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How the war wagon looked like in the 15th century?

Additions to the research connected to the development of a military vehicle

Abstract

By the first third of the 15th century, the use of war wagons on the Eastern and Central European battlefields was raised to a new level by the hussite rebels. The vehicle was adapted by the Hungarian Kingdom, as well, and there are sources containing evidences for its use in the late 16th century. Though, the rebels' warfare is rich in bibliography, the structure of the wagon is barely known. This article aims to give a detailed account on the structure of the vehicle, and on the difference between a "civilian" and a war wagon.

Keywords

war wagon, salt delivery wagon, hussite warriors, Győr

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Introduction

The use of war wagon in the medieval times is generally associated with the hussite rebels as it was them who perfected its use[1] by transforming a "civilian" vehicle. Libraries could be filled with literature on this topic, however, there are hardly any authors who dealt with the structural solutions used during the construction and transformation of the vehicles.

This article can be divided into three segments. In the first segment, I examine the main parts of the four-wheeled horse-drawn wagon based on the available literature. In the second segment, I use this knowledge to identify the main parts of the vehicle in the 15th century primary source material. In the third segment, I aim to find the difference between the structure of the contemporary "civilian" vehicle and its transformed variant.

This article aims to prove only one hypothesis which states that the delivery wagon used at the end of the Middle Ages and in the Early modern period is reconstructable in terms of its main structural elements, and thus, the structure of the war wagon can also be presumed.

Research History

Combined driving has an extensive literature in today's Hungary. In the first segment, I mostly relied on Balázs Pataki's book titled *Magyar népi fogatok [Hungarian folk carriages]* among the relevant works.[2] It was rather written for combined drivers and equestrian traditionalists than for researchers. However, due to its detailed description, with proper literature background, of the horse harnessing methods, the structure of horse carriages and wagons, and the horse tacks, it can be used for comparisons such as the one that is to be found later in this article

Nevertheless, examining the different variants of the delivery vehicles in the 15th century is a harder task. Which wagon and carriage models were typical in each region of the Carpathian Basin is a widely discussed topic within ethnography. However, these discussions are based on collections from the 20th century, thus, the given vehicle model and its structure reflects the 19th and 20th century. Researching the development of the delivery vehicles is hampered by the lack of sources and by the depictions being sporadic. Regarding the Middle Ages, only works

[1] They also perfected the use of the wagon fort, however, this article does not aim to research that.

[2] Pataki 2013.

dealing with economic history touch on the appearance of the wagons as different models can be differentiated in contemporary custom tariffs.

In the order of publication, *Mázsaszekér,*[3] *[Quintal cart]* written by Sándor Domanovszky, is the first work dealing with the medieval models of delivery vehicles within Hungarian history. Its use for studying the structure of the vehicle is limited as the work is dealing with the vehicle as a unit of measurement for custom tariffs. However, he deduces in what way this vehicle used in the international trade continued to exist until the middle of the 20th century which allows us to assume its structure.

Apropos of the study on the medieval civilian vehicles, Jenő Szűcs's work titled *A gabona árforradalma a 13. században*[4] *[The price revolution of the wheat in the 13th century]* also must be mentioned. Szűcs made his research taking Domanovszky's results into account, and one of his important partial results is that he managed to identify two other wagon models besides the quintal-wagon.

Despite its name, László Tarr's *A kocsi története*[5] *[The history of the carriage]* is dealing with the history of the two and three wheeled delivery vehicles used for the transport of people and goods, as well, and does not focus only on the carriage. In many cases, he refers to photos found in ethnographic collections, archaeological findings, and contemporary depictions instead of written sources as there is a lack of them. In case of this article, his work is important due to its depictions of the parts of the medieval wagon models.

Hugo Toman Bohemian historian was the first to deal with the look of the actual hussite war wagon. In his work titled *Husitské válečnictví za doby Žižkovy a Prokopovy*, *[Hussite warfare in the era of* Žižka and Prokop] which is dealing with the hussites' warfare, he writes that the wagons from the 15th century do not differ significantly compared to the wagons of his age (viz. the 19th century).[6]

The merchant wagon was the "civilian" vehicle on which the actual hussite war wagon was based. He claimed this referring to František Mihálek Bartoš' etymology dictionary where the parts of the wagon and their contingent name variants can be found.[7]

Though this article does not aim to prove the Bohemian author's right, I will make the comparison to achieve the proposed object. During the analysis I will not touch on every part depicted on picture 1. In the case of those which I do touch upon, I will mark the name of the parts below picture 1. with the assigned number.

