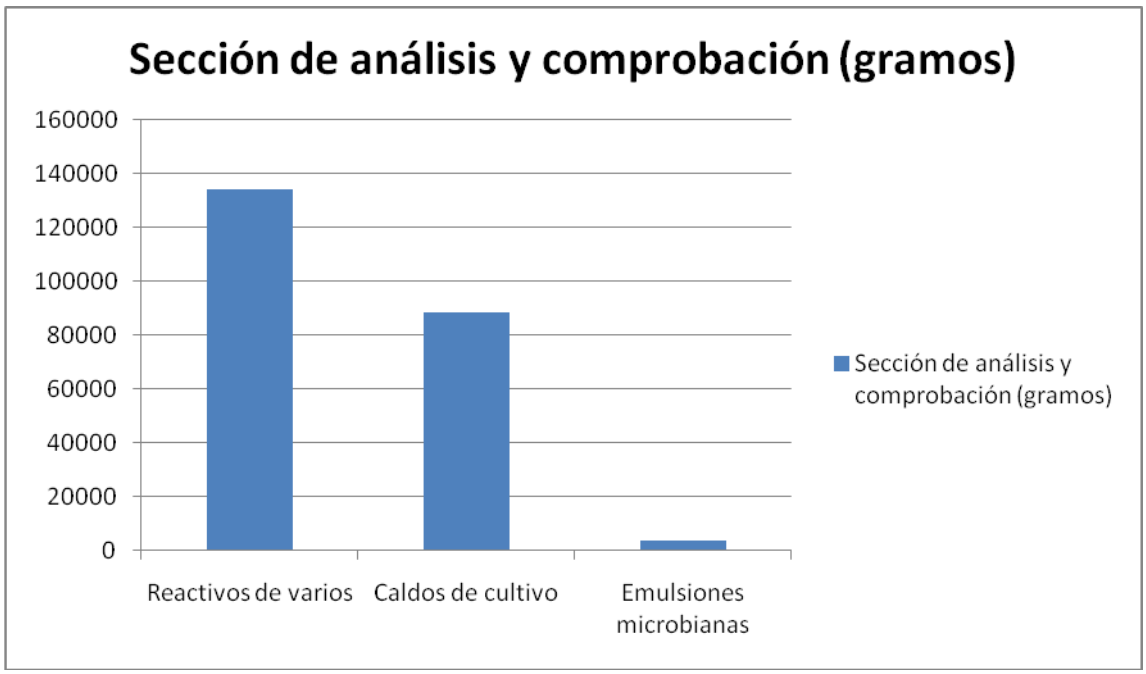
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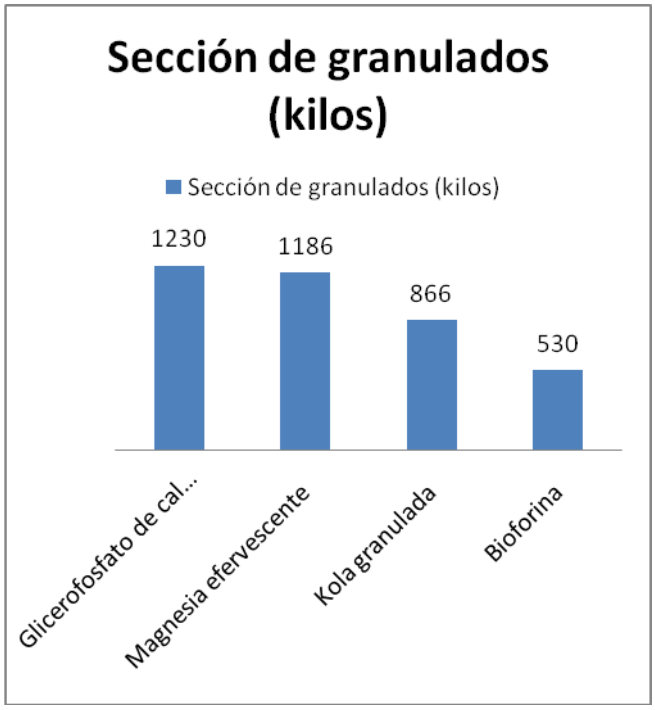


In 1938, a new individual antiseptic curing kit was developed. It contained manganito de plata, which came from the Laboratory of Santiango de Compostela. A whole department of the Complex at Valladolid was dedicated to the production of these kits [34].