The reconstructability of the delivery vehicles of the given time interval.

The structure of the vehicles used in the agriculture on the turn of the 19th and 20th century can be separated into a lower and an upper part. The lower part, the so-called, running gear is the

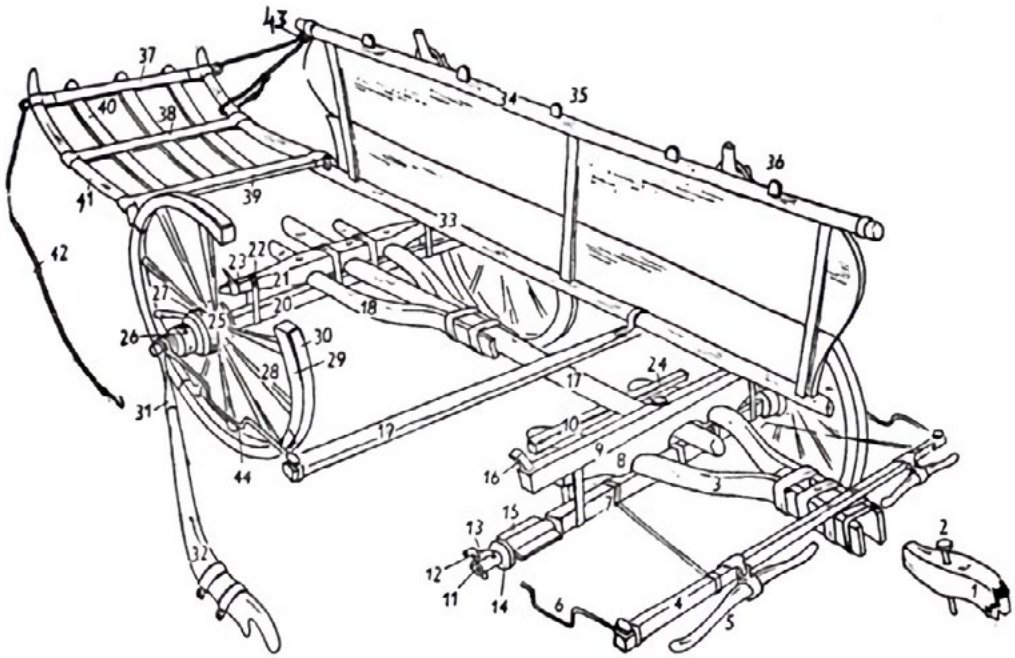
[3] Domanovszky 1917.

[4] Szűcs 1984.

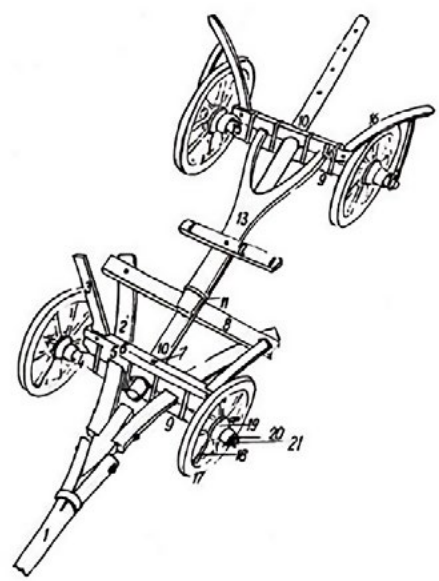
[5] Tarr 1968.

[6] Toman 1898. 198.

[7] Bartoš 1895. 442–446.