4.2. Military Pharmaceutical Complex of the Southern Army of Seville.

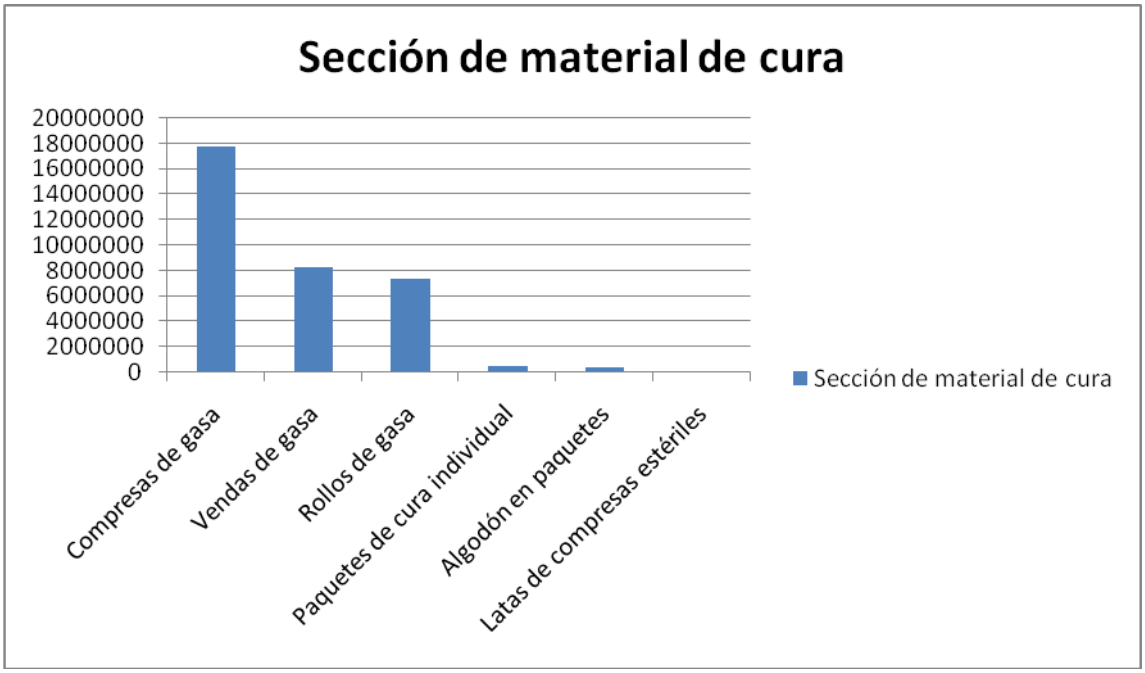
Since the beginning of the War, the Military Pharmacy of Seville continued producing the usual "especialidades", with the supplies coming from the Central Laboratory, in order to cover the needs of the Army of Andalucía, the legion and the regular expeditions to Africa. This Complex, together with the Laboratories of Cádiz and Córdoba, were of vital importance when it came to recollect raw materials and other basic tools from Portugal and Gibraltar.

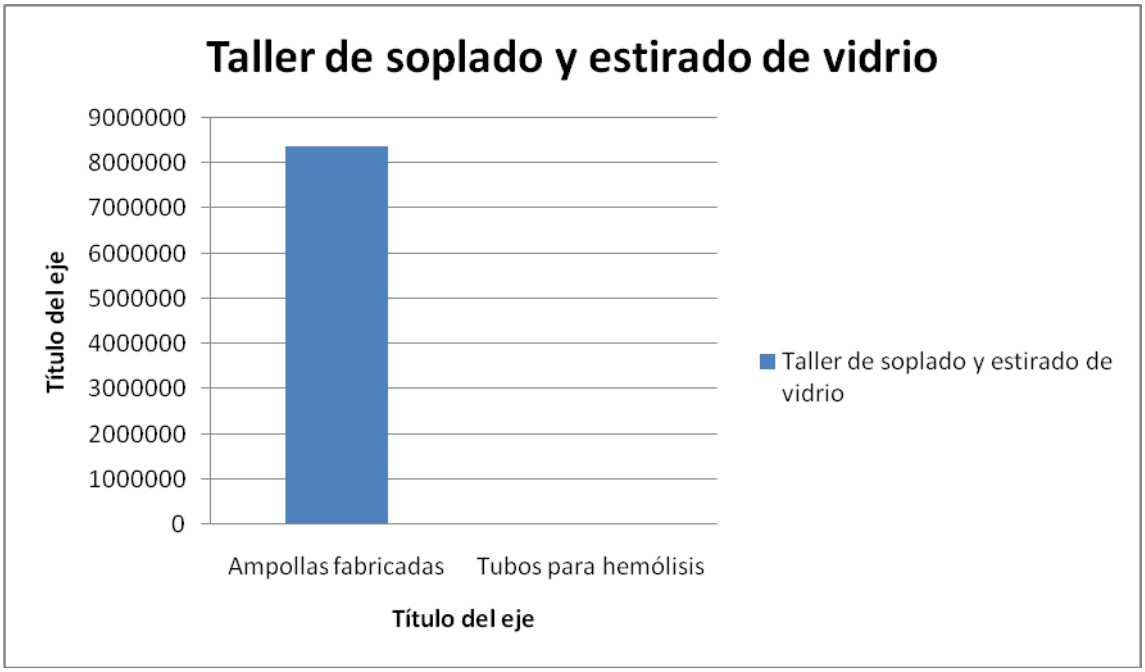
In April of 1937, the Military Pharmaceutical Complex of the Southern Army of Seville was installed at the same glass blowing factory of the Military Pharmacy of Seville, in an attempt to solve the lack of glass ampoules necessaries for the injections.

Glass blowing factory "La Trinidad", Sevilla. At the factory, long pieces of glass were transformed into ampoules for injections.

Later on, it was moved to the Telefonica´s Pavilion, at "Parque de Maria Luisa", where it could enjoy the same facilities as the Complex of Valladolid [35].

Telefonica´s Pavilion. Plaza Nueva, Sevilla.





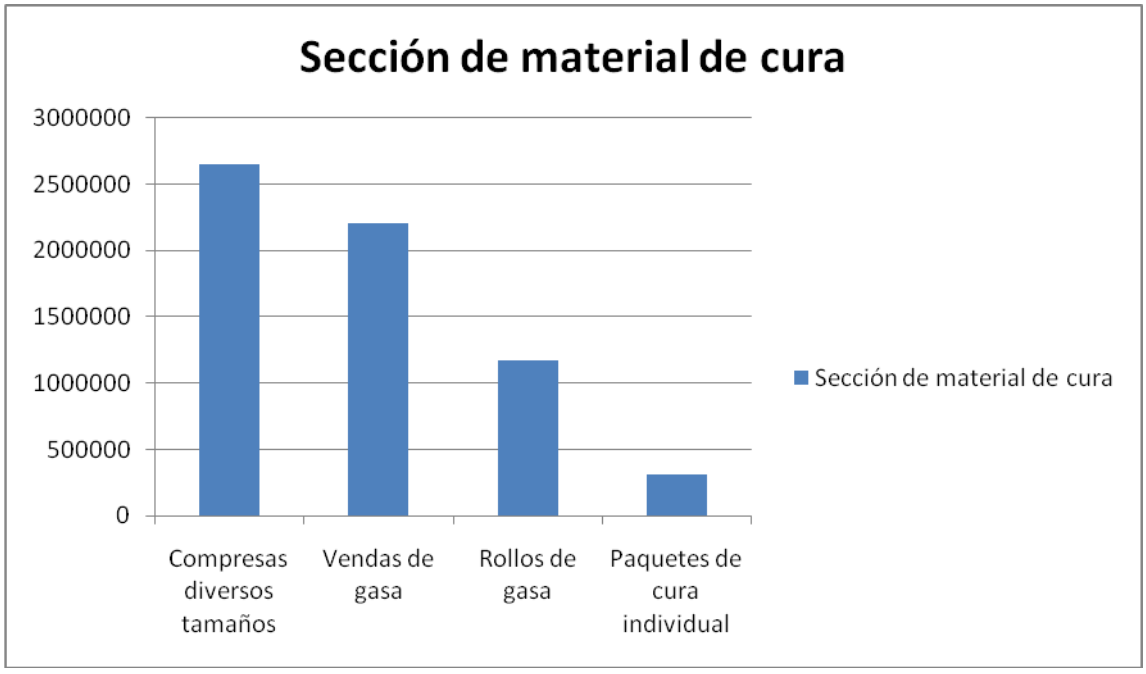
4.3 Pharmaceutical Complex of the fifth Army of Zaragoza.

It occupied part of the main building of the School of Medicine of Zaragoza, and it took care of the troops of this area. However, the park had to widen its duties when the Northern Army travelled to Aragon to take over Barcelona and Levante [36].

Gran Via Street of Zaragoza, and the School of Medicine at the right.

The Factory of “Carde and Escoriaza” (Zaragoza), produced military equipment for the National Army**.** In this case, they used a vehicle´s chassis and half wagon (17-9-1937). It worked as a *“Mixed van, Surgery, Pharmacy and Dietetics”* for the “Divisionary Relief Spot”.

Heath van of the Division 105.



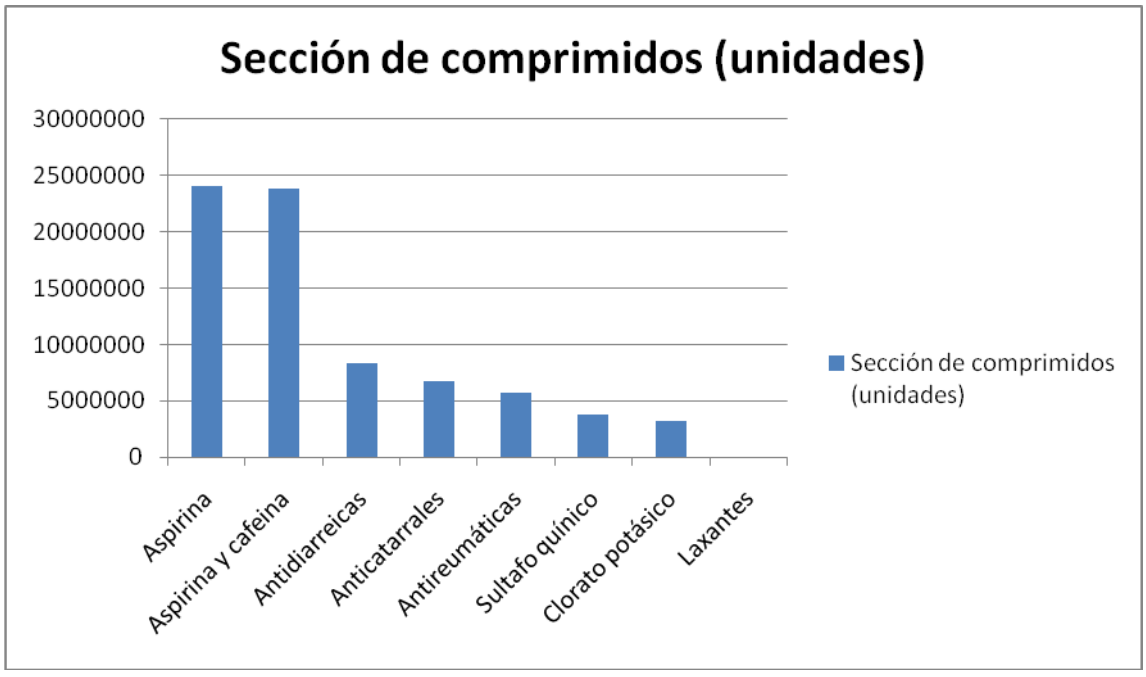
4.4. Pharmaceutical Complex of the Northern Army of Burgos.