Picture 1. *The structure of the horse-drawn wagon*
1) pole 2) pin 3) hounds 4) front crossbar/doubletree 5) singletree 6) front running-board 7) axle-box 8) front bolster 9) upper bolster 10) sway bar 11) axletree and axle-arm 12) wheelpin 13) bottom wheelpin 14) neck 15) wheelend 16) stake 17) reach 18) horizontal rod's wing 19) rear crossbar 20) rear axle-box 21) rear bolster 22) axlehoops 23) stakepin 24) main bolt 25) hub 26) hub band 27) spokering 28) spoke 29) felly 30) rim 31) car-stake's charm 32) car-stake 33) top rails 34) top rails 35) wagonside 36) car-stake's ring 37) stretcher's upper timber 38) stretcher's middle timber 39) stretcher's front timber 40) stretcherrod 41) stretcherside 42) stretcherchain 43) stretcherchain's retainer ring 44.) rear running-board



Picture 2. *The structural components of a military-type wagon (Used by the* K. u. K. Armée, *called:* Országos jármű *)*

supporting framework underneath the vehicle. It can be divided into several parts; the front axletree [Picture 1. – 11)] with two wheels attached; the bolster [Picture 1. – 8), 21)] and the upper bolster [Picture 1. – 9)] with the stake in it. (Picture 1. – 16)] The two short rods between the bolster and the axletree are the hounds (Picture 1. – 3)] which extend backwards and attach to the pole. [Picture 1. – 1)] The pole is attached to the reach [Picture 1. – 17)] with a main bolt [Picture 1. – 24)] in a way that allows the axletree to move in two directions, thus, making it rotatable. The ends of the hounds are secured by the sway bar [Picture 1. – 10)] which lies under the reach and stabilizes the pole.

The rear of the running gear is structured in a similar way. The only difference is that the reach is secured at the rear part. There is no upper bolster, thus, the rear axletree cannot rotate in any directions. The front and the rear parts are connected by the reach for which the hounds are often stabilized by iron bars.

The structure of the wheel is rather complex, as well. It usually constitutes of 6-8 different parts, the so-called fellies, [Picture 1. – 29)] which are held together by iron rims. [Picture 1. – 30)] Spokes [Picture 1. – 28)] are installed in each felly and their other endings meet in the hub. (Picture 1. – 25)] It is important to note that the wheels rotate independently of the axletrees.

The upper part of the vehicle, the one above the reach, is called the wagon bed which is the superstructure of the wagon. In most cases, there were two variants of the bed depending on the design of the cart-ladder. Accordingly, there were ladder and board wagons. In both cases, the cart-ladder is stabilised by two wooden rods called top rails [Picture 1. – 34), 35)] which are secured by side rungs.[8] Both sides attach to the stakes which hold the cart-ladders. In order to be able to support larger weights, the cart-ladders are secured at the necessary spots with ironed car-stakes [Picture 1. – 32)] that are attached to the hub band [Picture 1. – 26)] sticking out of the hub. To protect the delivered goods, a canvas was often tied above the cargo space

Regarding harnessing, crossbars [Picture 1. – 4), 19)] are vital components as the singletrees [Picture 1. – 5)] exert the pulling force of the harnessed workstock through these parts. There are examples for its use in the 15th century, and for the use of the double shaft, as well, which allowed the harnessing of two or three horses.

The Hungarian and Bohemian vehicles built in the 19th and the 20th century show no significant difference in their structure compared to the analysed wagon. There are only two smaller dissimilarities that are worth mentioning. Firstly, Toman did not mention racks in his work. This is the component that closes the sides; one at the front (small rack) and one at the rear (big rack).[9] Though it is true that only the small rack can be seen on the illustration of the etymology dictionary, and as it is written below, this component is completely missing from the medieval depictions.

The second difference may seem more serious; however, the contradiction is easy to solve. Toman calls the part helping the front axle to rotate *oplín* which in Hungarian may refer to both bogie and upper bolster. “The upper bolster lies on the front bolster and is attached to it with a main bolt, thus, allowing the wagon to rotate.”[10] However, Bartoš’ volume clears that the term refers to the upper bolster.[11]

[8] The three wooden components elements between the rails that are depicted but not marked on picture 1.

[9] Pataki 2013. 39.

[10] Pataki 2013. 37.

[11] Bartoš 1895. 444.