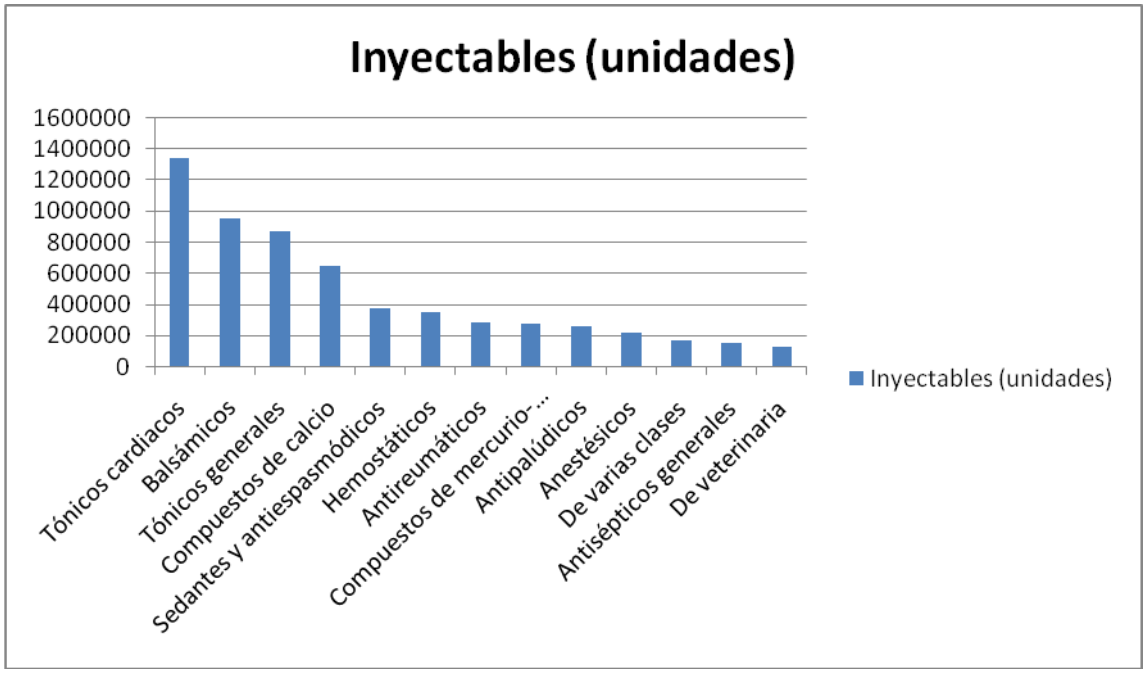
This Complex was responsible for the design and production of five automobile-pharmacy-laboratory for the Army of Navarra.