It is important to note that the above analysed structure is typical of the military vehicles, as well, more specifically the 1882M military and the 1854M treasury vehicles used in the second part of the 19th century, and it is not solely a characteristic of the four-wheeled horse-drawn „civilian" delivery vehicles.[12] Taking a look at the structural elements of the running gear also shows that their structure is nearly the same as the one analysed above.[13]

The basic civilian vehicle of the period

Inspecting if the delivery vehicles in the 15th century were similarly structured as the one analysed above is a harder task. Ethnographic collections may help as in the middle third of the previous century a late (20th century) descendant of a wagon model widely used in medieval Hungary was documented in them. At the time of the collecting, it was called the *salt delivery wagon* in the vernacular language. This is the so-called "loaded" or the "quintal-wagon", which is a more archaic name, which Sándor Domanovszky studied. In his research, he found that the vehicle first appeared in 13th century custom tariffs, however, regarding its look he only found that this vehicle is a "curru magnus quod vulgo masa dicitur" that is "large vehicle generally referred to as quintal."[14] It was used in the contemporary trade especially in the northern and the north-western parts of the Carpathian Basin.[15] Initially, the quintal-wagon was used to deliver fish between the contemporary Kingdom of Bohemia and the Kingdom of Hungary[16] in the 13th and the 14th century, however, later it was also used for delivering salt. From the 16th century, it is called freight wagon.[17]

It is difficult to be specific regarding the carrying capacity of the vehicle. The "quintal" prefix does not allow for making conclusions as it is not the same as the metric centner that is believed to have Roman origins, which belief, however, was never proved indisputably. Due to the lack of sources, it cannot be determined how much mass it meant in medieval Hungary.[18] Ortutay in his ethnographic lexicon considers the salt delivery wagon to be the descendant of the quintal-wagon whose carrying capacity was 200 wagon salt on mountain terrain and it would have been somewhat more than 250 wagon salt on plain terrain.[19] However, the wagon salt was not a specified unit, thus, it is a deceiving starting point, as well. In fact, this unit of measurement existed, however, it meant a different amount in each region. For example, in the case of the salt donated to Szentgotthárd Abbey, the edge of the salt was 10 [Hungarian] royal inches

[12] The difference between the 1882M and 1854M is that the latter is more robust and designed for driveways, whereas, the 1882M has a lighter structure and can be used on rough roads, as well. Read more: Farkas – Fröhlich 2015.

[13] Farkas – Fröhlich 2015. 252.

[14] Domanovszky 1917. 38.

[15] There is no sign of the use of quintal-wagons in the Hungarian Great Plain. Domanovszky 1917. 54.

[16] Regarding customs policy, several Bohemian features appeared, such as borrowing the Moravian and Bohemian merchants' privileges in 1344, during the reign of Charles I and Louis I.

[17] Its late descendant is the salt delivery or the ironed wagon, which was 8 meters long with the pole.

[18] Custom regulations sometimes contain *mensura cere non pure, quod vulgo masa dicitur* [measurement unit of the unpurified grain which is commonly called quintal], (Weisz 2013) however, it doesn't allow for a more specific definition.

[19] Ortutay 1982. 463.

(26 cm) based on which the volume can easily be calculated (17.576 cm^3) and then the mass of the cube (cca. 38 kg), as well. However, the unit of measurement in this form was used only until the end of the 13th century.[20]

As far as I know, only Jenő Szűcs's results can be used as a point of reference. Using Domanovszky's results, he found that three wagon models were used in medieval Hungary. One with large carrying capacity (*currus honeratus*), the quintal-wagon belonged to this "category",[21] one lighter model (*parvus levus*), and he presumed the existence of an "intercategory".[22] While studying the custom tariffs, Szűcs noticed that the sources regarding the middle 13th century customs of Buda mention wine delivery vehicles that could safely carry three barrels and each barrel had a capacity between 4 and 5.5 hl. From this, he concluded that the loading capacity of this vehicle was around 12 and 16.5 hl (1.2 and 1.6 t). This weight is roughly the same as what was meant by a wagonful of grain, which is 13.43 q (1.3 t).[23]

Presumably, this carrying capacity did not change by the 14th and the 15th century. However, the inconsistency of the units of measurement and the vehicle terminology throughout the regions remained the same. The traffic custom of Bács was created in this period, which also mentions the *quintal-wagon* similarly to the 1326 traffic custom of Bosnya[24] and to the 1327 toll of Hídvég.[25] At the end of the 15th century, the term appears in the town privileges of Kézsmárk (Kežmarok, Slovakia), as well.[26] The extent of the carrying capacity in Máramaros also resembles those that were mentioned earlier. "The smallest quantity [viz. what was put on the wagons – note from me (TD)] exceeded 10 q, and the largest was 27 q."[27]

As I have already referred to it multiple times, no detailed medieval written sources dealing with the structure of the contemporary delivery vehicles have been found yet. However, there are depictions of delivery vehicles used for military purposes (not for melee combat) in the period.[28] With their help and with the terminology found in the written primary source material,[29] it can be verified that there is no major difference between the medieval wagons and the wagons from the 19th century.

In Ulrich Beßnitzer's work titled *Zeughausinventar* there is a depiction of a (four-wheeled) wagon model.[30] The front and the rear wheels are the same size, each made with six spokes and

[20] F. Romhányi. 2016. 281.

[21] An instance of this can be find in 1317 when in the custom of Bács a model of a "loaded wagon which was commonly called quintal" *[curru honerato quod vulgo masa dicitur]* was mentioned. HOkl. 187. Original quotation: Weisz 2013. 457. *currus magnos fummarios vulgo mazás szekér (sic!) vocatos*.

[22] Szűcs 1984. 19.

[23] Addition; the research estimated that the load capacity of the load carrying wagons moving between the mountain passes of Switzerland and Italy to be around the same size, thus, cca. 12.5 q. Szűcs 1984. 19.

[24] „*uno magno curru honeroso, wulgariter masaa dicto"* Zichy I. 277. Original quotation: Weisz 2013. 458.

[25] „*currum, vulgo masaa dicto*" CD VIII/3. Original quotation: Weisz 2013. 200–201. 459.

[26] *„currus magnos fummarios, vulgo mazás szekér vocatos"* Wagner 1774. I. 56.

[27] Draskóczy, 178. o.

[28] There are depictions and drawings, however, the creators did not or barely left any notes or descriptions.

[29] Instances: the wagon bed (szekérderék in Hungarian) is „zekerderekath" in a document written in 1508, and the reach (nyújtórúd in Hungarian) is „nywthorwd" in a document written in 1493. Szamota 1906. 703, 901.

[30] Beßnitzer 1480. 14r.

ironed rims.[31] The car-stakes and another constituent that seems to be a running-board are easy to identify. The running gear cannot be seen; only the pole, the right hound and the crossbar is visible. The depiction is important for two reasons: firstly, the main structural elements are identifiable; secondly, it proves that transforming "civilian" vehicles into military ones was not a new practice. The depiction is an illustration for a list, thus, there is no note belonging to it.[32]

In Philipp Mönch's *Kriegsbuch¸* one can see the running gear of a saddle wagon.[33] [34] Most likely it was used for military purposes (for gun barrel delivering to be more specific), however, it contains structural elements that were also present in the contemporary civilian vehicles. The depiction of the wheels is rather strange; they lack spokes, the depicter makes them look rotund, and the ironings seem to secure the fellies in a peculiar way. At the front of the running gear, one can see the pole, the hounds and the sway bar. The reach located above the front axletree is also visible, however, the structure is confusing here as it cannot be decided to what component the reach between the hounds and above the sway bar, which structure is typical of the modern vehicles, is attached. Though it is tempting for a researcher to identify it as an upper bolster but in the depiction the rear and the front of the running gear are nearly the same, and thus, this component can be seen at rear part as well. As a result, I must presume that it is a bolster. There is a sway bar at the rear part, as well, which is interesting and atypical nowadays.

The analysis of the contemporary imagery from this angle requires further study, however, the two earlier mentioned examples also show that the main structural components of the wagon already developed by not later than the 15th century.

The difference between the structure of the civilian vehicle and the war wagon

In the previous subsection, we learnt how the contemporary "civilian" vehicles looked like based on the written primary source material. Now, we shall research appearance of a vehicle that is transformed for military purposes. The Bohemian authors (and the Hungarians and other foreigners who use their works) often refer to Toman when studying the appearance of the war wagon.[35] However, referring to the contemporary laconic regulations, Toman only claims that the hussite war wagon had no major differences compared to the "civilian" delivery vehicles apart from the massive and large wheels.[36]

[31] The manufacturing of the rims in the examined period is still in question. To answer, further research is required. According to a Czeh work, the rim was firstly mentioned in 1628. Visinger 2013. 22.

[32] The first point of the list of things to be held in store were *large and well-built wagons.* [drey(!) gross wolgerüsst Wagen] Ibidem.