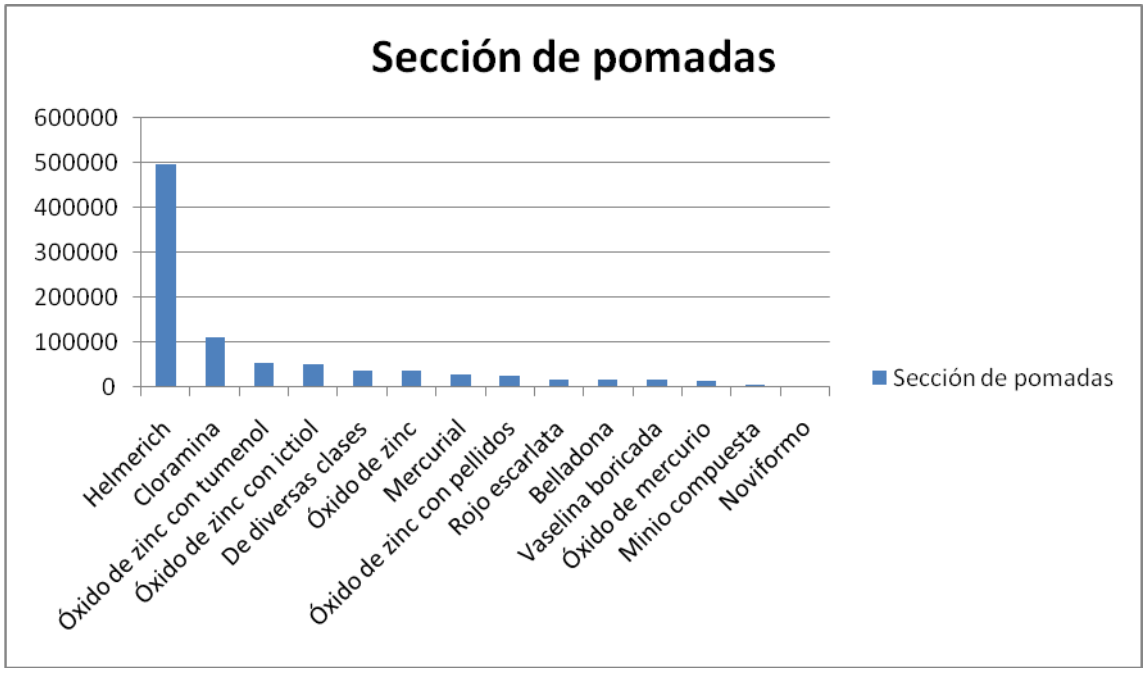
Military Pharmaceutical Complex of Burgos.

It was organized in five departments. Here are the details of its equipment and production:

- Distilled Water and Alcohols Department. (1 columna rectificadora).
- Extracts Department. (1lixivador and 1 vacuum extractor. 10 litres of extract per day).
- Tablets Department. (5 machines that produced 7,000 tablets per hour and machine).
- Injections Department. (9,000 ampoules per day).
- Creams Department. (750 tubes per day).
- Curing Material Department (4 machines for rolling gauzes and two for cutting bandages. In three shifts of eight hours each, these machines could prepare one million of gauzes and 25,000 bandages per day).




Inyectables (unidades)
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
Tónicos cardiacos
Balsámicos
Tónicos generales
Compuestos de calcio
Sedantes y antiespasmódicos
Hemostáticos
Antireumáticos
Compuestos de mercurio- ...
Antipalúdicos
Anestésicos
De varias clases
Antisépticos generales
De veterinaria
Inyectables (unidades)


Sección de pomadas
600000
500000
400000
300000
200000
100000
0
Helmerich
Cloramina
Óxido de zinc con tumenol
Óxido de zinc con ictiol
De diversas clases
Óxido de zinc
Mercurial
Óxido de zinc con pellidos
Rojo escarlata
Belladona
Vaselina boricada
Óxido de mercurio
Minio compuesta
Noviformo
Sección de pomadas

4.5. Chemical-pharmaceutical Laboratory of Santiago de Compostela.

It was a branch of the Pharmaceutical Complex of the Central Army, and was installed at the School of Pharmacy of Santiago de Compostela.

School of Fonseca. Old School of Pharmacy, Santiago de Compostela.

The production of this complex was organized in five departments:

- "Especialidades" and Research Department.
- Chemical products Department.
- Injections Department.
- Galenic Preparations (medicines) Department.

- Aseptic and Antiseptic curing Department.

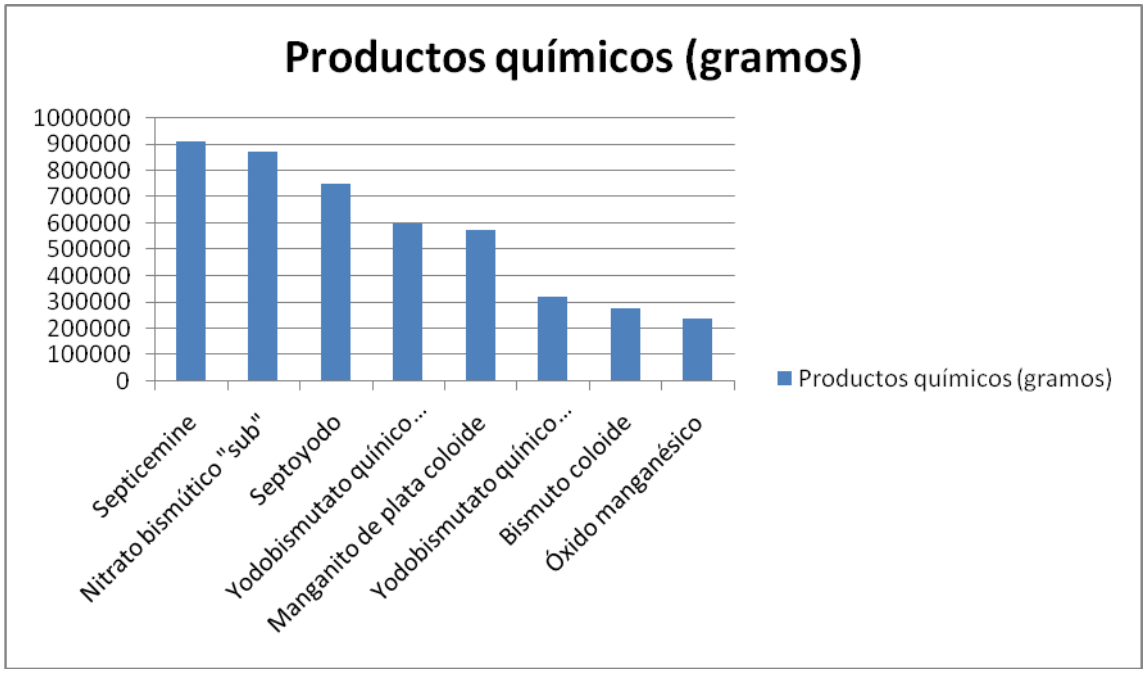
The laboratory financed the pharmacy-vehicle "Santiago de Compostela". In Brasa Arias, B. Gaceta del Aula Militar Bermúdez de Castro. Castellón, 2008. nº82

This Laboratory copied and produced some medicines that were introduced at the Spanish market as "especialidades". This was the case of *Septicemine francesa*, which would be administrate at the military hospitals as *Fagoseptina*. Another important achievement was *manganito de plata* (previously mentioned at the Pharmaceutical Complex of Valladolid), and antiseptic and healing serums that soaked the gauze. This allowed the elaboration of an individual antiseptic curing kit, used throughout the troops.

They also produced *Cilotropina, Efedrina and Urotropina*, and made some interesting researches concerning *gluconato calcico electrolitico* and ways of obtaining them this component was the base for preparing the painless injections. Finally, they produced *yodobismutato de quinine soluble* and *toluene sulfonado*, with similar characteristics to *Mitigal Bayer*.

Mitigal Bayer.

First aid kits for the battalions of the area were also elaborated at this center. It was also responsible of producing serums and vaccines, as well as assessing in the chemical field to the military industry [37].



4.6. Chemical-pharmaceutical Laboratory of Granada.

It was an active centre for twenty seven months at the School of Pharmacy of Granada.

La Facultad de Farmacia (1922-1960)

School of Farmacia in Granada (1922-1960).

It offered 94 different products: silver salts, especially *argirol*, thanks to its results similar to *argirol Barnes*.

Colirio de argirol al 10%. Servicio farmacéutico del Ejército español. Museo Español.

Anesthesic ether was produced and kept in ampoules, and it was the only ether used as an anesthesic at the Military hospitals of the Southern Army.

They also produced *citrate sodico, sulfato sodico puro, sulfato magnesico, acetato de plomo y fosfato sodico* [38].

Pomada oftálmica de ácido bórico. Farmacia Militar 3ª División, Valencia.

As for chemical war, more especifically, anti-gas protection, “active coal” for the filters of the masks was obtained from pits of olives and the shells of almonds.

An especial isolated chamber was built for manipulating aggressive chemical products. In this way, they could obtain *iperita, fosgeno, cloruro de bencilio y cloropicrina*.

In addition, they produced gas detectors for anti-gas equipments and a different model of anti-gas mask. Finaly, at this center were made different studies about medicinal plants of Granada, biochemical and toxicological analyses.

4.7. Recollection of medicines and sanitary material.

The recollection of medicines and chemical products from the enemy was a process controlled by the Recovery Departments, thanks to mobile-pharmacies. After a phase of analyses, these medicines went to the warehouses or delivery departments of the Army.

As for the recollection of their own materials, especially used gauzes, there different prodecures. Alcohol used at hospitals and blood hospitals for cleaning medical and

surgery equipment, was collected and reused after a phase of distillation. Tubes used for creams were melted down to produce new ones.

The recycling of dressings was a process spread by the Chief of the Group of Pharmacies at the Military Hospitals in Logroño. This system, improved by its author, could be used for all kinds of bandages and dressings, as well as gauzes. It allowed the reutilization of the material up to four times, no matter how stained it would be.

References:

[1] Rodríguez Nozal, R.: *Orígenes, desarrollo y consolidación de la Industria Farmacéutica española (ca. 1850-1936*). *Asclepio* Vol. LII-1-2000.

2 Industries form Madrid and Basque Country, as well as family bussines from Catalonia, almost all of them heirs of the first pharmaceutical companies created at the end of the 19th century, and devoted to the commercialization of imported medicines ("especialidades"), or to the elaboration of medicines produced at pharmacies.

[3] Puig Raposo, N.: *Redes empresariales de oportunidad en la España del siglo XX: El caso de la industria químico farmacéutica Historia empresarial. Nº 812.* (2004).

[4] The reorganization of the Army Ministry (Law of 22-9-1939) involved the creation of the State Industrial and Material Office.

[5] Martínez Ruíz, E.: *Guerra civil, comercio y capital extranjero en el sector exterior de la economía española (1936-1939). Estudios de Historia Económica*. Nº 49. (2006). The staff came from the CAMPSA´s staff and both volunteer and transfered workers. The headquartes were in Barcelona, and divided into tern technical sectors: agriculture, mechanics, metals and metallurgy, mines and coal, lead, textile, chemistry, health, mechanization and feeding. France and the USSR were the main suppliers of the Gentibus, after them were Belgium, United Kingdom and Holland.