[33] A wagon used for carrying firearm barrels. The structure of its running gear is nearly the same as the running gear of a civilian vehicle. Read more: Domokos 1997. 678., 696., 698.

[34] Mönch 1495. 13r.

[35] Example: Durdík 1952. 97., B. Szabó 2014. 459.

[36] Toman 1898. 197–198.

In the 15th century, multiple states regulated which vehicles were adequate for military use and how they were to be equipped.[37] It is important to note that there was a difference between a war wagon and a war wagon in the discussed period. The *streitwagen* mentioned in German sources that are written in the first third of the century is a delivery vehicle. The so-called *Silesian orders* of 1429 uses the same term and one of the passages order the use of strong wagons that have high-laddered sides and have a board fixed between and above the sides.[38] *The provision of the Teutonic Order* of 1433 mentions "a large, strong and ironed wagon with large wheels, which is wider than the other wagons"[39].

Though both texts use the *Streitwagen,* their use is different to that of the hussites' war wagon. We learn about the rebels' vehicle from the former condottiere Václav „Vlček" z Čenova's work in which he explains how the actual war wagon, the so-called *outer wagon [krajní vůz]* is supposed to look. He specified that it has to have a "…rampart 'with pitchforks'(?) and holes *[taras s berlú a s děrú]* and a board *[prkno]* has to hang from the bottom of each so that the people and the horses are protected."[40] The board underneath the wagon, which stops the enemy from crawling in, is mentioned in another work, as well. Hájek z Hodětína says that „...there shall be a board and a chain *[prkno a řetěz]* under the wagon."[41]

I believe it is safe to say that the vehicle used in battles by the hussites is a variant of the contemporary high-carrying capacity delivery wagon, but it is more massive, it is fortified with ironings and has larger wheels. It is equipped with boarded cart-ladder with one side having an extra board with battlements and there was another board attached between the two axletrees vertically to the bottom of the wagon. It is the utility of the contemporary small arms that dominated the design of the war wagon.[42]

Summary

This article aimed to answer if the delivery vehicle of the Middle Ages is reconstructable, and to find the differences between the "civilian" vehicle and the war wagon. I divided the article into three segments regarding their content. After having studied the main structural elements of a traditional horse-drawn wagon based on the literature in the first segment, I aimed to identify these elements in the 15th century primary source material. In the third segment, I attempted to find the difference between the "civilian" and the "military" vehicles of the period.

I was working with one hypothesis: I presumed that the delivery vehicle used at the end of the Middle Ages and at the beginning of the Early modern period can be reconstructed which

[37] In this article I do not deal with the equipment (apart from the firearms) and only focus on the instructions regarding the structure.

[38] *„…starker wagen soll sin in fassonwise mit hohen leitern (...) zwischen den leitern und under den leidern mit hagenden brettern an starken wider oder ketten."* Source: Toman 1898. 404.

[39] „einen guten, starken, grossen fuhrweyn mit hohen raden, die beslagen sin, und dass der etwas weiter sei, dann andere weyen." Source: Toman 1898. 421.

[40] In: Svejkovský 1952. 52.

[41] In: Svejkovský 1952. 41–42. Vlček added that a wagon should have two guns, two pounds of gun powder, stone bullets, arrows, iron-cramps and iron flails. In Svejkovský 1952. 52–53.

[42] The vehicle in Vlček's work is interestingly not a delivery vehicle as it helped the crew of the wagon in completing their task and achieve the proposed object. Read more: Tóth 2017. 240.

allows for the researcher to figure out the structure of the war wagon. I believe the hypothesis was proven to be true: most of the parts of the running gear and the superstructure (bolster, axletrees, reach, crossbar, pole, stake, etc.) can be found in the researched period. The depictions used for the research (Beßnitzer's *Zeughausinventar* and Mönch's *Kriegsbuch*) seems to prove this undoubtedly, however, further research is required for confirmation. Regarding the major structural elements, there were few differences between the base vehicle and its variant transformed for military use. As the German instructions and the two Bohemian authors', *Vlček's* and *Hájek's* notes of embattle show, the hussites used some additional elements that aimed to defend the people on the vehicle. Therefore, as Hugo Toman also pointed it out, the vehicles used to create the war wagon are indeed similar to the vehicles built on the turn of the 19th and the 20th century.

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