[6] Those who had been selected had to take a one-year course at the Military Health Academy, as well as a training course at a military service. (Law of 12-9-1932 concernig recruitment for the Army).

[7] There was a central pharmacy in each Division, and, in big towns or garrisons, there were military pharmacies "de Plaza", of hospitals, or military health spots.

[8] Montseny, F.: *La sanidad y la asistencia social durante la guerra civil*. Monografías Beecham. (1986).

[9] The Republican Army was made of six Mixed Brigades, the Rifleman Body was restructures, and the Central Army was organized, and set its headquarters in Valencia. International Brigades of Volunteers were reorganized in Albacete.

[10] The Republican Army reorganized its structure a few months later (Royal Decree 31-10-1936).

[11] Barona Vilar, J.L. y Fernanda Mancebo, M.: *José Puche Álvarez (1896-1979): Historia de un compromiso: estudio biográfico y científico de un republicano español.* Valencia. (1989). After the initial confusion at the beginning of the uprising, in 1938 the Military Health Office created a web of hospitals called "Group of Military Hospitals"", after the appointment of Dr. José Puche Alvarez as Military Health Chief.

[12] Ramón Soler i Segón, J.: *Organización de la Sanidad Militar en el Ejército de la República durante la guerra civil española 1936-1939. IV Congrés d'Història de la Medicina Catalana. Actes, Volum II.* Poblet, (1985). *Organigrama del cuerpo de sanidad el ejército de la república. Servicio Histórico militar. Sección guerra de liberación s.n.*

[13] Gómez Rodríguez, L.: *La evolución del servicio farmacéutico militar español en el siglo XX.* Colección Tesis Doctorales. Nº 305/89. U.C.M. Madrid, (1989).

[14] Navarro Carballo, J.N.: *La Sanidad en las Brigadas Internacionales*. Madrid, (1989). Rules of the International Brigades (Valencia, 23 de septiembre de 1937).

[15] Branciforte, L.M.:. *El Socorro Rojo Internacional y su intervención en España*. Congreso de la guerra civil española (1936-1939). (2006). The places when the International Red Aid were located are still recognizable in Madrid. For example, the Maudes´ Hospital, which during the Civil War was known as the Worker Hospital in Cuatro Caminos, an old private Hospital for tuberculosis patients that the Republican Government had seized. Another example is the hospital in Velazquez street, number 73, on the corner of Padilla, where were the headquarters of the National Executive Committee and the Regional Committee of the International Red Aid in Madrid, as well as its canteens.

[16] Anonymus: *El Laboratorio Central de Sanidad Militar. Memoria Histórico descriptiva. Madrid, 1898* This Laboratory was created by King Carlos III, and it staff was made of pharmacists of the Royal Pharmacy, which worked in nearby pharmacies. After a period of war, it resumed its activity in Madrid, in 1879, as the Central Laboratory and Medicines Warehouse of the Military Health Body. It was in charge of supplying pharmacies of the military hospitals, first-aid stations, ambulances and military pharmacies. It was a great factory of chemical and pharmaceutical products, and it continued working until the Spanish Civil War.

[17] *Reglamento de Hospitales Militares de 18 de agosto de 1884, capítulo XIII "Del Laboratorio Central y Depósito de Medicamentos, efectos y utensilios de Farmacia".*

[18] From the begining and until the end of the war, seizing Madrid was de goal of the National Army. They attacked from the North and South, and still Franco didn´t manage to enter the city. After the failure of the ground attack, Madrid suffered an air raid by German and Italian airplanes in the middle of November.

[19] García Irigoyen, M. y Martín Rico F.: Statements of the author,. Evolution of the Spanish Military Pharmaceutical Service during the 20th century.. PhD thesis of Luis Gomez Rodríguez. Madrid, 1989.

[20] Collectivization and Industry and Worker´s Contol of Industry and Trade Decree, published by the Generalitat of Catalonia, in 24-10-1936.

[21] Jordi González, R.: *Aportació a la Història de la Farmàcia catalana (1285-1997)*. Fundació Uriach 1838. (1997). Joan Oliva was a pharmacists entitled by the Generalitad to seize pharmaceutical centers and offices (26-7-1936).

[22] Solé, A.: *La industria farmacéutica catalana durante el Franquismo: el caso de Uriach.* Universitat de Barcelona. It quotes a production and raw materials statistic of the Industry and Trade Ministry together with the main pharmaceutical factories of Catalonia in 1939: Hijos del Dr. Andreu S.A. Establecimientos Dalmau Oliveres. Maluquer, Manuel. Laboratorios Andrómaco. La Química Comercial y Farmacéutica S.A. Laboratorios Norte España. Productos Pyre – Daniel Mangrané S.A. Laboratorio P. Martínez Llenas. Laboratorio Super S.A. Laboratorio Unitex S.A. Uriach y cía S.A. Productos Stella. Boheringer. Productos Químico-Farmacéuticos S.A. Laboratorio Quisana. Chemirosa Ibérica S.A. Laboratorios del Dr. Esteve S.A. Sociedad General de Farmacia S.A. Laboratorio Químico-Farmacéutico Opos. Giménez-Salinas y cía S.A. Laboratorios Dr. Grau S.A. Laboratorios Gummà. Laboratorios A.R.C.A.S.A. Lithinés del Doctor Custín, S.A.E. Profilac S.A. Sociedad Químico-Farmacéutica de los Establecimientos Rocafort-Doria. Instituto Farmacológico Serono S.A. Hijo de José Tarrés. Laboratorio R y B.

[23] www. uriach.com/

[24] Pagès, P.: *La guerra civil espanyola a Catalunya*. Sant Cugat del Valles. Barcelona, (1997).

[25] Hervás Puyal, C.: *Sanitat a Catalunya durant la República i la Guerra Civil*. Tesis doctoral. Institut Universitari d'Història Jaume Vicens i Vives. (2005). Pharmacists Benjamín Úbeda Sánchez y Joaquín Cortada Gayá were responsable for the Military Hospital Pharmacies Service. *Solidaridad Obrera*, 29-7-1936.

[26] Hervás Puyal, C.: *Sanitat a Catalunya durant la República i la Guerra Civil*. Tesis doctoral. Institut Universitari d'Història Jaume Vicens i Vives. (2005).

[27] García Irigoyen, M. y Martín Rico F.: Declaraciones al autor. En Gómez Rodríguez, L.: *La evolución del servicio farmacéutico militar español en el siglo XX.* Tesis doctoral. Madrid, 1989.

[28] There will be a failed Republican offensive at the Ebro River in July 1938. The Battle of the Ebro River would end in November 1938.

[29] Jordi González, R.: *Cien años de vida farmacéutica aragonesa (1830-1939).* Barcelona. (1960). The warehouse of the Northern Sector was installed in Monzon(Huesca) and it supplied: Warehouse of Boltaña, responsible for the Mountain Group, Warehouse of Siétamo, responsible for the Lenin Division, Warehouse of Sangarrén, responsible for Ascaso Division, and Warehouse of Salas, responsible for the Carlos Marx Division. In Caspe (Zaragoza) was the warehouse of the Southern Sector and it supplied: Warehouse of Peñalba responsible for the Urriti Division, Warehouse of Híjar

responsible for the Jubert Division and Warehouse of Alcañiz responsible for the Macia-Companys Division.

[30] Jordi González, R.: *Cien años de vida farmacéutica aragonesa (1830-1939).* Barcelona. (1960). 26 pharmacists, 76 assistants, and 7 ambulances supplied medicines to the seven Divisions that were involved in the combats of Boltaña, Siétamo, Albero Bajo, Almuniete, Bujaraloz, Híjar, and Alcañiz., following the same order were: Alpina Brigade, Lenin, ascaso, Carlos Marx, Durruti, Jubert and Maciá-Companys Divisions. A pharmacists and an assistant were assigned for each Division.

[31] Sedano, E. y de los Ríos, C.: *Historia de ESTEVE, un grupo químico-farmacéutico internacional. Actualidad en farmacología y terapéutica*. Vol. 7, Nº. 1. 44-48. (2009).

[32] At the end of the Civil War a lot of these donations were made public. Roman Casares Lopez quotes some of these in his speech "Spanish Military Pharmacy at the past War",at the opening of new centers of the Royal Academy of Pharmacy of Madrid, in May 1940 : "Pharmacists Garcia Zatorre and Fernando Rubio i Tudurí gave, during the first months, injections made in San Sebastián; sons of Dr. Andreu sent a great donative of medicines from Italy; Juan March also contributed from this same nation; Felipe Bertrán and Güel made another donation of bacterial serums, curing material and medicines; Catholics from Ireland also sent frequently a great number of medicines, and Mr. Villanueva prepared tablets at his laboratory in Burgos". Francisco Peña Torrea also talks about this matter in his book "Pharmaceutical Service of the National Army during the liberation war" Madrid, 1941.

[33] Santesmases, M.J. y Puig, N.: *La brecha entre dos mundos: aprendizaje e innovación científico-técnica en España. El caso del grupo químico farmacéutico del Banco Urquijo, 1944-1970.* CSIC, UCM. Madrid.

[34] Peña Torrea, F.: (1941).

[35] Andrés Turrión M.L.: *La fabricación industrial de medicamentos por el Ejército español: programas durante la guerra civil y primera etapa del franquismo, pp.317-352. El medicamento de fabricación industrial en la España contemporánea*. R. Rodríguez Nozal y A.González Bueno (coord.). Madrid, (2008).

[36] Andrés Turrión, M.L.: (2008).

[37] *Memoria Oficial del Laboratorio Químico-Farmacéutico de Santiago de Compostela*. Madrid, 1939. En PEÑA TORREA, F. (1941) p.113.

[38] Peña Torrea, F.: (1941) p.110.